

# Numeracy Foundation Workbook 2ed.

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### Numeracy Foundation: Workbook 2ed.

By Michael Carolan

**DELIVER Educational Consulting (978-1-925172-41-6)**

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## Attention: VCAL and Applied Learning, Careers, Pathways, and Work Education Co-ordinators and teachers.

### New editions of VCAL Work Related Skills and Personal Development Skills titles for 2020 and beyond.

All new releases for 2020 now available, more details on the next page.

- ✓ PDS - Foundation 2ed, PDS Intermediate 4ed, and PDS Senior 3ed.
- ✓ WRS - Foundation 2ed, WRS Intermediate 4ed, and WRS Senior 3ed.
- ✓ PDS Activity Planner - Foundation, PDS Activity & Project Planner - Intermediate, and PDS Project Planner - Senior.

In 2019 new editions of VCAL Numeracy and Literacy titles were released.

- ✓ Numeracy - Foundation 2ed, Numeracy Intermediate 2ed (units 1&2), Numeracy Senior 2ed (units 1&2).
- ✓ Literacy - Foundation 2ed, Literacy Intermediate 4ed, Literacy Senior 2ed.

In 2019 new editions of VCE Industry and Enterprise for 2019 were released.

- ✓ I&E Unit 1: Workplace Participation 4ed, I&E Units 1&2: Towards an Enterprising You 5ed, and I&E Units 3&4: Towards an Enterprising Australia 4ed.

Look for more information about these new resources, and others, online or through the emails.

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For VCAL, Career Pathways, Applied Learning and Work Education/Work Studies.

All resources below are available as printed books or as master e-versions.

- ☐ Career Pathways 2ed
- ☐ Work Placement Journal & Work Experience Journal
- ☐ Personal Development Activity Planner: Foundation; Personal Development Activity & Project Planner: Intermediate; and Personal Development Project Planner: Senior
- ☐ Community Services Foundation & Intermediate
- ☐ Retail Foundation & Retail Intermediate

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The full suite of WACE Career and Enterprise Resources (each with choice of e-version master):

- ☐ Career and Enterprise: Foundation 11
- ☐ Career and Enterprise: Foundation 12
- ☐ Career and Enterprise: CAE - General 11
- ☐ Career and Enterprise: CAE - General 12/ATAR11
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#### Current resource list: 2020 (\* = new)

##### VCAL and Applied Learning (Master sets also available)

- ⇒ \*Personal Development - Foundation Workbook/text 2ed & Activities booklet (2020)
- ⇒ \*Personal Development - Intermediate 4ed Workbook/text & Activities booklet (2020)
- ⇒ \*Personal Development- Senior 4ed Workbook/text & Activities booklet (2020)
- ⇒ \*Work Related Skills - Foundation Workbook/text 2ed & Activities booklet (2020)
- ⇒ \*Work Related Skills - Intermediate 4ed Workbook/text & Activities booklet (2020)
- ⇒ \*Work Related Skills - Senior 3ed Workbook/text & Activities booklet (2020)
- ⇒ Literacy - Foundation Workbook/text 2ed & Activities skills booklet. *Lit-Foundation also available as an e-version (2019)*
- ⇒ Literacy - Intermediate Workbook/text 4ed & Activities skills booklet. *Lit-Intermediate also available as an e-version (2019)*
- ⇒ Literacy - Senior Workbook/text 2ed & Activities skills booklet *Lit-Senior also available as an e-version (2019)*
- ⇒ Numeracy - Foundation Workbook/text 2ed & Skills Development Booklet (2019)
- ⇒ Numeracy - Intermediate Workbook/text 2ed (for units 1&2) & Activities booklet (2019)
- ⇒ Numeracy - Senior Workbook/text 2ed (for units 1&2)

& Activities booklet (2019)

##### Industry and Enterprise

- > I&E Unit 1: Workplace Participation 4ed (& e-version) (2019)
- > I&E 1&2: Towards an Enterprising You 5ed (2019)
- > I&E 3&4: Towards an Enterprising Australia 4ed (2019)

##### Career pathways, work education and personal development (PDF e-versions also available)

- > Career Pathways 2ed
- > Work Experience Journal
- > Work Placement Journal
- > \*Personal Development Activity Planner: Foundation (2020)
- > \*Personal Development Activity & Project Planner: Intermediate (2020)
- > \*Personal Development Project Planner: Senior (2020)

##### Industry-specific resources (PDF e-versions also available)

- > Community Services Foundation
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- > Retail Foundation
- > Retail Intermediate

##### WACE Career and Enterprise (PDF e-versions also available)

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- > Career and Enterprise ATAR 12
- > Career and Enterprise Foundation 12
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<b>WACE: Career and Enterprise</b>	<b>Printed text</b>	<b>e-version master</b>	<b>Total</b>
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Career and Enterprise General 11 (2016)	_____ @ \$55	_____ @ \$660	_____
Career and Enterprise General 12/ATAR 11 (2016)	_____ @ \$59.50	_____ @ \$660	_____
Career and Enterprise ATAR 12 (Jan 2017)	_____ @ \$59.50	_____ @ \$770	_____

<b>Careers, Work Education &amp; Personal Development</b>	<b>Printed text</b>	<b>e-version master</b>	<b>Total</b>
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Work Experience Journal 2015	_____ @ \$22	_____ @ \$165	_____
Work Placement Journal 2015	_____ @ \$29.50	_____ @ \$220	_____
Personal Development Activity Planner: Foundation 2020	_____ @ \$29.50	_____ @ \$220	_____
Personal Development Activity/Project Planner: Intermediate 2020	_____ @ \$29.50	_____ @ \$220	_____
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I&E Units 1&2: Towards an Enterprising You 5ed. 2019	_____ @ \$49.50	na	_____
I&E Units 3&4: Towards an Enterprising Australia 4ed. 2019	_____ @ \$66	na	_____

<b>VCAL/ Applied Learning Resource Sets</b>		<b>Printed text/workbook</b>	<b>Printed activities book</b>	<b>Master text/workbook</b>	<b>Master activities book</b>	<b>Combined master sets</b>	<b>or license with master e-version</b>
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Numeracy Foundation 2ed. 2019		_____ @ \$49.50	_____ @ \$27.50	_____ @ \$275	_____ @ \$99	or _____ @ \$330	na
Numeracy Intermediate 2ed. 2019		_____ @ \$49.50	_____ @ \$27.50	_____ @ \$275	_____ @ \$99	or _____ @ \$330	na
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<b>*WRS Foundation 2ed.</b> (Updated 2020)		_____ @ \$42.50	_____ @ \$27.50	_____ @ \$275	_____ @ \$99	or _____ @ \$330	na
<b>*WRS Intermediate 4ed.</b> (Updated 2020)		_____ @ \$42.50	_____ @ \$27.50	_____ @ \$275	_____ @ \$99	or _____ @ \$330	na
<b>*WRS Senior 3ed.</b> (Updated 2020)		_____ @ \$42.50	_____ @ \$27.50	_____ @ \$275	_____ @ \$99	or _____ @ \$330	na
<b>Totals</b>		_____	_____	_____	_____	_____	_____

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## Advice to students

- ⇒ Use this book to gain and develop skills to assist your numeracy development.
- ⇒ Complete the tasks in the spaces and pages provided. Use the self-reflections as part of your self-evaluation.
- ⇒ You will also need to maintain your own workbook to complete some tasks, as well as others given to you by your teacher.
- ⇒ You may need to collect and keep an evidence portfolio with copies of resources, handouts and evidence of you applying numeracy skills.
- ⇒ You should also use your *Numeracy Skills Development Booklet* to help build skills for various topics throughout the year. Look for the page icon that shows the related topic in that booklet.
- ⇒ You might be directed to complete some or even all of the assessment tasks listed opposite.
- ⇒ Throughout this workbook there are a number of quick-reference *Numeracy Superskills*. Use the table opposite to locate these.
- ⇒ When dealing with problems related to visual numeracy it is a good idea to draw a diagram.
- ⇒ Remember that your development of numeracy skills will provide you with the tools for a more successful personal, social and work life. So best wishes with your numerical journey.

Projects and activities I am required to participate in for Numeracy Foundation are...

## Assessment Tasks

AT1	Count Up and Count Down.....	26-27
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## Numeracy Superskills

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# A World of Numbers

# 1

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Activities 1: A World of Numbers	p.	Due date/Done?	Comment
1.02A <b>A world of numbers</b>	3	<input type="text"/>	<input type="text"/>
1.03B <b>Numbers as pictures</b>	4	<input type="text"/>	<input type="text"/>
1.04C <b>My world of numbers</b>	5	<input type="text"/>	<input type="text"/>
1.05A <b>Numbers at home</b>	6	<input type="text"/>	<input type="text"/>
1.06B <b>Numbers at work</b>	7	<input type="text"/>	<input type="text"/>
1.08C <b>Numeracy skills in a home</b>	9	<input type="text"/>	<input type="text"/>
1.10D <b>Applied numeracy skills</b>	11	<input type="text"/>	<input type="text"/>
1.12E <b>Applied numeracy for work</b>	13	<input type="text"/>	<input type="text"/>
1.16A <b>Addition</b>	7	<input type="text"/>	<input type="text"/>
1.18A <b>Subtraction</b>	19	<input type="text"/>	<input type="text"/>
1.19A <b>Addition &amp; subtraction</b>	20	<input type="text"/>	<input type="text"/>
1.20B <b>Testing time</b>	21	<input type="text"/>	<input type="text"/>
1.22A <b>Fractions</b>	23	<input type="text"/>	<input type="text"/>
1.22B <b>Decimals and fractions</b>	23	<input type="text"/>	<input type="text"/>
1.24C <b>Calculations: Fractions &amp; decimals</b>	25	<input type="text"/>	<input type="text"/>
AT1 <b>Count Up &amp; Count Down</b>	26-27	<input type="text"/>	<input type="text"/>
1.27 <b>Self-Reflection</b>	28	<input type="text"/>	<input type="text"/>

Comments:

## 1.01 Introduction

### Numeracy 101

Welcome to your studies of Foundation Numeracy so let's get started.

It's a world of numbers out there.

- ⇒ Numbers are used for your time and for your income.
- ⇒ Numbers are used for your shopping and for your personal budget.
- ⇒ Numbers are used for your health and for your personal wellbeing.
- ⇒ Numbers are used for meal preparation and cooking.
- ⇒ Numbers are used for sporting, recreational and social activities.
- ⇒ Numbers are used for measuring, design, practical, technical and trade tasks.
- ⇒ Numbers are used to collect, gather and analyse data and numerical information.
- ⇒ Numbers govern how people work, live and play!

So you have to build your numerical skills in order to improve your personal, social, educational and working lives. Let's do it!



**Numerical skills are required for all occupations. Workers in skilled trades need well developed practical and technical numeracy.**

Image: monkeybusinessimages/iStock/Thinkstock

# Preview Sample: Do Not Copy

### Numerical language

One of the key skills related to numeracy is being able to use appropriate numerical words, terms and descriptive phrases.

As a class discuss when each of these might be used.

- ⇒ bigger than (more or greater than)
- ⇒ smaller than (less than or fewer)
- ⇒ increasing (rising)
- ⇒ decreasing (falling)
- ⇒ half as much (halve)
- ⇒ twice as much (double)
- ⇒ more expensive (dearer)
- ⇒ less expensive (cheaper)
- ⇒ longer (further)
- ⇒ shorter (closer)

Image: hilch/iStock/Thinkstock



## A world of numbers

A

Match each of these numbers to the correct numerical statement. Discuss these as a class by talking about what these numbers show about the world.

- |   |                                      |  |
|---|--------------------------------------|--|
| <input type="checkbox"/> 2.6 people (in 2016) | <input type="checkbox"/> 82.24 years | <input type="checkbox"/> \$802,000             |
| <input type="checkbox"/> 14 hours 20 minutes  | <input type="checkbox"/> 88%         | <input type="checkbox"/> \$882,000             |
| <input type="checkbox"/> 30%                  | <input type="checkbox"/> 100°C       | <input type="checkbox"/> 25 million (approx.)  |
| <input type="checkbox"/> 37°C (approx.)       | <input type="checkbox"/> \$1,585     | <input type="checkbox"/> 1.4 billion (approx.) |
| <input type="checkbox"/> 71%                  | <input type="checkbox"/> \$419,500   | <input type="checkbox"/> 7.6 billion (approx.) |

**The population of Australia in 2018 is:**

\_\_\_\_\_

**The population of the World in 2018 is:**

\_\_\_\_\_

**The population of India in 2018 is:**

\_\_\_\_\_

**Life expectancy for a person born in 2000 in Australia is:**

\_\_\_\_\_

**The average household size in Australia is:**

\_\_\_\_\_

**The average weekly wage in Australia as at June 2018 is:**

\_\_\_\_\_

**The average price of a house in Melbourne as at June 2018 is:**

\_\_\_\_\_

**The average price of a house in regional Victoria as at June 2018 is:**

\_\_\_\_\_

**The average price of a house in Australia as at June 2018 is:**

\_\_\_\_\_

**The proportion of workers under 25 in the retail trade industry is:**

\_\_\_\_\_

**The proportion of female workers in the education and training industry is:**

\_\_\_\_\_

**The proportion of male workers in the construction industry is?**

\_\_\_\_\_

**The flight time from Melbourne to LA is:**

\_\_\_\_\_

**The temperature at which water boils is:**

\_\_\_\_\_

**A healthy adult body temperature is:**

\_\_\_\_\_

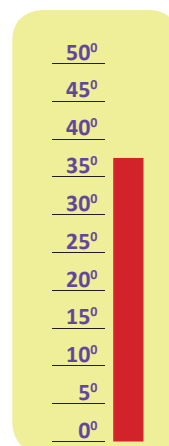
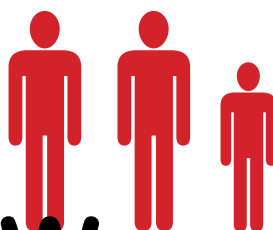
**Preview  
Sample:  
Do Not  
Copy**

## 1.03 Introduction

### B Numbers as pictures

Sometimes numbers can be represented by pictures, graphs, pictograms and other visual images.

1. Each of these images refers to one of the numbers from activity, 1.02A.  
Match the images with the correct number.
2. Try to create an image of your own to match one of the other numbers.



Preview  
Sample:  
Do Not  
Copy

*Image: selensergen/  
iStock/Thinkstock*

## My world of numbers C



Consider each of these aspects of your life. Add 2 more of your own.

1. For each one explain a numerical concept relating to that aspect.
2. Outline a specific numeracy example of that aspect related to you.

Numbers in my world	Explanation	Example
e.g. My health & wellbeing	<i>It is vital that I get enough sleep every night otherwise I get very grumpy.</i>	<i>I need to get 8-9 hours sleep per night which is about 60 hours per week.</i>
e.g. My social life	<i>I love to sing, dance and perform which requires me following timing cues.</i>	<i>I have to count the beats as 8,16,24 &amp; 32 so I know when to start dancing my routines.</i>
a. My time		
b. My shopping		
c. My money/ budget		
d. My health & wellbeing		
e. My meals		
f. My sport and recreation		
g. My social life		
h. My measuring		
i. My design (creative tasks)		
j. My practical/ technical tasks		
k. My work tasks		
l. Other		
m. Other		

**Preview  
Sample:  
Do Not  
Copy**



## 1.05 Numeracy Skills

### Personal numeracy

Numbers play an important role in our personal and home lives. Families often have to do a lot of counting (addition) in order to:

- ⇒ plan how they live
  - ⇒ manage their family
  - ⇒ allocate the space in their homes
  - ⇒ run a household budget
  - ⇒ organise transport
  - ⇒ socialise with family members and friends
  - ⇒ participate in sport, recreation and leisure,
- as well as many other day-to-day tasks and activities that are an essential part of their lives.

**"32 squares in the block. I really should stop at 4! Really...!"**



Image:  
AlbinaTplyashina/  
iStock/Thinkstock

### A Numbers at home

For each of these numbers (and approximated values) write an example of how it relates to your family (personal) life. For example:

- ⇒ 2 = We have 2 pets, Rufus the dog and Spike the cat.
- ⇒ 8 = The number of screens in our house - 2 TVs, 3 laptops, 3 phones & 1 iPad.
- ⇒ 10,000 (approx.) = The amount of \$ I need to save to buy a car.

1		100 (approx.)	
2		100 (approx.)	
3		1,000 (approx.)	
4		10,000 (approx.)	
5		100,000 (approx.)	
6		7:30am	
7		7:30pm	
8		45 minutes	
9		21°C	
10		10 metres	
20		>3km	

Preview  
Sample:  
Do Not  
Copy

## Work-related numeracy

Numbers play an important role in the everyday working lives of employees, business owners and customers. Workplace stakeholders need to:

- ⇒ estimate and plan costs and meet budgets
- ⇒ collect sales revenue and fees from customers and clients
- ⇒ manage staff rosters, opening hours and timetables
- ⇒ pay wages and salaries
- ⇒ pay GST, income and company tax
- ⇒ plan and organise production and service schedules.

They also have to do many other day-to-day work tasks and activities that are an essential part of working and the commercial world.

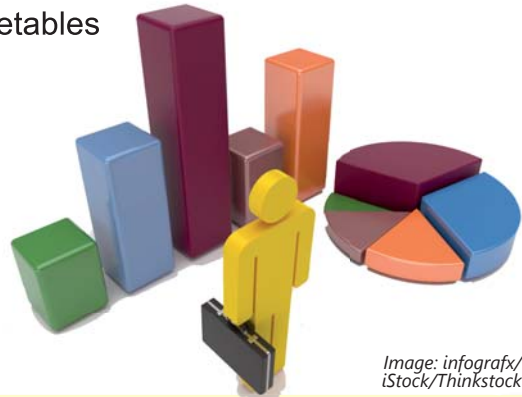


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## Preview

## Numbers at work

B

For each of these numbers (and approximates), outline an example of how it relates to your work experiences and/or the world of work. For example:

- ⇒ 4 = *The number of hours of a casual shift at my work.*
- ⇒ 50 (approx.) = *The number of workers employed at my workplace.*
- ⇒ 10,000 (approx.) = *The amount of \$ needed to install a new phone system.*

## Sample:

**Do Not  
Copy**

1	50 (approx.)	
2	100 (approx.)	
3	1,000 (approx.)	
4	10,000 (approx.)	
5	100,000 (approx.)	
6	8:30am	
7	5:30pm	
8	60 minutes	
9	1 metre	
10	18kg	
20	>3km	

## 1.07 Numeracy Skills

### Working it out

There are many skills associated with numeracy and these go well beyond simply adding, subtracting, multiplying and dividing.

Just like any skill, people have varied levels of numerical capability. And just like any skill, numerical skills can be improved and developed.

Some of you will be at a developing stage of your numeracy. That's fine. The aim of this course is for you to build, improve and develop your skills.

Others of you might have more advanced numeracy skills at this stage of your development. Through this course you will consolidate what you already know, and then develop and apply numerical concepts to broader situations.

The aim is to assist all of you to improve your ability to work with numbers. This will help make you more confident in your day-to-day lives.

Hopefully, this will also make you more employable in the longer term.



**"I improved my numeracy skills in the classroom by learning how to apply them to the workplace. And when I did work placement this made me a better worker!"**

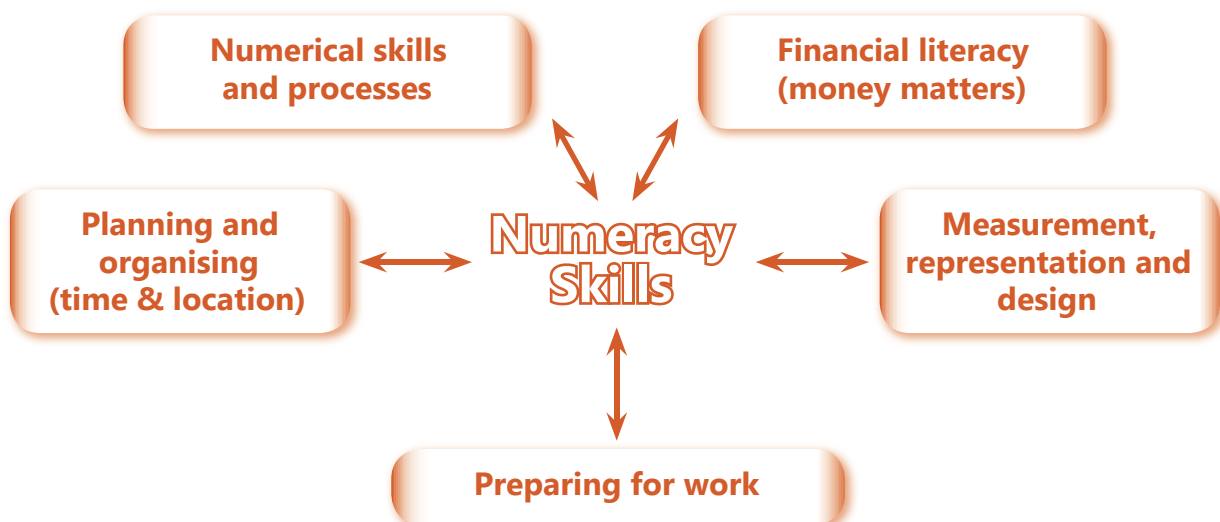
Image: Jochen Sand/ Photodisc/Thinkstock

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This unit is focused on you developing the types of numeracy skills that will enable you to start to work things out for yourself. The main skills or topic areas (listed in the diagram below) are explored over the next few pages. Your teacher will discuss these with you. To demonstrate required numeracy skills this year you will need to:

- ⇒ build your mathematical knowledge
- ⇒ learn and apply maths techniques
- ⇒ learn the language of numeracy and maths
- ⇒ learn how to interpret information.

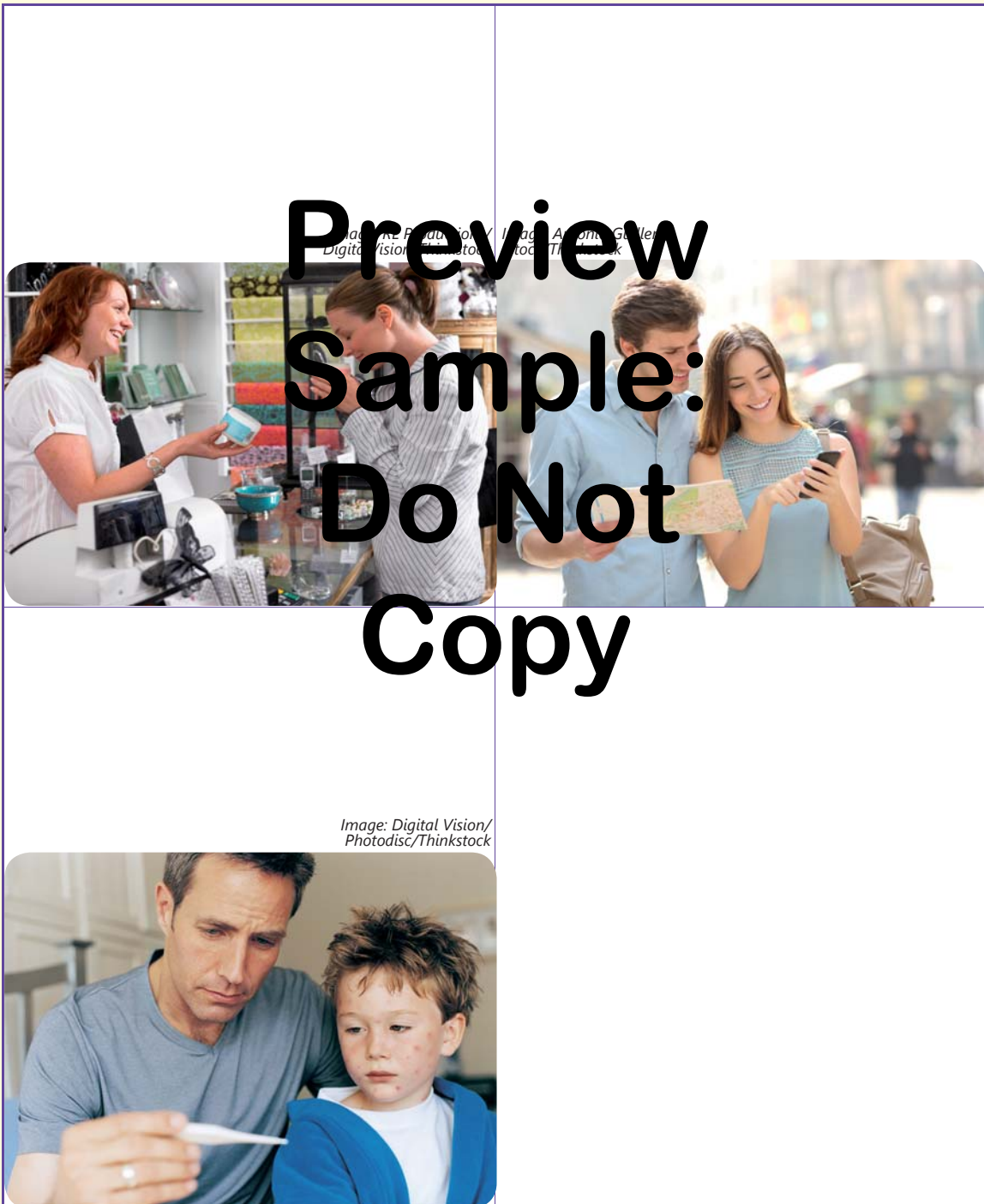


Numeracy skills in action C

Look at these images of people from their personal, social and working lives.

1. For each image briefly describe what the people are doing. Add one more image of your own.
2. For each image discuss the type of numeracy skill the people might be using (from those 5 skills in the diagram on p.8).

*Extension:* For each image identify another numeracy skill and briefly explain how these 2 skills are used together.



## 1.09 Numeracy Skills

### Numerical skills and processes

Involves these skills and more.

- ⇒ Adding, subtracting, multiplying and dividing numbers.
- ⇒ Calculating with fractions, decimals and percentages.
- ⇒ Calculating, estimating and rounding using numbers.
- ⇒ Understanding spoken and written numerical information.
- ⇒ Converting and comparing numbers.
- ⇒ Interpreting numerical information.
- ⇒ Collecting, organising and interpreting information.
- ⇒ Using tables and graphs.
- ⇒ Interpreting tables and graphs.
- ⇒ Describing trends.
- ⇒ Comparing information.
- ⇒ Using data to make decisions.



### Financial (money)

Involves these skills and more.

- ⇒ Estimating costs and prices.
- ⇒ Calculating costs and prices.
- ⇒ Comparing prices of products.
- ⇒ Estimating and calculating change.
- ⇒ Counting and making change.
- ⇒ Calculating discounts.
- ⇒ Interpreting financial language.
- ⇒ Interpreting financial documents.
- ⇒ Understanding pay slips.
- ⇒ Developing a budget.
- ⇒ Understanding banking products.
- ⇒ Comparing interest rates on loans.
- ⇒ Keeping our money safe and secure.



### Measurement, representation and design

Involves these skills and more.

- ⇒ Using the metric system.
- ⇒ Converting units of measurement.
- ⇒ Making measurement estimates.
- ⇒ Using measuring instruments.
- ⇒ Estimating and comparing height, width and length.
- ⇒ Estimating and comparing area, volume and capacity.
- ⇒ Identifying and naming different shapes.
- ⇒ Working with 2 and 3 dimensional shapes & objects.
- ⇒ Understanding and creating plans and diagrams.
- ⇒ Representing objects in plans and diagrams.
- ⇒ Constructing objects and models.



### Planning and organising (time & location)

Involves these skills and more.

- ⇒ Estimating, planning, and organising time.
- ⇒ Reading different times.
- ⇒ Meeting deadlines.
- ⇒ Investigating places, maps and distances.
- ⇒ Reading, using and making maps.
- ⇒ Estimating distance and travel times.
- ⇒ Giving and following directions.
- ⇒ Planning a travel route.
- ⇒ Interpreting scales and symbols.
- ⇒ Finding landmarks.



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Applied numeracy skills D

1. Describe an example from your personal, social, work, or any other situation, whereby you would need to apply each of these skills.
2. Give yourself a rating from 1 (lowest) to 5 (highest) of your current skill level in each situation.

Numerical skills and processes: When might I need to:	/My rating
...add and/or subtract numbers?	<input type="text"/>
...multiply and/or divide numbers?	<input type="text"/>
...work with fractions, decimals or percentages?	<input type="text"/>
...understand written and spoken numerical information?	<input type="text"/>
...collect, organise and interpret information?	<input type="text"/>
...interpret or create a table?	<input type="text"/>
...interpret or draw a graph?	<input type="text"/>
Your choice:	<input type="text"/>

Financial (money) skills: When might I need to:	/My rating
...estimate prices?	<input type="text"/>
...calculate prices?	<input type="text"/>
...compare prices?	<input type="text"/>
...estimate or calculate change?	<input type="text"/>
...make exact change?	<input type="text"/>
...understand financial documents?	<input type="text"/>
...develop a budget?	<input type="text"/>
Your choice:	<input type="text"/>

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## 1.11 Numeracy Skills

Planning and organising (time & location) skills: When might I need to:		/My rating
...read and understand different times?		<input type="checkbox"/>
...estimate and plan time?		<input type="checkbox"/>
...meet deadlines?		<input type="checkbox"/>
...organise timelines?		<input type="checkbox"/>
...read maps and interpret map symbols?		<input type="checkbox"/>
...make maps and use map symbols?		<input type="checkbox"/>
...plan a travel route?		<input type="checkbox"/>
...estimate travel times?		<input type="checkbox"/>
Your choice:		<input type="checkbox"/>

Measurement, representation and design skills: When might I need to:		/My rating
...use measuring units and devices?		<input type="checkbox"/>
...estimate and measure size?		<input type="checkbox"/>
...estimate and measure length or distance?		<input type="checkbox"/>
...measure length, perimeter or distance?		<input type="checkbox"/>
...estimate and measure area?		<input type="checkbox"/>
...estimate and measure volume and capacity?		<input type="checkbox"/>
...recognise and name 2D shapes?		<input type="checkbox"/>
...recognise and name 3D objects?		<input type="checkbox"/>
...read and/or draw plans and diagrams?		<input type="checkbox"/>
Your choice:		<input type="checkbox"/>

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### Numeracy for Work

Work and me: These skills & others.

- ⇒ Apply for a tax file number.
- ⇒ Understand and follow a roster.
- ⇒ Fill out a timesheet.
- ⇒ Check my timesheet and pay.
- ⇒ Open a bank account.
- ⇒ Use a bank account.
- ⇒ Interpret a bank statement.
- ⇒ Find wage rates.
- ⇒ Compare wage rates.
- ⇒ Calculate wage amounts.
- ⇒ Find wage rates.



Me at work. These skills & others.

- ⇒ Make work time estimates.
- ⇒ Make work materials estimates.
- ⇒ Count stock and value stock.
- ⇒ Complete customer orders.
- ⇒ Process financial transactions.
- ⇒ Use transaction technologies.
- ⇒ Interpret a spreadsheet.
- ⇒ Update a customer database.
- ⇒ Use work-related forms.
- ⇒ Use tables and graphs.
- ⇒ Work within a budget.

## Preview

Apply numeracy for work

E

Describe an example from work-related situations when you might need to apply each of these skills. Assign yourself a rating from 1 to 5.

## Sample:

Numerical work skills: When might I need to:		/My rating
...apply for a tax file number?		<input type="text"/>
...understand and follow a roster?		<input type="text"/>
...fill out a timesheet?		<input type="text"/>
...research and find wage rates?		<input type="text"/>
...interpret a bank statement?		<input type="text"/>
...make work time estimates?		<input type="text"/>
...complete customer orders?		<input type="text"/>
...use work-related forms?		<input type="text"/>
...process financial transactions?		<input type="text"/>
Your choice:		<input type="text"/>

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## 1.13 Calculating - Addition

### Calculating

Calculating crosses over with, and is vital to, every other numeracy skill. You need to develop a suite of basic numerical calculating skills that you can use in personal and work-related situations.

Some of the basic functions that you are already likely to know include **addition**, **subtraction**, **multiplication** and **division**. You might also be able to calculate **percentages** and **fractions**, as well as being able to **measure** temperature, area and distance.

### Calculating

- ⇒ Numerical calculating involves mastering sets of skills involved in performing calculations involving numbers (of course!).
- ⇒ These include calculation functions such as addition, subtraction, multiplication and division - through to more sophisticated methods.
- ⇒ Numerical calculation is important for personal activities such as doing the shopping.
- ⇒ It is also important for work-related activities such as processing orders when working in a retail store.

### Basic calculations

Basic calculations are those calculations that you should generally be able to do in **your head**. At times, for more complex problems, you might do these calculations **on paper**.

In some cases you might need to use a **calculator** for these. However, it is not good to just rely on using a calculator to do all calculations. You really need to develop skills to do some calculations in your head, as well as on paper, and then be able to check these by using a calculator.

Sometimes you have to think on your feet, so being able to do calculations in your head is important. For example, doing the shopping with only \$20 for the entire spend!

Sometimes you have to do calculations on paper. For example, if you are working in a shop and the cash register breaks down and you have to tally up orders manually.

And of course you always need to be able to work out if the answer the calculator gives you is correct. For example, putting an extra zero at the end of a big number can turn 1,000 into 10,000 very quickly. And that can have disastrous consequences!

It is important to remember that a calculator will only do calculations based on the numbers you enter. People can make errors when **entering data**. You need to be confident that the calculator's answer is correct. So that's why you also have to be able to predict and estimate using your own in-built calculator - which is your brain!



Preview  
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## Addition

Addition is the adding of amounts or numbers to get a **total** or a **sum**. Essentially addition involves **counting**.

You might have performed addition problems by one or more of these methods explained on pp.15-16.

You should know how to use each method effectively, so let's do a recap of these.

## Physical counting

This involves counting the number of items based on pictures or images; or even counting physical items, objects and people.

For example, a teacher will do a head count when you are getting on a bus as part of an excursion. Or you might count the number of fish fingers on each plate as part of a meal for four. You might even count the number of beats while waiting to start your dance moves.

## Addition (plus or sum or adding) ...shown by a '+' sign

Addition can involve combining two numbers into a **sum**. e.g.

$$2 + 2 = 4$$

$$4 + 19 = 23$$

$$1/2 + 1/2 = 1$$

$$\$75 + \$24.95 = \$99.95$$

Addition also involves combining more than two numbers. e.g.

$$1 + 2 + 1 = 4$$

$$17 + 20 + 13 = 50$$

$$1/4 + 1/4 + 1/4 = 3/4$$

$$12c + 87c + \$1 = \$1.99$$

$$9 + 11 + 55 + 25 = ?$$

NUM  
SUPER  
SKILLS

# Preview Sample: Do Not Copy

## Addition: Using counting



e.g.  $4 + 3 + 5$   
Total = 12



Image: Iryna Kurhan/  
Hemera/Thinkstock



## 1.15 Calculating - Addition

### Number lines

You can make use of a number line to add up a total amount. A number line allows you to visually mark out different amounts to 'see' a total.

When you are using rulers to measure distance, and thermometers to measure temperature, you are actually using a number line.

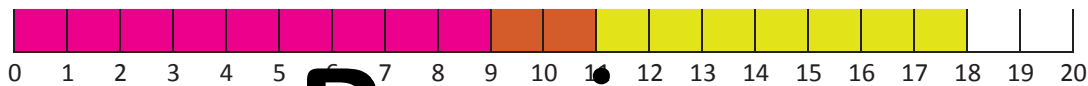
For example, a tailor or dressmaker may use a soft measuring tape to work out the total amount of fabric they may need.



Image: Elnur / Depositphotos.com

### Addition: Using a number line

Calculate  $= 9 + 2 + 7$



**Preview**

### Mathematical sums

You can use methods for setting out mathematical sums as part of addition, especially when the numbers become larger and more complex.

In order to do this you set out the problem making sure that the numbers are right aligned (see below).

Doing this ensures that you have numbers of the same place value (ones, tens, hundreds and so on) underneath each other.

Then you use an addition method to work out the sum. Your teacher will show you a preferred addition method and some of you will have already mastered the common methods for doing this. But for now we'll use this method shown below.

**Tip: Always perform any calculations in brackets first!**

### Addition: Using calculations

e.g. Calculate the total of:  $17 + 42$

$$\begin{array}{r} 17 \\ + 42 \\ \hline 59 \end{array}$$

e.g. Calculate the total of:  $9 + 46 + 154$

$$\begin{array}{r} \phantom{0}9 \\ \phantom{00}46 \\ + 154 \\ \hline 209 \end{array}$$

e.g. Calculate the total of:  $23 + 8 + 1016 + 115$

$$\begin{array}{r} \phantom{00}23 \\ \phantom{000}8 \\ 1016 \\ + 115 \\ \hline 1162 \end{array}$$

## Applied addition

People need to use addition in many personal and work-related situations. Some common situations are listed here. But can you think of some more?

### Personal

- ⇒ Calculating how much food to cook and serve for family meals.
- ⇒ Adding up the grocery shopping.
- ⇒ Working out the time it might take to travel between destinations.
- ⇒ Measuring and calculating the timber needed to make a garden border.
- ⇒ Counting the number of steps as part of a personal fitness routine.
- ⇒ Planning a personal diary to balance school, personal and work commitments.

### Work-related

- ⇒ Calculating the total of a customer's bill in a café.
- ⇒ Adding up total sales for the day.
- ⇒ Calculating the business costs for a week.
- ⇒ Adding up wages as a part of a timesheet.
- ⇒ Planning the time schedule for a courier delivery run.
- ⇒ Working out how much time is needed to do a specific work task such as a house painting job.

**"I have calculated that to feed 20 people at our BBQ we will need, 40 sausages, 3 loaves of bread, a bottle of sauce and 2 kg of onions. Anything else I might have missed?"**



**Preview  
Sample:  
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**Addition A**

In your workbooks complete the following addition calculations. Make sure that you show appropriate working out.

a. $9 + 6 =$	b. $4 + 28 =$	c. $16 + 87 =$	d. $72 + 25 =$
e. $4 + 19 + 29 =$	f. $17 + 13 + 20 =$	g. $100 + 75 + 36 =$	h. $56 + 0 + 144 =$
i. $8 + 7 + 4 + 3 =$	j. $8 + 12 + 9 + 16 =$	k. $15 + 10 + 25 + 35 =$	l. $40 + 55 + 20 + 200 =$
m. seven plus forty-six =	n. twelve add ninety =	o. one hundred plus 44 add 17 =	p. the sum of five, fifteen and fifty =
q. $\$25 + \$24.95 =$	r. $\$7 + \$7.50 +$ 45 cents =	s. 3 hours plus 6 hours =	t. 2 hours + 45 mins =



## 1.17 Calculating - Subtraction

### Subtraction

Subtraction is taking away amounts or numbers to get a total or a sum. Once again it involves counting, and in common calculations should result in an answer that is smaller than the original. e.g. 25 take away 10 equals 15.

Subtraction problems can also be solved using a number line or by setting out mathematical sums. Your teacher will go through the examples below, as well as others, with you.

The answer determined by subtraction gives us the difference between the original amount and the new amount. e.g. The difference between 25 and 10 is 15.

Subtraction using physical counting can also result in finding out the difference between an original amount and a new amount. e.g. At the start of the day a trading stand had 100 hotdogs and at the end we have counted that we have 14 left. The difference is 86 ( $100 - 14 = 86$ ). Therefore we must have sold 86 hotdogs.

**Tip: Always perform any calculations in brackets first!**

### Subtraction (take-away or minus) ...shown by a '-' sign

Subtraction involves taking a number away from another, i.e. finding the difference between two numbers.

$$4 - 3 = 1$$

$$41 - 28 = 13$$

$$1 - 1/2 = 1/2$$

$$\$50 - \$27 = \$23$$

Subtraction can also involve taking away more than two numbers. e.g.

$$3 - 2 - 1 = 0$$

$$1 - 1/4 - 1/4 = 1/2$$

$$\$10 - \$5 - \$6 = -\$1$$

$$100 - 50 - 25 - 10 = ?$$

**Tip:** When subtracting more than one number you can take the first number away to get an answer, then take the 2nd number away from that answer... and so on. (See below)

NUM  
SUPER  
SKILLS

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### Subtraction: Using a number line

Calculate: 20 minus 13



e.g.  $20 - 13 = 7$

### Subtraction: Using calculations

e.g. Calculate the total of:  $49 - 17$

$$\begin{array}{r} 49 \\ - 17 \\ \hline 32 \end{array}$$

e.g. Calculate the total of:  $144 - 68$

$$\begin{array}{r} 144 \\ - 68 \\ \hline 76 \end{array}$$

e.g. Calculate the total of:  $95 - 43 - 11$

$$\begin{array}{r} 95 \\ - 43 \\ \hline 52 \\ - 11 \\ \hline 41 \end{array}$$

**Tip:** Do the 1st calculation to get an answer; then do the 2nd calculation to get your final answer!

## Applied subtraction

People also need to use subtraction in many personal and work-related situations. Discuss those below and once again, can you think of some more?

### Personal

- ⇒ Keeping track of spending in a bank account for a personal budget.
- ⇒ Taking away the essential bills before working out how much is left over to spend in a household budget.
- ⇒ Subtracting the travel time when working out how much time you have left when going out for the evening.
- ⇒ Subtracting how much timber to saw off when making a garden border.
- ⇒ Subtracting the time taken for school, personal and work commitments as part of a daily schedule.

### Work-related

- ⇒ Making change for a customer paying for a purchase.
- ⇒ Taking away lunch breaks from a total work time as part of a timesheet or staff roster.
- ⇒ Calculating how much stock is left at the end of a day's trading.
- ⇒ Working out a business's profit (revenue less expenses) for the week.
- ⇒ Working out how much time is available in a work day after answering emails in the morning.

**"I've blown my budget again. I'm good at the adding part; but not so good at the subtracting part!"**

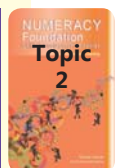
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**Subtraction A**

In your workbooks complete the following subtraction calculations. Make sure that you show appropriate working out.

a. $9 - 3 =$	b. $24 - 8 =$	c. $86 - 17 =$	d. $105 - 25 =$
e. $50 - 20 - 10 =$	f. $87 - 12 - 20 =$	g. $100 - 45 - 36 =$	h. $156 - 0 - 144 =$
i. $8 - 2 - 5 - 1 =$	j. $28 - 12 - 9 - 6 =$	k. $75 - 10 - 25 - 35 =$	l. $140 - 50 - 40 - 60 =$
m. forty minus six =	n. ninety take away thirty =	o. one hundred minus 44 take away 17 =	p. 25 less 10 =
q. $\$25 - \$19 =$	r. $\$10 - \$7.50 =$	s. 2 and $\frac{1}{2}$ hours minus $\frac{1}{2}$ hour =	t. 3 and $\frac{1}{2}$ hours - 30 minutes =



## 1.19 Putting It Together

### Addition and subtraction

Sometimes you might have to perform calculations that involve both addition and subtraction. This will require more than a one-step calculation process and is a more advanced numeracy skill. The idea is to deal with two numbers at a time, get an answer and then deal with the next number; and so on.

*For example:*

- ⇒ You have \$500 in the bank.
- ⇒ You are paid \$100 in wages.
- ⇒ You spend \$200 on a new pair of Docs.
- ⇒ You also spend \$50 on a present for your Mother's Birthday.

*How much is left in your bank account?*

*So let's look at this as a calculation. You can just work left to right.*

*e.g.  $\$500 + \$100 - \$200 - \$50$*

*$= \$500 + \$100 - \$200 - \$50$*

*$= \$600 - \$200 - \$50$*

*$= \$400 - \$50$*

*$= \$350$*

Preview  
Sample:  
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People might need to do these types of calculations when they are:

- ⇒ planning a household budget
- ⇒ managing their bank account
- ⇒ keeping track of time
- ⇒ planning a travel itinerary
- ⇒ making sure they have enough stock for their business
- ⇒ planning a menu or a function
- ⇒ estimating and measuring materials
- ⇒ working out total people in attendance;

as well as many other personal and work-related activities. Your teacher will discuss these

examples with you, but think of some others.

Image: BrianAJackson/  
Depoitphotos.com



### A Addition & subtraction

Calculating time is an area whereby you might have to both add and subtract. In your workbooks, set out a calculation to solve the following problem.

*You only have 1 hour to do your homework tonight because you have to work a 4-hour shift. But your boss texts you and cancels the shift. Your homework will take 2 hours and you also want to exercise for 1 hour. How much time do you have left over? What might you do with this 'extra' time?*





Testing time **B**

1. Perform the following calculations in your head or on paper. Your teacher will set a time limit.
2. Now do the same calculations using a calculator. Time this.  
Estimate how many calculations you have done correctly.  
Your teacher will give the answers after the class has done both tasks.
3. Discuss with the class how you went. What were the patterns around your own areas of strength and weakness? What about for the class as a whole?

a.	$37 + 92$	=	$37 + 92$	=
b.	$56 - 29$	=	$56 - 29$	=
c.	$42 + 25 + 60$	=	$42 + 25 + 60$	=
d.	$75 - 25 - 25$	=	$75 - 25 - 25$	=
e.	$10 + 15 - 12$	=	$10 + 15 - 12$	=
f.	$27 - 12 + 50$	=	$27 - 12 + 50$	=
g.	$88 - 9 - 29$	=	$88 - 9 - 29$	=
h.	$75 + 25 + 50 - 40$	=	$75 + 25 + 50 - 40$	=
i.	$152 + 87$	=	$152 + 87$	=
j.	$136 - 37$	=	$136 - 37$	=
k.	$\$25 + \$20 + \$15$	=	$\$25 + \$20 + \$15$	=
l.	$\$150 + \$27.50$	=	$\$150 + \$27.50$	=
m.	$\$100 - \$47$	=	$\$100 - \$47$	=
n.	$\$200 - \$50 + \$100$	=	$\$200 - \$50 + \$100$	=
o.	60 minutes + 3 hrs	=	60 minutes + 3 hrs	=
Estimated correct		/15		/15
Total correct:		/15		/15

Preview  
Sample:  
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## 1.21 Fractions and Decimals

### Fractions

A fraction represents a part or a portion of a whole number. Essentially a fraction divides the top number (**numerator**) by the bottom number (the **denominator**).

For example:

- ⇒ An orange cut equally in two portions =  $1/2$  an orange +  $1/2$  an orange.  
If you eat one of these portions you have eaten  $1/2$  of an orange. And  $1$  divided by  $2 = 1/2$ . (Or, "how many 2s go into 1: a half!")
- ⇒ 25 cents = a quarter of a dollar or  $1/4$  (in the US they have 'quarter' coins and not 20c coins like in Australia; so our 20c =  $1/5$  of a dollar).
- ⇒ A pizza sliced in 8 portions =  $8 \times 1/8$ . Each slice is  $1/8$ .

Peckish?            2 slices =  $1/4$  (or 2 eighths or  $2/8$ )

Hungry?            4 slices =  $1/2$  (or 4 eighths or  $2/4$  or  $1/2$ )

Famished?        6 slices =  $3/4$  (or 6 eighths or  $6/8$  or  $3/4$ )

Starving?        8 slices = 1 (or 8 eighths or 4 quarters, or 2 halves)

For example, Igor is really greedy and eats his whole pizza which is cut into 4 pieces. So that's 4 quarters (or 2 halves) depending on how big his mouth is!

His friend Frankie goes to get some Tabasco sauce and Igor quickly scoffs down another quarter slice of Frankie's pizza.

Igor has now eaten one and a quarter pizzas (or  $5/4$  which is  $1\frac{1}{4}$  plus another  $1/4$ ). Now that's a very improper thing to do!

Preview  
Sample:  
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Image: ekizv/  
Depoitphotos.com

### Fractions

#### Proper fraction:

A proper fraction is one where the number on top (**numerator**) is **less than** the number on the bottom (**denominator**).

This means that the number represented by the fraction will always be less than 1. e.g.  $\frac{1}{2}$   $\frac{1}{3}$   $\frac{1}{4}$   $\frac{3}{5}$   $\frac{1}{10}$   $\frac{5}{6}$   $\frac{1}{8}$   $\frac{3}{7}$   $\frac{13}{20}$   $\frac{25}{100}$



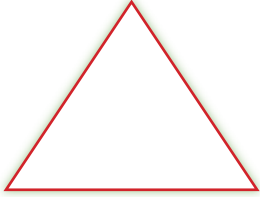


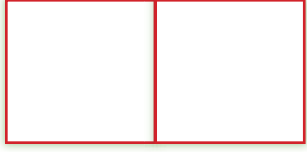
#### Improper fraction:

An improper fraction is one where the number on top (**numerator**) is **more than** the number on the bottom (**denominator**).

This means that the number represented by the fraction will always be more than 1. e.g.  $\frac{3}{2}$   $\frac{4}{3}$   $\frac{5}{4}$   $\frac{10}{5}$   $\frac{11}{10}$   $\frac{14}{6}$   $\frac{12}{8}$   $\frac{10}{7}$   $\frac{60}{20}$   $\frac{200}{100}$

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Colour in the shapes to indicate each fraction.

$\frac{1}{4}$ 	$\frac{1}{2}$ 	1 
$\frac{1}{3}$ 	$\frac{2}{5}$ 	$\frac{3}{4}$ 



## Decimals

A decimal is another way of representing a fraction. Decimals are based on our number system which uses the power of 10's, (i.e. 1, 10, 100, 1000, 0.1, 0.01, 0.001, 0.0001).

Some numbers include a decimal point. These represent a whole number, such as 2, plus a fraction of a whole number, such as 0.5. Written together this will be 2.5 (or 2 and five tenths). 2.5 can also be written as  $2\frac{1}{2}$ .

For example, Ellie ran 2 full laps plus another half of a lap of the oval before she had to stop. In decimal terms, Ellie ran 2.5 laps of the oval.

For really accurate numbers such as in medicine, pharmacy and other technical and scientific jobs decimals might go up to the hundredth (i.e. 2 numbers after the decimal point; 0.01); or even to the thousandth, (i.e. 3 numbers after the decimal point; 0.001). For this stage of numeracy we can keep decimals to the tenth, which is one number after the decimal point, or . . . However, when dealing with money you will need 2 decimal places; and when converting measurements you might also require 2 (or even more) decimal places. Why so?



Write each of these as their correct decimal or fraction.

$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{5}$	$\frac{1}{8}$	1	$\frac{2}{4}$	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{7}{10}$	$\frac{5}{8}$	$\frac{3}{4}$
0.5											
0.4	0.2	0.5	0.7	0.33	0.9	0.67	1.0	0.75	0.6	0.125	1.5
		$\frac{1}{2}$									

## 1.23 Fractions and Decimals

### Working with fractions

Sometimes you might have to add or subtract using fractions. One way to do this is to say the numbers in your head. e.g.

- ⇒ “One half plus two halves means that I’ve got three halves (or one and a half).”
- ⇒ “One quarter plus two quarters equals three quarters.”
- ⇒ “One minus a half = a half.”
- ⇒ “Three quarters minus a half =  $\frac{3}{4}$  minus  $\frac{2}{4}$  which equals  $\frac{1}{4}$ .”

But if the calculation gets more complex then you will need to follow a numerical method. Your teacher will work through a number of examples with you.

### Fractions: Addition and Subtraction

If the fractions have the same bottom number (**denominator**) then simply add or subtract the top numbers (**numerator**).

e.g. i

$$\frac{1}{2} + \frac{1}{2} = \frac{2}{2} = 1$$

e.g. ii

$$\frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

e.g. iii

$$\frac{5}{2} + \frac{4}{2} - \frac{3}{2} = \frac{9}{2} - \frac{3}{2} = \frac{6}{2} = 3$$

**But**, if the fractions have different bottom numbers (**denominators**) then you will have to find the lowest common **denominator** (or lowest common multiple). After this you can then add or subtract the top numbers. e.g. i

$$\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

e.g. ii

$$\frac{6}{4} + \frac{2}{4} - \frac{1}{8} = \frac{12}{8} + \frac{4}{8} - \frac{1}{8} = \frac{15}{8} = 1 \frac{7}{8}$$

NUM  
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SKILLS

### Working with decimals

Working with decimals is common in life especially in workplaces and job tasks that deal with money, and for measurements using the decimal system. The easiest way to do this is to use the same rules for calculating by setting this out vertically. But the key is to make sure your numbers are aligned based on the decimal point.

### Adding and subtracting decimals

e.g. Calculate the total of:  
 $2.5 + 3.4$

$$\begin{array}{r} 2.5 \\ + 3.4 \\ \hline 5.9 \end{array}$$

e.g. Calculate the total of:  
 $0.45 + 3.40$

$$\begin{array}{r} 0.45 \\ + 3.40 \\ \hline 3.85 \end{array}$$

e.g. Calculate the total of:  
 $1.5 + 2.7 - 1.6$

$$\begin{array}{r} 1.5 \\ + 2.7 \\ \hline 4.2 \\ - 1.6 \\ \hline 2.6 \end{array}$$

e.g. Calculate the total of:  
 $27.95 + 3.5 - 2.8 - 15$

$$\begin{array}{r} 27.95 \\ + 3.50 \\ \hline 31.45 \\ - 2.80 \\ \hline 28.65 \\ - 15.00 \\ \hline 13.65 \end{array}$$

Calculations: Fractions and decimals C



1. Perform the following calculations in your head or on paper. Your teacher will set a time limit.
2. Now do the same calculations using a calculator. Time this. Estimate how many calculations you have done correctly. Your teacher will give the answers after the class has done both tasks.
3. Discuss with the class how you went. What were the patterns around your own areas of strength and weakness? What about for class as a whole?



a.	$1/2 + 1/2 =$	=		=
b.	$0.5 + 0.25 =$	=		=
c.	$1.50 + 3.49 =$	=		=
d.	$1/4 + 2/4 =$	=		=
e.	$4.5 + 1/2 =$	=		=
f.	$3 \frac{1}{3} + 2 \frac{2}{3} =$	=		=
g.	$20 \frac{1}{2} + 9 \frac{1}{4} =$	=		=
h.	$1 - 0.5 =$	=		=
i.	$1 - 1/4 =$	=		=
j.	$50 - 25.5 =$	=		=
k.	$3 - 2/3 =$	=		=
l.	$0.5 + 1/2 + 0.25 =$	=		=
m.	$3.5 - 0.5 - 1/2 =$	=		=
n.	$1/8 + 3/8 - 1/4 =$	=		=
o.	$100 - 0.1 + 1/10 =$	=		=
Estimated correct		/15		/15
Total correct:		/15		/15

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## 1.25 Assessment Task

### AT1 Count Up & Count Down

#### Overview

For this task you are required to identify items from your personal, home or social lives and document these.

You are required to count up exactly to 50 by identifying these items in your life. The best way to understand this is with an example.

e.g. 4 fingers + 2 pets + 3 siblings  
+ 5 apples + 9 screens, etc..

Once you get to 50 you are required to count down, using different items until you arrive at zero.

#### Rules

- ⇒ You cannot use the same number more than once when counting-up.
- ⇒ You cannot use the same number more than once when counting-down.
- ⇒ You must select different types of items (e.g. only one body part, only one fruit, only one electrical product and so on, across both the counting-up of items and the counting-down of items).
- ⇒ You must document the items using images, video, etc..

#### Report

You must prepare a report that:

- ✓ shows the calculations
- ✓ documents the items using images, video or some other method
- ✓ explains why some of these items are an important part of your life.



Your teacher might also instruct you to present your report to the class using multimedia, a poster or some other method.


Note: Your teacher might add other information including due dates. Record this and other task information below.

#### This task focuses on:

- ⇒ **counting, calculating and subtracting**
- ⇒ **identifying numerical information in your personal life**
- ⇒ **presenting images of numerical information**
- ⇒ **interpreting numerical information from words.**

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Name(s):					
Key dates:					
Tasks - AT1: Count Up & Count Down	Re- quired	Due by	Done	Teacher initials	
<b>Stage 1: Counting up</b>					
⇒ Negotiate the task details with your teacher.	✓				
i. Identify suitable items.	✓				
ii. Complete the counting-up calculations.	✓				
iii. Document the items.	✓				
iv.					
<b>Stage 2: Counting down</b>					
i. Identify suitable items.	✓				
ii. Complete the counting-down calculations.	✓				
iii. Document the items.	✓				
iv.					
<b>Stage 3: Reporting</b>					
⇒ Prepare a draft of your report.	✓				
⇒ Use appropriate numerical language.	✓				
⇒ Prepare your final report.	✓				
⇒ Present your report (if required). 					

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Additional information:

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

## 1.27 Self-Reflection

### Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→ \_\_\_\_\_

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped improve my personal life?

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped my development of work-related skills?

→ \_\_\_\_\_

→ \_\_\_\_\_

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Doing The Numbers

# 2

## Contents

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2.02A <b>Say what?</b>	31	<input type="text"/>	<input type="text"/>
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2.05B <b>Estimating in action</b>	34-35	<input type="text"/>	<input type="text"/>
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2.10B <b>Multi-multiplication</b>	39	<input type="text"/>	<input type="text"/>
2.12A <b>Division</b>	41	<input type="text"/>	<input type="text"/>
2.14B <b>Advanced division</b>	43	<input type="text"/>	<input type="text"/>
2.15A <b>Multiplication &amp; division</b>	44	<input type="text"/>	<input type="text"/>
2.16B <b>Testing time</b>	45	<input type="text"/>	<input type="text"/>
2.17A <b>Fractions &amp; percentages</b>	46	<input type="text"/>	<input type="text"/>
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2.21A <b>Bar graph</b>	50	<input type="text"/>	<input type="text"/>
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2.23A <b>Pie chart</b>	52	<input type="text"/>	<input type="text"/>
2.24B <b>Pie charts in action</b>	53	<input type="text"/>	<input type="text"/>
AT2 <b>How Much Nosh?</b>	54-55	<input type="text"/>	<input type="text"/>
2.27 <b>Self-Reflection</b>	56	<input type="text"/>	<input type="text"/>

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## 2.01 Doing the Numbers

### Numeracy 201

In the previous section you explored types of numeracy skills for varied purposes and also how numeracy is an important part of your personal and work-related life. You also built your **calculating** skills by focusing on **addition** and **subtraction**.

In this section you will start to build your numeracy skills in **estimating**. Estimating numerical information is often done in relation to:

- ⇒ **money** (e.g. when budgeting)
- ⇒ **time** (e.g. when working)
- ⇒ **temperature** (e.g. when cooking), and
- ⇒ **measurements** (e.g. making things or travel distances).

Later in this section you will move on to developing your **multiplication** and **division skills**. This means that by the end of Section 2 you will have explored all four basic calculation skills.

Of course you will be expected to continue improving your understanding of written and spoken numerical words and language. Being able to recognise words as numbers, and interpreting terms and phrases as numerical concepts (e.g. bigger than), will assist you to apply numerical understanding to all parts of your life.

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Sometimes when people ask numerical questions they might use the same term for questions that relate to varied numerical concepts. At first, this can be confusing.

For example, they might say the term, 'how much' in relation to:

- ⇒ cost (i.e. "How much is that jumper?") or
- ⇒ size (i.e. "How much dinner do you want?").

As another example, they might say the terms 'how long' in relation to:

- ⇒ size (i.e. "How long does the dress need to be?") or
- ⇒ time (i.e. "How long is your video?").

And they might say the terms, 'how near (or close)' or 'how far' in relation to:

- ⇒ distance (i.e. "How far is it to Geelong?") or
- ⇒ time (i.e. "How near (or how far) away are you from finishing that job?")

So the different use of numerical terms and language, especially when speaking, can cause misunderstandings.

This is because sometimes the specific word that is used (such as 'far' or 'close') has its own meaning (e.g. 'far' usually = a long way away, whereas 'close' usually = quite nearby)!

So what do you usually say?

Image:  
Ivory/  
Thinkstock



Say what? A

So what types of words do you commonly use when communicating numerical information, such as when asking questions?

1. Match the 6 terms with examples you would most likely use this term for.

☐ far

☐ long

☐ much

☐ little

☐ many

☐ tall

How \_\_\_\_\_ ?

...more than twice  
your height.

How \_\_\_\_\_ ?

...usually 25-30  
years.

How \_\_\_\_\_ ?

...just \$3 a week.

How \_\_\_\_\_ ?

...enough to do 2  
even coats.

How \_\_\_\_\_ ?

...\$8 for each person  
should be enough.

How \_\_\_\_\_ ?

...about a week's  
drive.

2. Match these 6 examples with the terms that might best suit.

☐ ...3 and a half hours.

☐ ...at least 100 kms.

☐ ...around the corner.

☐ ...\$249.95.

☐ ...larger than a rhino.

☐ ...enough to fry an  
egg!

How far?

How big?

How long?

How much?

How hot?

How near?

3. As a class suggest real examples that might match each of these numerical statements from Q2. e.g. An elephant is larger than a rhino.

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## 2.03 Estimating

### Estimating accurately

Estimating is one of the most important and useful skills to help people better manage their personal, social and work-related lives.

Sometimes we don't always have enough time to make exact calculations. So it is important to be able to do quick and fairly accurate estimates.

You might make estimates related to:

- ⇒ money
- ⇒ time
- ⇒ size
- ⇒ length
- ⇒ distance
- ⇒ weight
- ⇒ temperature
- ⇒ quantity (amount).

Examples are shown in the diagram below. But there are many more times when people estimate, so come up with other examples as a class.

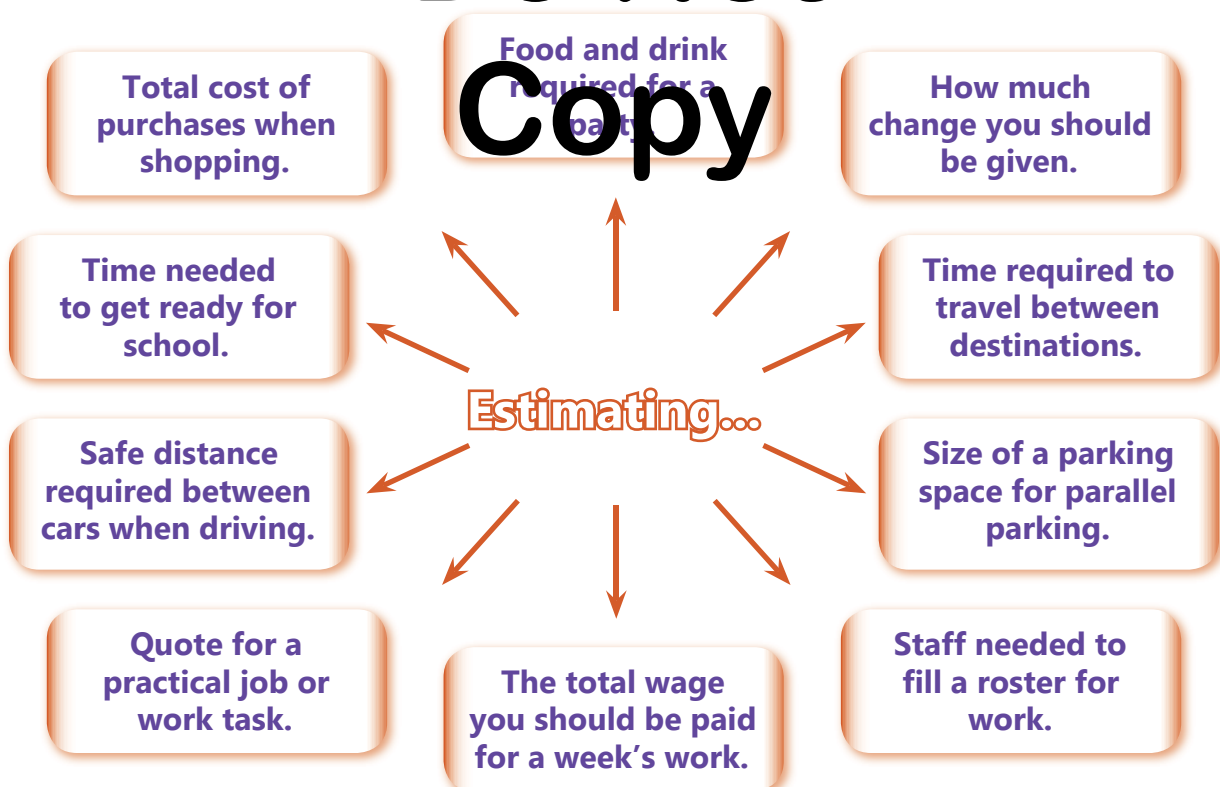
### Estimating

- ⇒ Estimating involves making an initial 'guess' or coming up with a 'rough figure' based on a person's knowledge, skills and past experience.
- ⇒ Numerical estimating is important for things such as size, cost, time, distance and shape.
- ⇒ At home you might estimate the time taken to mow the lawns; or the amount of cash needed to shop at the market.
- ⇒ At work a carpenter might make estimates as part of a quote to build a new deck.
- ⇒ A retailer might estimate how many staff they need to roster on for a busy shift.



Image: seilemann/iStock/Thinkstock

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Make an estimate A

1. Estimate answers for these questions, but make sure that you do this quickly and without calculations.
2. Your teacher will then work through each example with the class, and show you how to best go about doing these estimates.
3. Work in pairs to calculate the actual answers to 3 of these examples. How close were your original estimates? Why so?



Question	Estimate	Exact calculation
1 Estimate the height of the table at which you are sitting.		
2 Estimate your foot length in centimetres.		
3 Estimate the length of your greatest arm span from fingertip to fingertip.		
4 Estimate how many students are enrolled in your school.		
5 Estimate how many students are absent today.		
6 Estimate the number of hours you spend a week using social media.		
7 Estimate the number of hours you spend a week exercising.		
8 Estimate the number of hours you spend a week sleeping.		
9 Estimate how many weeks it would take you to save up \$1,000.		
10 Estimate how long it would take you to 'run' (or wheel) 1 km.		
11 Estimate how much money your family spends on food each week.		
12 Estimate how long it would take to drive from your school to the CBD.		

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4. Complete this sentence using appropriate examples.

It is important for me to estimate things such as \_\_\_\_\_

because \_\_\_\_\_.

## 2.05 Estimating

### Round numbers

As part of your development of numerical skills you are expected to be able to do calculations on paper, using a calculator and in your head.

When you do calculations in your head you might not need to work out exact amounts. Rather you can make estimated calculations using round numbers.

This enables you to get an idea of the result.

Sometimes this is called a 'ball park' figure. Then afterwards you can check the estimate on paper or with a calculator.

Rounded estimates are very useful when shopping, giving quotes, planning a dinner or a party, comparing deals and many other times. Using rounded numbers for estimating can also help you to balance your own personal budget, make sure you have enough money to pay for day-to-day purchases and also avoid being trapped by tricky salespeople.

**"You can trust me, you don't need to do any calculations in your head!"**



Image: carlacastagno/Depositphotos.com

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#### Rules for rounding 1

- ⇒ Round to nice, even friendly numbers that are more easily calculated in your head. e.g. 5, 10, 20, 50, 100
  - ⇒ Remove all fractions and decimals when rounding (e.g. 1.5 becomes 2, 1.4 becomes 1.)
  - ⇒ Round up for bad things. (e.g. Costs, time, quantity, materials, expenses, etc.. This means that you are playing it safe and over-estimating potential costs.)
  - ⇒ Round down for good things. (e.g. Income, revenue, time saved, etc.. This also means that you are playing it safe and under-estimating potential benefits.)
- e.g. Suzie is shopping for a new TV. The salesperson says that she can pay it off using 18 payments of \$22. So Suzie works this out in her head.

- Suzie rounds the 18 payments up to 20.
- Suzie then rounds the \$22 amount down to \$20.
- Suzie estimates that the TV will cost about \$400; ( $20 \times \$20 = \$400$ ). So how close was Suzie's estimate?

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### B Estimating in action

1. Do these estimates and then calculate the result to see how close you were.

i. 11 Weeks pay @ \$90/week.	ii. 9 monthly payments of \$52.50.	iii. 93 crowdfunding supporters who each contribute \$11.

2. Each of these estimates is based on pretty sound numerical logic. But it is important to be able to prove that logic by doing the maths. It is also a good skill to be able to turn spoken or written words into numbers. One way to do this is to underline all the numbers, as well as all of the numeracy concepts. This has been done for the first problem.

Discuss these estimates as a class and then do the calculations.



- a. Nancye estimates that she walks at about 6 kilometres per hour. She reckons it will take her about 3 and a half hours to walk 20 kms.
- If Nancye walks for 3 hours, what distance is she likely to travel?
  - Do the calculations to assess whether Nancye's estimates are valid.
  - What other factors might you need to consider when doing these estimates and calculations?

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- b. Vinh and Joy are making spring rolls for a multi-cultural lunch as part of a PDS group activity. It takes them 20 minutes to chop all the ingredients, and approximately 2 minutes to assemble a spring roll. They estimate it will take them about 1 hour to prepare and assemble 20 spring rolls.
- Do the calculations to assess whether their estimates are valid.
  - How many spring rolls do you think they could assemble in the 2nd hour? Why so?

## 2.07 Calculating - Multiplication

### Multiplication

With multiplication you are calculating an answer based on repeated 'adding' of a particular number.

The best way to clearly understand multiplication is by saying the words in the calculation out loud.

For example:

- ⇒ Calculate: Four times six.
- ⇒ This means you have to work out the total of four sixes.
- ⇒ Four sixes is just: six plus six plus six plus six. i.e.  $4 \times 6$ .
- ⇒ The answer to this, is of course, 24!

### Multiplication (times) ...shown by a 'x' or '\*' sign

Multiplication involves repeated addition of the same number to find the answer (also called the **product**).

In other words you are adding the same number together for however many times is specified. e.g.

$$2 \times 4 = 8 \text{ or}$$

$$(4 + 4 = 8)$$

$$5 \times 7 = 35 \text{ or}$$

$$(7 + 7 + 7 + 7 + 7 = 35)$$

$$12 * 11 = 132 \text{ or}$$

$$(11 + 11 + 11 + 11 + 11 \dots \text{and so on}).$$

NUM  
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SKILLS

Can you hear how saying the words out loud helps make multiplication much easier to understand? Multiplication is simply: something times something else.

- ⇒ Ten times ten? Well ten tens is a hundred.
- ⇒ What about  $20 \times 5$ ? Well  $20 \times 5 = 100$ .
- ⇒ And how about nine by five? Sometimes people 'say' multiplication this way; i.e. something by something else. The method is  $(9 + 9 + 9 + 9 + 9 = 45)$ .

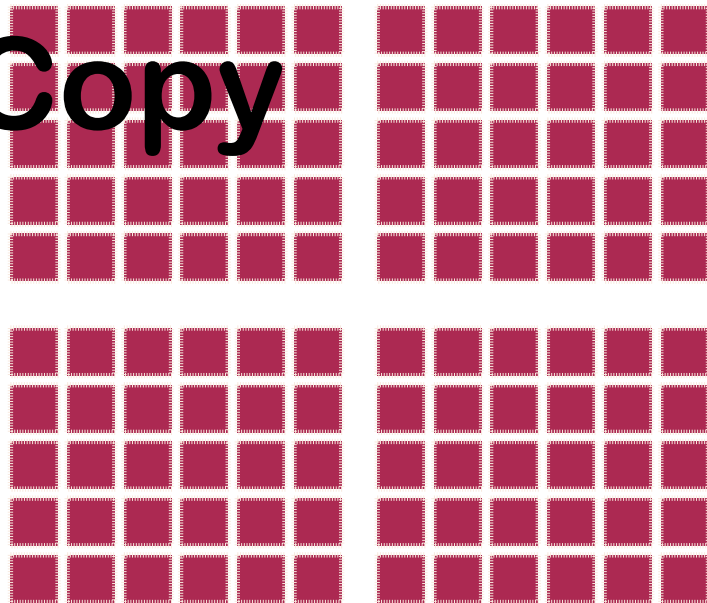
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### Multiplication: Using visual data

What is  $20 \times 6$ ?

Well here we can show this visually.

- ⇒ 6 boxes (in rows) repeated 20 times (and a nice pattern!)
- ⇒ If we count the boxes you find there's 30 in each rectangle.
- ⇒ If you count all of the boxes you will eventually get to 120. But this is going to take a long time. And your eyes will go all funny!
- ⇒ So it's easier just to do multiplication.
- ⇒ Multiplication involves a particular number, multiplied by another number.
- ⇒ So in other words, you count the first number by the number of times of the second number. i.e.  $6 \times 20$ . (And now you can do the calculation both ways because  $6 \times 20$  is the same as  $20 \times 6$ !)



## Multiplication calculations

When performing multiplication it is important to know these instructions.

- ⇒ You have to set out the question in the proper way. This includes making sure that you right-align the numbers.
- ⇒ You might also have to carry a number (or numbers). Your teacher will explain how to do this.
- ⇒ For bigger numbers you might have to include a 0 to show place value for 10s, and another 0 to show place value for 100s and so on. Once again your teacher will explain how to do this.

These might sound a bit confusing written in words. But when your teacher works through examples it will be much easier. This is because most people learn better from watching and doing numerical calculations, rather than from reading how they're done! Do you agree?



**Tip: Always perform any calculations in brackets first!**

*e.g. Calculate the total of:  $9 \times 7$*

$$\begin{array}{r} 9 \\ \times 7 \\ \hline 36 \end{array}$$

**Preview**

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*e.g. Calculate the total of:  $110 \times 5$*

$$\begin{array}{r} 110 \\ \times 5 \\ \hline 550 \end{array}$$

*e.g. Calculate the total of:  $15 \times 15$*

$$\begin{array}{r} 15 \\ \times 15 \\ \hline 75 \\ 150 \\ \hline 225 \end{array}$$

(Carry the 2 from  $5 \times 5 = 25$ )

(Put a 0 to show place value for tens)

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**Multiplication A**

In your workbooks complete the following multiplication calculations. Make sure that you show appropriate working out.

a. $9 \times 6 =$	b. $4 \times 8 =$	c. $12 \times 10 =$	d. $7 \times 11 =$
e. $14 \times 3 =$	f. $15 \times 5 =$	g. $8 \times 12 =$	h. $10 \times 11 =$
i. $24 \times 6 =$	j. $20 \times 12 =$	k. $50 \times 20 =$	l. 35 by 15 =
m. seven times forty-six =	n. twelve times ninety =	o. one hundred by 20 =	p. fifty multiplied by 15 =
q. $\$25 \times \$2 =$	r. 50 cents by 200 =	s. 2 hours $\times$ 2 =	t. $10 \times 60$ mins =



## 2.09 Calculating - Multiplication

### Multi-multiplication

Sometimes you might have to multiply more than two numbers. Of course this is a more advanced use of multiplication. But essentially the method is still the same as for multiplying two numbers.

To multiply three numbers you perform the first calculation to get an answer (an intermediate answer). Then you perform the next calculation to get the final number.

When doing your calculations you always move from left-to-right. You can even use brackets to group the numbers together.

So for a three-number multiplication you do two one-step calculations. For a four-number multiplication problem you do three one-step calculations and so on!

This might be a time when your teacher recommends you use a calculator, or even a spreadsheet. But you can set these out as on-paper calculations just the same as you have learned.

**Tip: Always perform any calculations in brackets first!**

**Preview Sample: Do Not Copy**

"These calculations are much easier to do if I set them out correctly on paper."

### Multiplication (advanced)

Multiplication of more than two numbers involves finding the answer (or the product) of the first 2 numbers.

Then you multiply that answer by the next number, and so on.

You always move from left to right.

$$\begin{aligned} \text{e.g.} \quad & 4 \times 7 \times 2 = ? \\ & (7 + 7 + 7 + 7) \times 2 = ? \\ & 28 \quad \times 2 = 56 \end{aligned}$$

Another way to show this is by using brackets. Once again you always move from left to right.

$$\begin{aligned} \text{e.g.} \quad & 8 \times 6 \times 4 = ? \\ & (8 \times 6) \times 4 = ? \\ & (48) \times 4 = 192 \end{aligned}$$

$$\begin{aligned} \text{e.g.} \quad & 9 \times 7 \times 4 \times 2 = ? \\ & (9 \times 7) \times 4 \times 2 = ? \\ & (63 \times 4) \times 2 = ? \\ & (252) \times 2 = 504 \end{aligned}$$

Another way to do this would be to multiply 63 by 8. Why so?



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### Multi-multiplication: Using calculations

Image: Fuse/Thinkstock

e.g. Calculate the total of:  $9 \times 6 \times 2$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \\ \times 2 \\ \hline 108 \end{array}$$

e.g. Calculate the total of:  $5 \times 12 \times 5 \times 3$

$$\begin{array}{r} 5 \\ \times 12 \\ \hline 60 \\ \times 5 \\ \hline 300 \\ \times 3 \\ \hline 900 \end{array}$$

e.g. Calculate the total of:  $4 \times 5 \times 2 \times 10$

$$\begin{array}{r} (4 \times 5) \times (2 \times 10) \\ = 20 \times 20 \\ \text{So...} \quad 20 \\ \times 20 \\ \hline 400 \end{array}$$



### Applied multiplication

People need to use multiplication in many personal and work-related situations.

Can you think of some more?

#### Personal

- ⇒ Calculating the amount of ingredients to use when increasing recipe size.
- ⇒ Adding up the grocery shopping on a weekly or monthly basis.
- ⇒ Working out a budget on a weekly, monthly or even annual basis.
- ⇒ Totalling the time to travel between destinations for multiple trips.
- ⇒ Calculating total weight lifted on a particular exercise per workout.

**"I need to organise 5 shelves.  
There's 10 boxes on each shelf and 100  
documents in each box. That's 5000  
documents! There goes my weekend!"**

#### Work-related

- ⇒ Calculating daily sales into weekly and monthly sales.
- ⇒ Calculating daily costs into weekly and monthly costs.
- ⇒ Working out how many hours are needed by multiple employees for a job.
- ⇒ Estimating the time needed for complex work tasks.
- ⇒ Totalling wages for timesheets for multiple employees.
- ⇒ Working out costs of materials for practical jobs.



Preview  
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#### Multi-multiplication B

These multiplication problems are written as words and numbers. Set out the calculation in your workbook and calculate the answer to get a total.

i. In the gym: Bench press - total kgs? 3 sets 10 reps 30kg	ii. At work: Wage bill - total wages? 3 staff 4 hours \$10 per hour
iii. Managing the budget: Grocery total? \$50 per week for each person 4 people 50 weeks to budget for.	iv. At work: Total sales of a product? 50 sales per week \$20 each per sale Total for 4 weeks?
v. At home: Walk up 15 stairs each time Do this 20 times a day How many stairs per week?	vi. In the kitchen: How many eggs? Recipe feeds 4 people Needs 3 eggs per person 8 people coming for dinner.

## 2.11 Calculating - Division

### Division

With division you are calculating an answer based on how many times one number (the **divisor**) goes into another number. You can better understand division by saying the words in the calculation out loud.

For example:

- ⇒ Calculate: 30 divided by 10.
- ⇒ This means you have to work out how many 10s there are in 30.
- ⇒ So if we say "10", "10", "10" we quickly count up to 30.
- ⇒ The answer to this, is of course, 3!

But dividing for 10s is easy, as is working out division for small numbers by counting. In order to deal with less

uniform numbers, as well as bigger numbers, you will need to learn and apply the skills for calculating division. And you should also know that doing the division calculation is the opposite of doing the multiplication calculation.

- ⇒ Multiplication:  $10 \times 10 = 100$ . Division  $100 \div 10 = 10$ .
- ⇒ Multiplication:  $25 \times 4 = 100$ . Division  $100 \div 25 = 4$  or  $100 / 4 = 25$ .

So can you see the division/multiplication relationship now?

### Division (how many) ...shown by a '÷' or '/' sign)

Division involves finding the quotient of 2 (or more) numbers. In other words, how many times one number goes into another. e.g.

$$10 \div 5 = 2$$

(How many 5s are in 10?; there's 2!)

$$28 \div 2 = 14$$

$$150 / 10 = 15$$

Sometimes not all numbers are divisible (or go into each other) equally, which leaves a **remainder**.

You might express this remainder as a decimal or as a fraction. e.g.

$$9 / 2 = 4.5 \text{ (Remainder a decimal.)}$$

$$9 \div 2 = 4 \frac{1}{2} \text{ (Remainder a fraction.)}$$

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### Division: Using visual data

We can once again use visual data to understand division.

- ⇒ Here are 100 boxes. You can count 20 rows of 5 (or 20 columns of 5).
- ⇒ You can also count 4 squares of 25.
- ⇒ You could even count 100 small squares (if you have time and good eyesight!)

Let's look at the **divisors** for 100 here.

- ⇒ 1 is a divisor - there are 100 1s in 100!
- ⇒ 2 is a divisor - there are 50 2s in 100!
- ⇒ 5 is a divisor - there are 20 5s in 100!
- ⇒ 10 is a divisor - there are 10 10s in 100!
- ⇒ 25 is a divisor - there are 4 25s in 100!
- ⇒ We can see each of these divisors quite easily on the diagram. You could draw a circle around them.

- ⇒ However, there are other divisors for 100. What are they? Perhaps you could try drawing 'circles' around the blocks using different colours to work these out.



## Division calculations

When performing short division it is important to know these instructions.

- ⇒ You have to set out the question in the proper way. This includes using a division box as shown below.
- ⇒ You set out the **dividend** (the number you are dividing into) by the **divisor** (the number you are dividing by). i.e. 20 (the dividend) divided by 5 (the divisor).
- ⇒ You might also have to carry a number (or numbers) if you get a remainder. Your teacher will explain how to do this.

Remember that most people learn better from watching and doing numerical calculations rather than from reading how they're done! That's why your teacher will do some examples for the class and then get you to try some on your own.

**Tip: Always perform any calculations in brackets first!**

# Preview

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e.g. Calculate the total of:  $66 \div 6$

$$\begin{array}{r} 11 \\ 6 \overline{) 66} \end{array}$$

e.g. Calculate the total of:  $95 / 5$

$$\begin{array}{r} 19 \\ 5 \overline{) 95} \end{array}$$

(Carry the 1 from 10/5 = 1 plus 4 remainder)

e.g. Calculate the total of:  $132 \div 11$

$$\begin{array}{r} 12 \\ 11 \overline{) 132} \end{array}$$

(Carry the 2 from 13/11 = 1 plus 2 remainder)

Division **A**

In your workbooks complete the following division calculations. Make sure that you show appropriate working out.

a. $20 \div 10 =$	b. $18 \div 6 =$	c. $75 \div 5 =$	d. $64 \div 8 =$
e. $45 / 3 =$	f. $100 \div 5 =$	g. $160 / 10 =$	h. $144 \div 12 =$
i. $300 \div 20 =$	j. $1000 / 10 =$	k. $75 \div 37.5 =$	l. $7.5 / 5 =$
m. seventy divided by five =	n. 110 divided by 11 =	o. one hundred how many twos =	p. how many halves are in 5 =
q. $\$25 / \$5 =$	r. $\$140 \div \$7 =$	s. 6 hours divided by 2 =	t. how many 15 minutes in 2 hours =



## 2.13 Calculating - Division

### Advanced division

Sometimes you might have to divide more than two numbers. Of course this is a more advanced use of division. But the method is still the same as for dividing two numbers - there's just more steps involved.

To divide three numbers you perform the first calculation to get an answer (an intermediate answer). Then you perform the next calculation to get the final number.

When doing your calculations you always move from left-to-right. You can even use brackets to group the numbers together.

So for a three-number division you do two one-step calculations. For a four-number division problem you do three one-step calculations - and so on. Once again this might be a time when your teacher recommends you use a calculator, or even a spreadsheet. But you can also set these out on paper.

**Tip: Always perform any calculations in brackets first!**

### Division (advanced)

Division of more than two numbers involves finding the answer (or the **quotient**) of the first 2 numbers.

Then you divide that answer by the next number, and so on.

Once again you always move from left to right.

A good way to set this out for short division is by using brackets for each calculation.

$$\begin{aligned} \text{e.g. } 150 \div 15 \div 10 &= ? \\ (150 \div 15) \div 10 &= ? \\ 10 \div 10 &= 1 \end{aligned}$$

$$\begin{aligned} \text{e.g. } 100 \div 5 \div 10 \div 2 &= ? \\ (100 \div 5) \div 10 \div 2 &= ? \\ (20 \div 10) \div 2 &= ? \\ (2 \div 2) &= 1 \end{aligned}$$

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**Preview  
Sample:  
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Division can cause problems!  
People don't always get all equal and some want more than others!  
So which would be your slice of cake?



Image: Anton Balazh/Hemera/Thinkstock

### Advanced division: Using calculations

e.g. Calculate the total of:  $18 \div 3 \div 2$

$$\begin{array}{r} \text{Step 1} \quad 3 \overline{) 18} \\ \underline{6} \\ \text{Step 2} \quad 2 \overline{) 6} \\ \underline{3} \end{array}$$

e.g. Calculate the total of:  $160 \div 10 \div 4$

$$\begin{array}{r} \text{Step 1} \quad 10 \overline{) 160} \\ \underline{16} \\ \text{Step 2} \quad 4 \overline{) 16} \\ \underline{4} \end{array}$$

(Carry the 6 from  $16/10 = 1$  plus 6 remainder)

e.g. Calculate the total of:  $200 \div 10 \div 2 \div 2$

$$\begin{array}{r} \text{Step 1} \quad 10 \overline{) 200} \\ \underline{20} \\ \text{Step 2} \quad 2 \overline{) 20} \\ \underline{10} \\ \text{Step 3} \quad 2 \overline{) 10} \\ \underline{5} \end{array}$$

### Applied division

People need to use division in many personal and work-related situations.

Can you think of some more?

### Personal

- ⇒ Calculating the quantity of ingredients to use when decreasing a recipe size.
- ⇒ Dividing a weekly wage to cover different family household costs.
- ⇒ Turning a monthly budget into a weekly budget.
- ⇒ Working out how many slices to cut to share a pizza.
- ⇒ Cutting a length of timber into equal parts.
- ⇒ Working out how to share driving hours on a long trip.

### Work-related

- ⇒ Calculating weekly sales from monthly sales totals.
- ⇒ Calculating daily costs from weekly and monthly costs.
- ⇒ Dividing for how many hours each employee has taken on a group task.
- ⇒ Splitting a bill evenly between customers.
- ⇒ Calculating the hourly pay rate from a weekly wage.

**Splitting the bill requires division.  
And you don't need an app for that!**



Image: AndrewJohnson/  
iStock/Thinkstock

**Preview  
Sample:  
Do Not  
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### Advanced division **B**

These division problems are written as words and numbers. Set out the calculation in your workbook and calculate the answer.

i. In the gym: Squats Need to do 60 reps. Need to do 5 even sets. How many reps per set?	ii. At work: Wage bill Paid \$400 for the week. Worked 40 hours for the week. How much paid per hour?
iii. Managing a budget: Electricity bill \$330 Share house has 4 people. How much does each person need to contribute?	iv. At work: Weekly sales of one product \$2500 in total sales. Each product was sold at \$20 How many products were sold?
v. In the kitchen: Cooking for 2 The recipe feeds 4 people. Need 6 eggs for 4 people. Need 500g of pasta for 4 people.	vi. At home: Laying edging in the garden Have a 4 metre length of timber. Need 1 x 2 metre length of timber. Need 2 x 1 metre lengths of timber.



## 2.15 Putting it together

### Multiplication & division

Sometimes you might have to perform calculations that involve both multiplication and division. This will require more than a one-step calculation process and is a more advanced numeracy skill.

The idea is to deal with two numbers at a time, get an answer and then deal with the next number; and so on.

**Tip: Always perform any calculations in brackets first!**

For example:

- ⇒ Your team earns \$12 per hour for 8 hours work.
- ⇒ This has to be divided evenly between 4 team members.
- ⇒ How much does each person get?

So let's look at this as a calculation.

- ⇒ You must work left to right.
- ⇒ And you can use brackets to group each of the steps.

$$\begin{aligned} \text{e.g. } \$12 \times 8 &= \$96 \\ &= (\$12 \times 8) \div 4 \\ &= (\$96) \div 4 \\ &= \$24 \text{ each} \end{aligned}$$

For example:

- ⇒ You need to walk 100km between towns.
- ⇒ You'll walk an equal distance over 5 days.
- ⇒ You have found out there's about 1,200 steps per km.
- ⇒ How many steps per day?

This sounds complicated but let's look at this as a calculation.

$$\begin{aligned} \text{e.g. } 100 \div 5 \times 1,200 \\ &= (100 \div 5) \times 1,200 \\ &= 20 \times 1,200 \\ &= 24,000 \text{ steps daily} \end{aligned}$$

(We haven't worried about including all the different units in this calculation!)

Preview  
Sample:  
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### A Multiplication & division

Businesses often have to make calculations using both multiplication and then division (or vice versa). This is because businesses often deal in large volumes. And multiplication and division are calculations that help you to deal with larger amounts. So have a go at this problem in your workbooks.

- a. A shoe retailer has 5 shops. The owner orders 1000 pairs of a new season's style in bulk. She wants to allocate the stock evenly across all 5 stores. Set out and perform the calculation to show this.
- b. The shoes will be sold at \$60 a pair. However one of the stores is located in a 'wealthier' suburb. The shoes will be sold at \$70 a pair in this one shop. Set out and perform the 2 calculations to show these (assuming all the stock is indeed sold).
- c. Use addition to calculate the total sales across all 5 stores.
- d. Use division to work out the average sales price across the 5 stores.





Testing time **B**

1. Perform the following calculations in your head or on paper. Your teacher will set a time limit.
2. Now do the same calculations using a calculator. Time this.  
Estimate how many calculations that you think you have done correctly.  
Your teacher will give the correct answers after the class has done both tasks.
3. Discuss with the class how you went. What were the patterns around your own areas of strength and weakness? What about for the class as a whole?



a.	$7 \times 9$	=	$7 \times 9$	=
b.	$50 / 10$	=	$50 / 10$	=
c.	$4 \times 2 \times 6$	=	$4 \times 2 \times 6$	=
d.	$100 \div 25 \div 2$	=	$100 \div 25 \div 2$	=
e.	$10 \times 15 \div 5$	=	$10 \times 15 \div 5$	=
f.	$28 / 14 \times 50$	=	$28 / 14 \times 50$	=
g.	$132 / 3$	=	$132 / 3$	=
h.	$6 \times 2.5$	=	$6 \times 2.5$	=
i.	$180 \div 3 \div 4 \div 3$	=	$180 \div 3 \div 4 \div 3$	=
j.	$152 \times 8 \times 5 \times 2$	=	$152 \times 8 \times 5 \times 2$	=
k.	$\$25 \times \$2 \times \$5$	=	$\$25 \times \$2 \times \$5$	=
l.	$\$100 \times \$2.50$	=	$\$100 \times \$2.50$	=
m.	$\$100 / \$25 \times \$20$	=	$\$100 / \$25 \times \$20$	=
n.	$\$200 \times \$5 \times 4$	=	$\$200 \times \$5 \times 4$	=
o.	2 hours x 3 hours	=	2 hours x 3 hours	=
Estimated correct		/15		/15
Total correct:		/15		/15

Preview  
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## 2.17 Percentages

### Percentages

A **percentage** represents a **portion** (or a fraction) of a whole amount. A percentage represents a **fraction** out of 100%. With percentages the whole amount is 100%. Half of that whole amount equals 50%. One quarter of that whole amount represents 25%. One tenth of the same whole amount represents 10%.

Percentages are one of the most straightforward calculations going around, because a percentage simply represents a proportion of a whole! Every percentage is going to be between 0% (none) to 100% (all) of a total.

If you have a look at this image of the percentages of an orange it is similar to the fractions of a pizza. It's just here we are showing the fractions as a percentage.



1 = 100%



$\frac{1}{2} = 50\%$



$\frac{1}{4} = 25\%$



$\frac{1}{8} = 12.5\%$

Preview  
Sample:

### A Fractions & percentages

- Complete this table to show these fractions as decimals and then as percentages.

$\frac{1}{10}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{6}{10}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{7}{8}$	$\frac{1}{1}$
			0.25								
								75%			

- Colour in each of these shapes to show the percentage.

50% 	100% 	50% 
75% 	66% 	25% 



## Calculating percentages

If there are 10 people at a McDonald's, and 6 of these buy a Big Mac, then the percentage of Big Mac eaters in this McDonald's is 60%. See it's easy in words. It's easy in numbers as well.

$$\begin{aligned} & \frac{6 \text{ (number of Big Mac eaters)}}{10 \text{ (total number of people in McDonald's)}} \times \frac{100\%}{1} \\ &= 0.6 \times 100\% \\ &= 60\% \end{aligned}$$

So to work out percentages you divide the amount or the portion you are focusing on, by the total amount. This gives a fraction or a decimal (such as 6/10 or 0.6).

You then multiply by 100% to express this as a percentage.

So if there are 25 people in Hungry Jacks who buy fries with their order and there are 50 diners in total, what percentage of Hungry Jacks diners bought fries? The fraction is 1/2 and the decimal is 0.5, so the percentage is 50%!

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## Proportion as a percentage

A percentage represents a smaller proportion of a whole; let's consider these examples. And while you're at it, discuss how accurate *these made up percentages* might be.

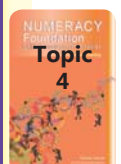
- ⇒ 50 out of every 100 Australians with a smartphone have an iPhone. That's 50%.
- ⇒ 8 out of 10 people prefer Pepsi Max to Diet Coke. That's 80%.
- ⇒ 25 out of 100 adults do not have a driver's license. That's 25%.
- ⇒ 10 out of 50 people surveyed agreed that watching MasterChef made them want to eat more food. That's 20%, i.e. 20 out of 100.
- ⇒ 99 out of 100 Foundation Numeracy students believe that after doing this topic they will know how to calculate percentages. That's 99%, do you agree?

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## Percentages B

Calculate each of these percentages.

i. 10% of 100	ii. 10% of 150	iii. 20% of 200
iv. 25% of 1000	v. 75% of 500	vi. 40% of 300



## 2.19 Data and Tables

### Data

Data is a term used for various types of numerical information. When we collect, organise and analyse data we are more able to make informed decisions based on the numerical information we have collected.

*For example, when you are comparing NBN plans you are comparing data such as cost, download speeds, download limits and so on, of the different internet providers.*

Data sources can include a survey which is a direct (or **primary** source) of information, e.g. surveying customers on their buying preferences. Data also includes other (**secondary**) sources, which involve looking at data that comes from external sources, such as government information about employment statistics. Data can also include both written and **numerical information** about customers, employees and other workplace stakeholders that might be stored in a database.

### Data collection

Data collection involves collecting information and doing research to find out information. This might include:

- ⇒ surveying people about their views
- ⇒ researching different information sources to find out prices
- ⇒ collecting information to update a customer database.

### Data organisation

Data organisation involves taking the data you have collected and organising it in such a way as to be able to use this data. This might involve:

- ⇒ organising key statistics in a table
- ⇒ creating graphs and images to show this data
- ⇒ arranging information in a customer database so as to make it usable.

### Data analysis

Data analysis involves looking at the information shown by the data and then using this to make a decision. This might involve:

- ⇒ working out what the key statistics are showing about people's choices
- ⇒ analysing the patterns and trends shown in graphs
- ⇒ analysing information in a customer database so as to work out which customers are vital to business success.

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Image: Wavebreakmedia Ltd/  
Wavebreak Media /Thinkstock



## Table

We often organise data in tables. This makes it easier to perform calculations, to look for patterns and trends, and do comparisons. We can also show data in graphs. This enables us to 'see' various patterns and trends reflected in the numbers.

In the contemporary world we often access a lot of data from digital sources and use digital tools (such as spreadsheets) to help analyse the data. Although this enables us to access more data and numerical information, it also makes it harder to sort opinions from facts, as well as truths from mistruths.

Have a look at the table shown here as an example. A table will usually contain certain types of information

**Heading:** This indicates the type of information organised in the table.

**Time period or date:** The data will often refer to a time period.

**Column headings:** These headings indicate the type of data that is being shown in the table (including appropriate units such as \$).

**Row headings:** These headings indicate the variables being shown, such as people, customers, products, months of the year, etc.

**Data:** This is the collected information as shown in the table.

**Totals:** Row or column totals that perform a calculation.

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Customer purchase patterns - August 2019				
Column headings		Heading	Time period	
		Customer	Purchases	Average
Row headings			Data	
	Siri	7	140	\$20
	Tatum	5	100	\$100
	Blaine	2	400	\$200
	Hope	8	160	\$20
Totals		Totals	25	1,000
			Totals	\$40

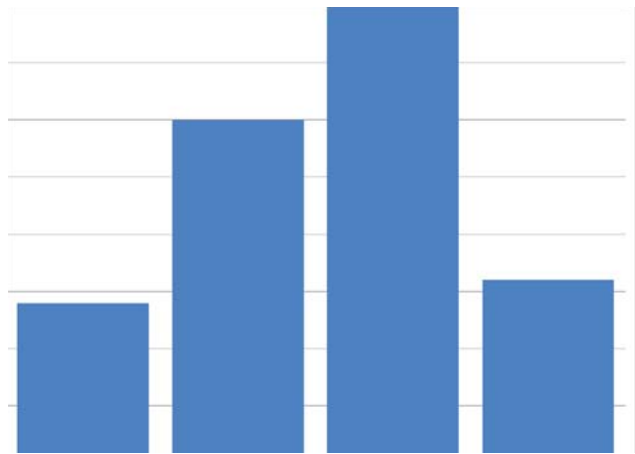
So, from the information in this table we can say that:

- Customers spent a total of \$1,000 in August 2019.
- There were 25 purchases made in August.
- The average transaction amount was \$40.
- Blaine spent the most of any customer in August, \$400.
- Blaine also has the highest average spend per transaction, \$200.
- Hope made the most transactions in August, with 8.
- Siri spent the least in August, \$140, but she had the second most transactions, 7.
- Both Siri and Hope had the lowest average spend per transaction, \$20.

## 2.21 Bar Graphs

### Graphs

One of the most useful elements of tables is the ability to turn the information into graphs. Graphs allow a person to look at numerical information, including information involving lots of data, in a **visual form**. This visual form can make it easier and faster to **interpret** data. A graph also allows for **comparisons** to be more easily made. One very useful graph is a **bar graph** (or bar chart).



### Bar graphs

- ⇒ A bar graph shows a comparison between the data of various categories.
- ⇒ A more complex bar graph can also be used to compare different variables on the same chart (using more than one set of bars).
- ⇒ The components of a bar graph are:

- **Horizontal (bottom) axis (x):** Plots the categories along the bottom, usually with spaces between the bars.
- **Vertical (side) axis (y):** Plots the amount along the side, which is usually a number, a count, a percentage or a \$ amount.
- **Heading and data labels:** These tell the reader what is indicated by the graph so you know just what the graph is showing.
- **Bars:** The height indicates the amount being graphed. The bars can be drawn using the same colour, or different colours, depending on what is represented on the graph.

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### A Bar graph

The bar graph shown in the image above gives you an idea of how a bar graph should look. In fact this graph uses the data from *Customer purchase patterns - August 2019* on p.49.

However, this graph is not very useful because it doesn't include a heading, nor labels for the different bars on the bottom (the horizontal axis), nor \$ amounts up the left-hand side (the vertical axis).

In your workbooks construct a properly labelled bar graph to show how much each of the 4 customers spent in August, 2019.

You will need to have 4 'bars' along the bottom side, (1 for each of the 4 customers).

Your scale up the left-hand side will need to start at \$0 and will have to reach as high as \$400. Why so? Your teacher will check on your progress.



## Bar graphs

Bar graphs are a good way to show numerical information because the user can very easily look at the size of the bars in order to interpret some information. We look at what each bar represents (the **label**) and the **height** of each bar (the scale) in comparison with the other bars. Of course we also first need to look at the **heading**.

A bar represents a particular **category** such as:

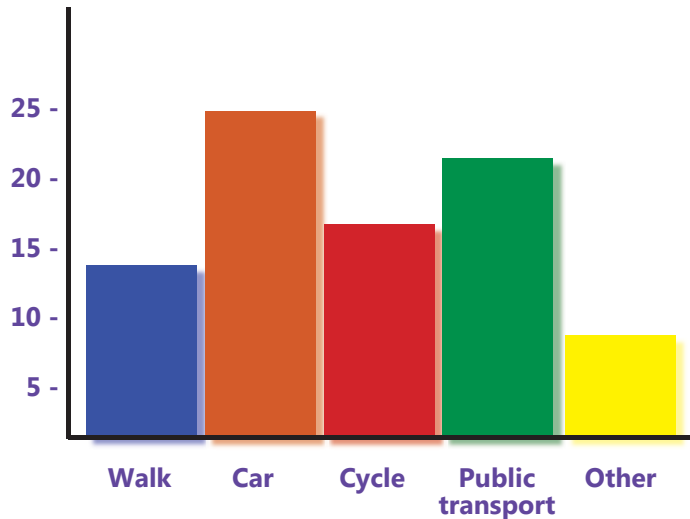
- ⇒ a person (sales by employees),
- ⇒ a time period (monthly electricity gas usage), or
- ⇒ a survey preference (favourite colour).

The height of the bars usually represent 'how much' a particular bar is measuring. For example,

- ⇒ total sales in \$ (for each salesperson)
- ⇒ total electricity used (for a particular period i.e. months), or
- ⇒ % of people surveyed whose favourite colour is pink (37%).

**Comparisons** can then be made using words such as "more", "larger" or "greater than", "less" (or "fewer"), "smaller" or "less than". We can also use comparison descriptors such as "twice as much", "half as much", "almost the same", "slightly more", "much more" (or "less") and so on. This will help the user to make key points and to interpret the visual graph in words.

Student travel method to school: Sep 4-8, 2019



Preview  
Sample:  
Do Not  
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## Bar graphs in action B

1. Answer each the following based on the bar graph shown above.

What is being measured?	What is the time period?	Approximately how many people used each method?	Which method was used most?
Which method was used least?	Which method was used about only half as much as the highest method?	Which methods were used more than walking?	What might the 'other' include?



2. Construct a similar bar graph based on a survey of your own classmates.



## 2.23 Pie Charts

### Pie chart

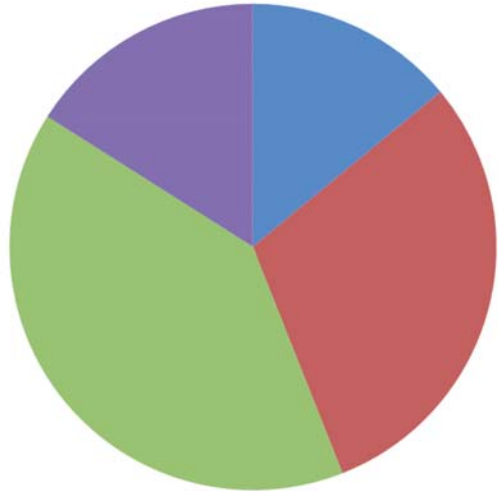
Pie charts are a good way to visually show numerical information that represents relative proportions or amounts of a whole.

So they are good for showing relative percentages.

The pie represents the whole. Each segment or slice of the pie represents a part of that pie.

Segments will usually be different sizes, unless the data is exact for each proportion.

The size of the segment will correspond to the proportion (the % of the total). Segments will also be coloured which helps the viewer to easily identify each segment.



**Pie charts**

**Preview**

**Sample:**

**Do Not**

- ⇒ A pie chart shows the relative size of different amounts shown by pie segments of a proportional size.
- ⇒ On a pie chart we can easily see the difference between variables shown by the size (or area) of the pie segments.
- ⇒ The chart should include the segments, a legend, data values (or %) and a heading.
- ⇒ When constructing a pie chart it is important not to have too many segments, otherwise it will be hard to make sense of the data. This might mean you will need an 'other' category to catch all the smaller or less frequent amounts.

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### A Pie chart

The pie chart shown in the image above gives you an idea of how a pie chart should look. This graph also uses that data from *Customer purchase patterns - August 2019* on p.49.

However, once again this chart is not very useful because it also doesn't include a heading, nor labels that indicate which portion belongs to which customer, nor the % represented by each portion.

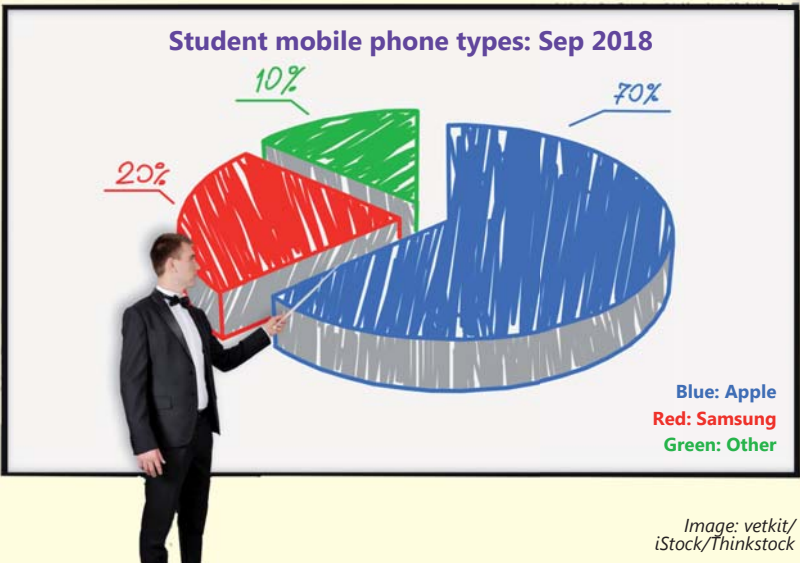
In your workbooks construct a properly labelled pie chart to show the relative proportion of how much each of the 4 customers spent in August, 2019.

You will need to have labels to show which of the customers each of the coloured portions represents.

You also need to show a % amount for each portion of the pie. You can include this at the side or put the %'s on each portion.

Pie charts in action B

- 1. Answer each of the following based on the pie chart shown here.
- 2. In your workbooks show the information from the graph in a table.



What is being measured?	What is the time period?	What type of phone did most students have?	If 100 students were surveyed what would be the numbers of phones in each category?
What about the number of phones if 50 students were surveyed?	About how many more students had Apple phones compared to Samsung phones?	What might the 'other' include?	Do you think that this pie chart should have more segments? Explain.

- 3. Survey the students in your class about their phones. Construct a table to collate the results and calculate the relative percentages.
- 4. Draw a properly labelled pie chart to show the results. Note: You are probably going to need more than 3 segments.
- 5. Summarise the results using words and numbers. Comment on whether the results are what you would expect or if they are different? Suggest reasons for these results.



## 2.25 Assessment Task

### AT2 How Much Nosh?

#### Overview

For this task you are required to estimate and calculate amounts of items needed to put on a small-scale BBQ for your class.

Your teacher might get you to work in pairs for this task. If you do this well you might actually run this BBQ as a PDS task.

You should set out your findings in tables. Prepare a report that summarises the following.

#### Part A: Estimates

- ☐ Estimate the number of **students** in your class.
- ☐ Estimate how many **sausages** you might need to feed the class.
- ☐ Estimate how many **loaves of bread** you might need.
- ☐ Estimate how many **kilograms of onions** you might need.
- ☐ Estimate how much **sauce and oil** you might need.
- ☐ Estimate how much **soft drink in bottles** you might need and how many **cups of drink** this will make.

#### Part B: Calculations

- ☐ Count the number of **students** in your class.
- ☐ Calculate how many **sausages** you will need to feed the class.
- ☐ Calculate how many **loaves of bread** you will need.
- ☐ Calculate how many **kilograms of onions** you will need.
- ☐ Calculate how much **sauce and oil** you will need.
- ☐ Calculate how much **soft drink in bottles** you will need.

#### Part C: Communicate data

- ☐ **Estimate** the **cost** of buying these items. Show these as %'s using a **pie chart**.
- ☐ **Estimate** the **time** needed for planning, buying, prep, cooking and cleaning. Show this as a **bar graph**.
- ☐ Research and **calculate** the **cost** of these items as well as the time needed for planning, buying, prep, cooking and cleaning.
- ☐ Comment on the **accuracy** of your estimates.

#### This task focuses on:


- ⇒ **making estimates of quantities**
- ⇒ **calculating by adding and subtracting**
- ⇒ **calculating by multiplying and dividing**
- ⇒ **comparing estimates to actual amounts**
- ⇒ **constructing tables, graphs and charts**
- ⇒ **interpreting and using numerical information.**

**What about vegetarians, food allergies and other issues?**

*Other information*

**Name(s):**

**Key dates:**

Tasks - AT2: How Much Nosh?	Re-quired	Due by	Done	Teacher initials
<b>Part A: Making estimates</b>				
⇒ Negotiate the task details with your teacher.	✓			
i. Estimate students.	✓			
ii. Estimate food amounts.	✓			
iii. Estimate drink amounts.	✓			
iv. Estimate other amounts.	✓			
⇒ Perform numerical calculations for estimates.	✓			
<b>Part B: Calculating totals</b>				
i. Count students.	✓			
ii. Calculate food amounts.	✓			
iii. Calculate drink amounts.	✓			
iv. Calculate other amounts.	✓			
⇒ Perform numerical calculations for totals.	✓			
<b>Part C: Data</b>				
i. Estimate cost of buying items & pop chart.				
ii. Estimate time required for different tasks & bar graph.				
iii. Research and calculate cost of buying items.				
iv. Research and calculate time required for task stages.				
v. Comment on accuracy of estimates.				
<b>Report</b>				
⇒ Prepare a draft of your report.	✓			
⇒ Use appropriate numerical language.	✓			
⇒ Prepare your final report.	✓			
⇒ Present your report (if required). 				
Additional information:				
Signed: _____ Date: _____				

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2.27 Self-Reflection

Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→

→

→

How have the skills of numeracy helped improve my personal life?

→

→

How have the skills of numeracy helped my development of work-related skills?

→

→

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Money

3

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## 3.01 Money

### Money

Money is used as the key tool to settle purchase transactions, to pay wages, to accumulate wealth and for a variety of other purposes. Money is a **medium of exchange** that uses a recognisable **currency unit** (i.e. notes and coins).

Money might exist in cash form, as cheques (mainly in business) and increasingly as digital credit amounts that utilise eCommerce payment methods.

It is important to be able to estimate and calculate using money so as to:

- ⇒ add up totals
- ⇒ estimate and make change
- ⇒ manage your day-to-day personal finances
- ⇒ maintain a household budget
- ⇒ complete day-to-day transactions in the workplace
- ⇒ manage the income and expenses associated with running a business
- ⇒ plan and save for your future.

So raise your hand if you feel you have enough money?

Anyone?

💡 Why do think this is the case?

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Image: Peter Jergen/  
Depositphotos.com

### Money, money, money

- ⇒ Money represents the value of the goods and services it can 'buy'.
- ⇒ People need to have good numerical understanding in order to better manage their money as part of their personal finances.
- ⇒ Many people are not financially literate and can find themselves in financial trouble with lots of debt.
- ⇒ Creating a personal budget is one method to help people manage their finances.
- ⇒ However, sticking to a budget requires discipline, and this is where many people struggle.
- ⇒ So, are you good with money?

💡



Image: Suriyapong/iStock/Thinkstock

A world of money A

Match each of these numbers to the correct numerical statement. Discuss these as a class by talking about what these numbers show about the 'world'.



- ☐ billion
- ☐ budget
- ☐ currency
- ☐ debt
- ☐ EFTPOS

- ☐ expenses
- ☐ income
- ☐ loss
- ☐ profit
- ☐ wage

- ☐ 5c
- ☐ 100
- ☐ \$40
- ☐ \$100
- ☐ \$18.93

The number of cents in a dollar is:

\_\_\_\_\_

Notes and coins are referred to as:

\_\_\_\_\_

One thousand millions is called a:

\_\_\_\_\_

Many people are paid according to an hourly:

\_\_\_\_\_

A business that earns more than it spends is making:

\_\_\_\_\_

A business that spends more than it earns is making a:

\_\_\_\_\_

The general term used for wages, salary, profit and interest is:

\_\_\_\_\_

The general term used for costs, overheads and expenditure is:

\_\_\_\_\_

Buying things without enough funds to pay straight away leads to:

\_\_\_\_\_

Australia's biggest 'regular' currency unit is:

\_\_\_\_\_

Australia's smallest 'regular' currency unit is:

\_\_\_\_\_

A planning tool to better manage finances is a:

\_\_\_\_\_

The minimum hourly adult pay rate in 2018/19 was:

\_\_\_\_\_

The average hourly wage in Australia (in 2018) was about:

\_\_\_\_\_

The general term for retail electronic transactions is:

\_\_\_\_\_

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### 3.03 Currency

#### Decimal currency

In Australia we use a **decimal currency**. This means that \$1 is made of up 100 cents. People then tend to count money in 10s, 100s, 1,000s, 10,000s and so on.

We use a combination of **coins** and **notes** as money. These coins and notes allow us to carry out everyday transactions. Many people also use **e-transactions** which **debit** (subtract) and **credit** (add) money from and to their bank accounts.

Small items we purchase are usually expressed in dollars and cents such as \$2.20 for a Mars Bar. Large items are usually expressed in dollars such as \$16,990 for a new Hyundai Accent.

Wages are paid as dollars and cents, such as \$10.75 per hour for a 16 year-old working in a take-way shop.

People in professional jobs are usually paid a salary expressed only in dollars such as \$57,000 per year.

You need to be able to work out the right currency units for different amounts of money. Although the use of e-transactions is growing rapidly, cash is still a major form of currency in many industries and businesses, especially for smaller transactions.

# Preview: Sample:

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How much currency do you see in this picture?

Image: robynmac/  
iStock/Thinkstock

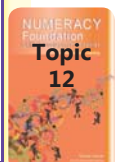




Indicate the correct combination of notes and coins needed to represent each of these amounts. Try to use the least number of currency units.

i. \$75 in notes.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>
ii. \$17.50 in notes and coins.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>
iii. \$37.75 in notes and coins.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>
iv. \$41.60 in coins.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>
v. \$245	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>
vi. \$750.85	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>
vii. \$995.95	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div> </div>

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## 3.05 Money Calculations

### In your head

One way to do simple money calculations is in your head. Developing this skill is important for many personal, social and work-related situations. So let's try and explain this. Your teacher will do this example for the class as a better way of showing you how it is done.

#### Adding money

For **addition**, add the dollar amounts first. Then keep that number in your head.

e.g.  $\$3.50 + \$2.45 = \$5$  (i.e.  $\$3 + \$2$ )

Then add the cents amounts.

$$50c + 45c = 95c$$

Now if the cents amount is less than 100 just add the cents to your dollar amount.

$$\$5 + 95c = \$5 + 0.95 = \$5.95$$

But if the added cents equal more than 100, then you need to add an extra dollar to your dollar calculation, plus the remaining cents:

e.g.  $\$10.50 + \$1.95c = \$11 + 145c = \$12.45$

## Preview

#### Subtracting money

If **subtracting** use the same steps, but by 'taking away'. First subtract the dollars.

e.g.  $\$3.50 - \$2.45 = \$1$  (i.e.  $\$3 - \$2$ )

Then subtract the cents amounts.

$$50c - 45c = 5c$$

So the answer will be.

$$\$3.50 - \$2.45 = \$1.05$$

If your subtracted cents amount is less than 0 then you need to take this amount away from your dollar calculation to get the final answer.

e.g.  $\$7.40 - \$3.80 = \$4$  (i.e.  $\$7 - \$3$ ) and  $-40c$  (i.e.  $40c - 80c$ )  
 $= \$4 - 40c$   
 $= \$3.60$

# Sample: Do Not Copy

Now what if I tell you that you can do this quite easily in your head as long as you have a basic grasp how to add and subtract numbers. Do you believe me? Have a go!

In your head add:  $\$5.50 + \$2.20 = ?$

How about:  $\$4.60 + \$8.50 = ?$

Now try a subtraction:  $\$9.70 - \$3.50 = ?$

And try:  $\$8.25 - \$4.75 = ?$

See, it's much easier to do this in your head rather than following the correct, but complex, instructions above. It's a natural numeracy skill you have developed, or can develop, through your life experiences. That's why these types of numeracy skills are about applied learning.

Note: If the calculation gets too complex then just set it out on paper and make sure you right-align!



Image: sabphoto/  
Depositphotos.com



## Calculating with money

⇒ When adding and subtracting with money the rules are the same as you learned in Section 1.

- Step 1: Do your additions.
- Step 2: And then if needed do any subtractions from that answer.

⇒ You must also make sure that you **right-align** or **right-justify** your numbers.

e.g.  $\$2 + \$7 = \$9$       e.g.  $\$27 + \$42 + \$150 =$       e.g.  $\$50 - \$20 + \$250 =$

$$\begin{array}{r} \$7 \\ + \underline{\$2} \\ \$9 \end{array}$$

$$\begin{array}{r} \$ 27 \\ \$ 42 \\ + \underline{\$ 150} \\ \$ 219 \end{array}$$

$$\begin{array}{r} \$ 50 \\ + \underline{\$ 250} \\ \$ 300 \\ - \underline{\$ 20} \\ \$ 280 \end{array} \quad \text{or} \quad \begin{array}{r} \$ 50 \\ - \underline{\$ 20} \\ \$ 30 \\ + \underline{\$ 250} \\ \$ 280 \end{array}$$

⇒ Sometimes you might be dealing with both dollars and cents; especially if you are working with items that have a small price or cost (e.g. supermarket).

⇒ So when working with money it is important to use correct **place value** to line up your calculation, because a dollar amount has 2 decimals.

e.g. \$1 = \$1.00 = 100 cents, or \$1.95 = \$1 and 95 cents = 1,495 cents.

⇒ So this means you have to carefully **right-align** when you set up your sum to keep all the correct units (and their values) in the proper place.

e.g.  $\$1.25 + \$3.75 = ?$  e.g.  $\$5.50 + \$6.45 = ?$  e.g.  $\$9.99 + \$50 - \$13.25 = ?$

$$\begin{array}{r} \$1.25 \\ + \underline{\$3.75} \\ \$5.00 \end{array}$$

$\$3.50$   
 $+ \underline{\$6.45}$   
 $\$9.95$   
 $\underline{\$4.00}$   
 $\$5.95$

$$\begin{array}{r} \$ 9.99 \\ + \underline{\$ 50.00} \\ \$ 59.99 \\ - \underline{\$ 13.25} \\ \$ 46.74 \end{array}$$

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SKILLS

Image: [ibogdan/Depositphotos.com](#)

So estimate and then calculate how much these groceries might cost in total for the shopper?



3.07 Money Calculations

A Money calculations

1. Try to complete the calculations based on money, ‘in your head’. Then check your answer on paper or using a calculator.

75 cents + \$1 =	\$10 + \$5.50 =	\$99 + \$59.99 =
50c + 90c + \$2.45 =	1,100 cents + \$12 =	\$9.95 - \$5.50 =
\$7 + \$0.75 - \$3 =	\$500 - \$100 + \$400 =	\$17.55 - \$6.55 - \$11 =
\$700 + \$975 - \$235 =	\$50.50 - \$20.80 + \$3 =	\$24.95 - \$12 + \$27.95 - \$16 =

2. Complete these calculations based on the information provided. You are going to have to estimate prices and then do the calculations. Add one transaction of your own.

A salad sandwich, a bottle of water and an apple.	A dozen eggs plus a kilo of sugar and 500gm of butter along with 2kg of gluten-free flour.
A piece of flake, minimum chips, can of lemonade and a pickled onion.	

3. When you have to multiply or divide using money, the principles are just the same as what you have learned already. However, once again you need to make sure that you have the correct place value (for \$ and c) and that you right-align your numbers (if setting these out on paper).

So complete the following calculations. Double-check with a calculator.

$\$10 \times \$5 =$	$5 \times \$2.50 =$	$\$100 \div 20 =$
$\$9.99 \times 50 =$	$\$157.50 \div 5 =$	$\$125 \div 5 + 500 =$
$\$15 \times 15 - \$30 =$	$\$10.99 - \$2.99 \times 20 =$	$\$2 + \$2 \times 20 =$

4. Complete these calculations based on the information provided. Once again you are going to have to estimate prices and then do the calculations. Add one transaction of your own.

Six cans of Pepsi Max plus 4 Mars bars.	50 litres of petrol.
A dinner for 6 people at your local restaurant. But because it is Jakko's birthday he is being 'shouted' by the others.	

### 3.09 Making Change

#### Making change

When you are buying things using **cash** the **transaction** will often involve **change**.

The **change amount** is the difference between the **purchase price** and the **money tendered**.

If you are the **customer** it is important to know that you are being given the correct amount of change. This prevents you from being **short-changed**.

If you are the **worker** then you must be able to calculate change accurately. Even if you use an **electronic point of sale register** that tells you how much change to give, you will have to manually 'make' the correct change using notes and coins.

As more and more everyday purchases are transacted using **e-commerce**, the skill of making change actually becomes more important, rather than less important. Why do you think this might be the case?

#### Making change

One step is used when:

- ⇒ it is a single purchase, or
- ⇒ the total is calculated using a cash register, POS terminal or some other means.

The correct process is:

'money tendered' less 'purchase price' equals 'change'.

*For example: Purchase \$75. Given \$100*

$$\$100 - \$75 = \$25$$

Two (or more) steps are used when:

- ⇒ there are multiple purchases, and/or
- ⇒ you have to work out the totals manually.

The correct process is:

Step 1: Calculate total purchase price using addition and/or multiplication.

Step 2: 'Money tendered' less 'total purchase price' = 'change'.

*e.g. Purchases of \$50 and \$35. Given \$100*

$$\text{Step 1: Total purchases} = \$50 + \$35 = \$85$$

$$\text{Step 2: } \$100 - \$85 = \$15$$

*e.g. Purchases of 5 items @ \$12. Given \$100*

$$\text{Step 1: Total purchases} = 5 \times \$12 = \$60$$

$$\text{Step 2: } \$100 - \$60 = \$40$$

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#### Change process

Making change might involve 2 or 3 of the 4 basic calculation functions. Remember that the 'money tendered' is the amount that a customer hands over for payment.

- ⇒ Addition: Calculating total purchases.
- ⇒ Multiplication: Calculating total purchases for multiple items.
- ⇒ Subtraction: Calculating the change by taking away the purchase amount from the amount given (tendered) by the customer.
- ⇒ In some cases division might also be needed such as when calculating bill splitting.



Image: pawelhelbik1985/  
Depositphotos.com

Making change I A

Indicate the correct combination of notes and coins needed to make change for each of these transactions. Try to use the least number of currency units.

i. Purchase of \$55. Given a \$100 note.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>
ii. Purchase of \$7.95. Given a \$20 note.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>
iii. Purchase of 2 items for \$75 each. Given 2 x \$100 notes.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>
iv. Total sales = \$73.50. Given a \$50, a \$20 and 2 x \$2 coins.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>
v. Purchase of 5 items @ \$3:00 Given a \$50.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>
vi. Purchase of 3 x \$2.50, 2 @ \$5:00. Given 2 x \$10 notes.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>
vii. Purchase of \$50 and purchase of \$52.50. Given 5 x \$20s.	<div>\$100</div> <div>\$50</div> <div>\$20</div> <div>\$10</div> <div>\$5</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>x _____</div> <div>\$2</div> <div>\$1</div> <div>50c</div> <div>20c</div> <div>10c</div> <div>5c</div>

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### 3.11 Making change

#### Counting change

One tried and true method of making the correct change is by using a physical counting method.

The best physical counting method involves counting up from the purchase amount using the currency units to move to round numbers.

This usually involves placing the change either in the customer's hand or down on the counter.

*So for example, if the customer makes a purchase for \$27.50 and tenders a \$50 note the process is as follows.*

*"\$27.50 plus 50c equals \$28.00. \$28.00 plus \$2 equals \$30.00. \$30.00 plus \$20 equals \$50."*

A second method is to make the change from the biggest units through to the smallest units starting from the purchase price.

*So for the same example:*

*\$27.50 plus \$20 equals \$47.50. \$47.50 plus \$2 is \$49.50. And \$49.50 plus 50 cents equals \$50."*

A third method is to just physically count the change amount.

So for the same example:

*"Purchase is \$27.50 so your change is \$22.50. That's \$20 plus \$2 plus 50 cents. Your change of \$22.50 plus the purchase price of \$27.50 equals \$50."*



Which method do you think you would prefer using? Have a go using training currency and try for yourself!

**When balancing your register at the end of the day, counting the coins can take the longest time!**

#### Counting change

You physically count and say aloud the currency units to make the change.

- ⇒ State the amount tendered.  
*"You gave me a \$20."*
- ⇒ Then 'state' the purchase price  
*"Your purchase was \$14.50."*
- ⇒ Count up to whole numbers by counting the change out from lowest unit to highest unit.  
*"\$14.50 + 50c makes \$15."*
- ⇒ Count the next highest unit.  
*"\$15 + \$5 makes \$20."*
- ⇒ Finish to get to the amount tendered.  
*"Your change from \$20 is \$5.50."*
- "Thank you and come again!"*

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Image: DannyIrvine/  
iStock/Thinkstock





Making change II B

Work out the change for each of these purchases and amounts tendered. Then count out the currency notes and/or coins to make the change.

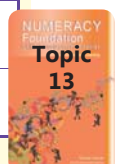
Purchase	Amount	Change	Currency
e.g. \$7.50	\$10	\$2.50	\$2 + 20c + 20c + 10c
\$5.75	\$10		
\$3.15	\$10		
\$9.45	\$10		
\$7.80	\$10		
\$2.20	\$10		
\$4.80	\$10		
\$1.45	\$10		
\$6.60	\$10		
\$0.75	\$10		
\$5.99	\$10		

Purchase	Amount	Change	Currency
e.g. \$16.30	\$20	\$3.70	\$2 + \$1 + 50c + 20c
\$9.25	\$20		
\$17.50	\$20		
\$15.00	\$20		
\$3.75	\$20		
\$19.40	\$20		
\$1.55	\$20		
\$6.25	\$20		
\$14.50	\$20		
\$7.30	\$20		
\$0.95	\$20		

Purchase	Amount	Change	Currency
e.g. \$26.50	\$50	\$23.50	\$20 + \$2 + \$1 + 50c
\$11.80	\$50		
\$2.75	\$50		
\$29.95	\$50		
\$48.50	\$50		
\$49.75	\$50		
\$17.50	\$50		
\$22.00	\$50		
\$0.95	\$50		
\$32.50	\$50		
\$15.25	\$50		

Purchase	Amount	Change	Currency
e.g. \$38.75	\$100	\$61.25	\$50 + \$10 + \$1 + 20c + 5c
\$61.50	\$100		
\$28.75	\$100		
\$75.50	\$100		
\$92.00	\$100		
\$82.25	\$100		
\$16.75	\$100		
\$9.60	\$100		
\$33.50	\$100		
\$54.15	\$100		
\$41.75	\$100		

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### 3.13 Money - Rounding

#### Round numbers

When dealing with money it is important to keep track of how much things cost (the purchase price). It is also important to be able to know how much change you should give or receive when completing money transactions. It is also important to know how much you are spending in total so as to have control over your own personal finances and budget.

The previous topics have supported you to develop your numerical calculation skills related to money. Another numerical skill that can assist you is that of estimating.

One effective approach to numerical money estimating is to use rounding. Rounding helps you to be able to estimate roughly how much you are **spending** when making purchases. It also enables you to **estimate** approximately how much **change** you should be given, or should give, when participating in money **transactions**.



Image: aarett/  
iStock/Thinkstock

## Preview Sample:

Recall that it is better to round to 'friendly' numbers that are more easily calculated in your head. e.g. 5, 10, 20, 50, 100.

⇒ When rounding for money purchases use even dollar amounts and 50 cent amounts. e.g. \$3.90 becomes \$4, \$2.35 becomes \$2.50. \$1.05 becomes \$1.

In most cases you should:

- ⇒ round up for 'money spent' (e.g. costs, time, quotes, materials, expenses, etc.). This means that you are playing it safe and over-estimating potential costs.
- ⇒ round down for 'money in' (e.g. income, revenue, time saved, etc.). This also means that you are playing it safe and under-estimating potential benefits.

For currency transactions use rounding to estimate the major currency units you should use, or be given as change.

*e.g. Purchase a meat pie of \$4.80. Pay with a \$10 note.*

*By using rounding the pie costs about \$5.*

*By using rounding you should get at least \$5 change.*

*You will expect to receive a \$5 note; or perhaps 2 x \$2s and a \$1 in your change (or some other combination of currency units); and a coin.*

*e.g. Purchase the meat pie of \$4.80 and a bottle of Pepsi Max for \$2.75. Pay with a \$10 note.*

*By using rounding the pie costs about \$5 and the Pepsi costs about \$3. Together the rounded total = \$8.*

*By using rounding you should get at least \$2 change. You have rounded both of your purchases up so you will expect some more small coins as well as the \$2.*

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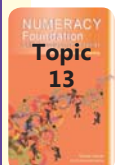
Rounding purchases A

1. Use rounding to complete the table for the following transactions.  
(You might even use training currency for this task.)

Purchase amount	Rounded amount	Money tendered	Estimated change	Estimated currency	Exact change	Exact currency
e.g. \$6.75	\$7	\$10	\$3	\$2 + \$1	\$3.25	\$2 + \$1 + 20c + 5c
\$2.95	\$	\$5	\$		\$	
\$1.25	\$	\$5	\$		\$	
\$9.45	\$	\$10	\$		\$	
\$7.80	\$	\$10	\$		\$	
\$1.95	\$	\$10	\$		\$	
\$14.80	\$	\$20	\$		\$	
\$15.10	\$	\$20	\$		\$	
\$17.75	\$	\$20	\$		\$	
\$4.95	\$	\$10	\$		\$	
\$33.75	\$	\$50	\$		\$	

2. Use rounding to complete the table for the following multi-step transactions.  
(Once again you could even use training currency for this task.)

Purchase amounts	Calculation	Rounded amount	Money tendered	Estimated change	Estimated currency	Exact change	Exact currency
e.g. \$2.50 + \$2.25	= \$4.75	\$5	\$10	\$5	\$2 + \$1 + 20c + 5c	\$5.25	2x \$2 + \$1 + 20c + 5c
\$1.90 + \$1.99		\$	\$5	\$		\$	
\$3.25 + \$2.70		\$	\$10	\$		\$	
\$4.95 + \$3.95		\$	\$10	\$		\$	
75c + \$1.55 + \$14.50		\$	\$20	\$		\$	
\$2.75 x 3		\$	\$50	\$		\$	
\$41 + \$2.85		\$	\$50	\$		\$	



## 3.15 Comparing Prices

### Comparing prices

An important numeracy skill that people need as part of their everyday lives is to compare prices. When comparing prices it is important that you take into account other issues such as product **quality**, product **features** and whether you actually **need** that quantity of product in the first place.

Developing the ability to compare prices will help you to:

- ⇒ be able to compare the **relative price** of different sized products
- ⇒ make your dollar go further when making purchases to help save money
- ⇒ manage your finances as part of a personal budget
- ⇒ factor in issues such as personal preferences, product quality and product features
- ⇒ be more effective as an employee in relation to the cost of inputs.

### Comparing Prices: Issues to Consider...



### False economy

The concept of false economy means that although you think you might be saving money in the short-term, you are likely to end up spending more money in the long-term. Here are some examples, but you should be able to think of more.

- ☹ Buying more than you need and ending up wasting most of the item. e.g. You buy a discounted box of fruit and most of it goes bad before you can eat it all.
- ☹ Buying cheaper items on special but then consuming more than you would've. e.g. Instead of 1 packet of chips for \$4.50 you buy 2 for \$7 on special. Not only do you spend more, you end up scoffing down twice as much!
- ☹ Buying low quality goods that break down and need to be replaced, e.g. A tradie buys cheap power tools that end up costing more in money and lost time.

Comparing prices **A***Part A: Comparing prices*

Jatz is having some friends over and she is going to offer some light snacks and sandwiches. After researching online and in catalogues she has put together a table of this week's prices for the key products she wants to buy.

1. Calculate the totals of the 'basket of goods' at each of the supermarkets.
2. List an 'other' source for each of these products along with a price.
3. From which supermarket or supermarket(s) would you recommend Jatz source her products? Explain using evidence.
4. What other issues should Jatz take into account when choosing between these different sellers?

Product	Size	Coolworths	Boles	IPA	Baldi	Other
Wholegrain bread	680 gm	\$3.50	\$3.50	\$3.85	\$2.79	
Free range eggs	dozen	\$5.75	\$6.25	\$5.99	\$4.85	
Iceberg lettuce	na	\$1.50	\$2.99	\$3.50	\$1.50	
Curry powder	100 gm	\$2.45	\$2.35	\$1.99	\$2.15	
Tasty cheese slices	24 pack	\$6.50	\$6.20	\$5.77	\$4.99	
Tomatoes	1 kg	\$4.99	\$6.99	\$5.99	\$5.25	
Hummus dip	250 gm	\$3.45	\$2.49	\$3.50	\$1.79	
Packet of crackers	250 gm	\$1.50	\$1.25	\$1.50	\$0.99	
Cola drink	2 litres	\$1.40	\$1.10	\$1.50	\$0.99	
Totals		\$	\$	\$	\$	

*Part B: Comparing prices in action*

Choose shopping items that your household regularly purchases. Research their current prices from different sellers. Check for any items on special.

Complete a table like the one above. Calculate the total price for the 'basket of goods' and potential savings.

Make recommendations to help your family's shopping budget, e.g. should they shop around more?

*Part C: Comparing sizes*

Sometimes you will have to compare the price of different sized items.

Supermarkets are required to display the price per amount, such as price per litre, or price per kg. Choose an item you consume regularly and research the 'price per amount' of different-sized products (drinks are a good example).



### 3.17 Comparing Prices

#### Line graph

The most common way to show connected data or numerical information over **time** is to use a line graph. Line graphs are generally used to plot data that is connected as part of a **time series** (or over time).



A line graph spaces the **time periods** of the data (such as monthly sales) along the **bottom** (or horizontal) axis using an even scale.

The amounts indicated by the **data** (or the **numerical information**) are shown up the **side** of the graph, also using an even scale (the vertical axis).

Joining the dots gives us an easy way to see **high**s and **low**s, as well as the overall **trend** of the data.

Line graphs are commonly used to represent data such as the weather over time, business sales and profit, savings amounts, personal achievements such as fitness data and weight changes and other information.

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- ⇒ A line graph shows a variable over an extended period of time.
- ⇒ The components of a line graph are:
  - **The Horizontal (bottom) axis (x):** Plots the timespan (time series)
  - **The Vertical (or side) axis (y):** Plots the variable amounts over time
  - **Heading and data labels:** Tells the reader what is indicated by the **graph**
  - **Data line:** Shows the data in visual graph form.
- ⇒ A line graph can also be used to show different variables on the same chart so as to make quick and simple visual comparisons of the data.

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#### A Line graph

Have a look at the line graph shown above. Once again it doesn't include headings or data labels. Fill in the blanks to explain what is missing.

Along the b\_\_\_\_\_ there should be some type of a t\_\_\_\_\_ period, such as weeks. Up the side there should be some type of a s\_\_\_\_\_ in numbers (or numerical information) to show what the graph is measuring.

This graph has a starting point and then includes \_\_\_\_\_ periods of time.

Overall, the t\_\_\_\_\_ of the graph is upwards.



*Part A: Fuel lines*

A line graph is a good way to visually represent changes in price over time.

e.g. Sheree was keeping an eye on fuel prices at her local servo. She picked a Thursday as the comparison day. This week the price was \$1.56/litre. Last week it was \$1.52. The week before that it was \$1.68. 3 weeks ago the price was \$1.50 and the week before that the price was \$1.43.

1. Draw a properly labelled line graph based on Sheree's investigation of petrol prices over time. (Below, in your workbooks, or on a device).
2. In one sentence describe the trend of the graph in your workbooks.

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Do you notice that although Sheree has found that the price of petrol has varied a lot, the graph doesn't really 'show' much change visually. This means that plotting the full price might not give a true indication of price changes.

3. Cut out a piece of cardboard or paper to cover up your graph all the way up to \$1.40. How would you describe the trend of the line graph now. Does this give a better indication of the situation? Why/why not?

*Part B: Up, up and away - or down?*

Choose 3 items that you or your family commonly buy which can fluctuate (change) in price. e.g. Fresh fruit and vegetables, meat products, petrol, etc..

- a. Record the prices of these items over a 4-week period. Record in a table.
- b. Draw line graphs to show these price changes over time.
- c. Comment on your findings.
- d. Do these price changes, or does this price stability, surprise you? Explain.



## 3.19 Calculating Discounts

### Discounts

A discount is an amount that is deducted from the normal price or cost of an item. Some discounts are good; but others are used to encourage you to purchase more of an item than you actually need. So therefore, there are many instances when you might have to estimate or calculate if a discount is indeed, a 'good bargain', or just a waste of more of your money.



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Discounts are normally applied as a % reduction to a retail or wholesale price. Most (but not all) discounts are calculated using percentages (see p.47).

e.g. i: End of season clearance on jackets - save 50%

e.g. ii: Buy 2 and save 25% off both

i. 50% off

Normal price = \$100

Discount =  $\$100 \times 50\% = \$50$

New price =  $\$100 - \$50 = \$50$

ii. 25% off for 2 items

Normal price = \$30 and \$30

Discount =  $(\$30 + \$30) \times 25\%$

Discount \$ =  $\$60 \times 25\% = \$15$

New total =  $\$60 - \$15 = \$45$

e.g. iii: Buy two pizzas get a third for free! (Offer applies to lowest priced item).

iii. Buy two pizzas get a third free.

Normal price = \$16, \$14 and \$10 = \$40

Total price paid =  $(\$30 + \$0)$

Discount \$ =  $\$40 - \$30 = \$10$  (normal price less price after discount)

Discount % =  $\$10/\$40 \times 100\%$

= 25%

💡 (So, what is the after discount average price of each pizza?)

NUM  
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SKILLS

## Calculating discounts A

1. Estimate the discount for each of these transactions. How much will the total be after the discount?
2. Calculate the discount amount and the total amount after discount, showing your workings. How close were your estimates?

Purchase a pair of boots at \$90. Discount will be 10%	Purchase a packet of chips at \$4.50. Sale says get 20% off the price.
See an airfare online for \$200. Early booking discount will be 25%	Computer is on sale. Regular price is \$1,500. Discount will be 40%
Want to buy a new bike. It's \$350 at the bike shop, or \$400 online but with a 15% discount	Sale offer is 'buy 2 pairs of undies for \$10 and get a 3rd pair for free'.
2 for 1 deal sees 50% off the second shirt. 1st shirt is \$60, 2nd is \$40. What is the total discount?	Offer says buy 10 of the same items and get the 11th free. What is the discount in %?

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3. These transactions already have had a discount applied to them. Calculate the \$ amount of the discount showing your workings.

Pay \$10 after a discount of 50%.	Pay \$75 after a discount of 25%.	Pay \$400 after a discount of 20%.
-----------------------------------	-----------------------------------	------------------------------------

4. Calculate both \$ amount of the discount and the % amount of the discount.

Buying 1 and getting the 2nd identical item free meant a total of \$75.	5 pizzas for the price of 4 and the total was \$40.	Bulk buy discount meant 1,000 items for \$10,000 instead of \$12,000.
---	---	---

## 3.21 Assessment Task

### AT3 Working with Money

#### Overview



#### Part A: Money and change

For this task you are required to participate in a practical exercise that involves:

- ⇒ calculating purchase amounts for **simulated transactions**
- ⇒ making correct change as a **worker**
- ⇒ checking for correct change as a **customer**.

Prepare a report that summarises your strengths and weaknesses.

Your teacher will observe and record your success in participating in this simulation. (You might use training currency for this activity.)

#### Part B: Investigation

You are required to compare the prices of a set of products (goods). As part of your investigation you will need to:

- ⇒ compare the prices of **different size goods**
- ⇒ compare the price of **similar goods** made by **different producers**
- ⇒ compare the prices of goods offered by **different sellers**
- ⇒ compare the prices of goods over a **2-week time period**
- ⇒ identify if any of the products are **on sale** and estimate and/or calculate the **discount amount** and **discount %** for these products.

#### Report

You are then required to **report** on your findings. In your report you should include the following.

- a. Use **tables** to record, collate and show your information.
- b. Create at least **2** different **graphs** to show your information.
- c. Discuss your **findings**, using numerical information and words in relation to:
  - ⇒ different-sized goods
  - ⇒ similar goods from different producers
  - ⇒ the same goods offered by a different seller
  - ⇒ differences in prices over time
  - ⇒ discounts and savings.
- d. From your findings you will then need to come up with **5 clear recommendations** for consumers based on your investigation.

#### This task focuses on:

- ⇒ **calculating financial transactions**
- ⇒ **estimating and making change**
- ⇒ **checking accuracy of change**
- ⇒ **comparing prices**
- ⇒ **estimating/calculating discounts.**

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**Name(s):**

**Key dates:**

Tasks - AT3: Working with Money	Re-quired	Due by	Done	Teacher initials
<b>Part A: Working with money</b>				
⇒ Negotiate the task details with your teacher.	✓			
i. Calculate total purchase amounts.	✓			
ii. Make correct change as a worker.	✓			
iii. Estimate and check change as a customer.	✓			
iv. Comment on your strengths and weaknesses.	✓			
<b>Part B: Price investigation</b>				
⇒ Compare the prices of different-sized goods.	✓			
⇒ Compare prices of similar goods from other producers.	✓			
⇒ Compare prices of goods offered by different sellers.	✓			
⇒ Compare prices of goods over a 4-week time period.	✓			
⇒ Identify and calculate any discount amounts and %'s.	✓			
<b>Part C: Reporting</b>				
a. Use tables to record, collate & show your information.	✓			
b. Create graphs to show your information.	✓			
c. Discuss your findings using numerical information & words.	✓			
d. Come up with 5 clear recommendations.	✓			
⇒ Prepare and submit your final report.	✓			
⇒ Present your report if required.				

Additional information:

3.23 Self-Reflection

Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→

→

→

How have the skills of numeracy helped improve my personal life?

→

→

How have the skills of numeracy helped my development of work-related skills?

→

→

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Money Matters

# 4

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Activities 4: Money Matters	p.	Due date/Done?	Comment
4.02A <b>Order, order</b>	83	<input type="text"/>	<input type="text"/>
4.04B <b>Income</b>	85	<input type="text"/>	<input type="text"/>
4.06A <b>Budgeting 101</b>	87	<input type="text"/>	<input type="text"/>
4.07B <b>Feed the kitty</b>	88	<input type="text"/>	<input type="text"/>
4.08C <b>Personal budget</b>	89	<input type="text"/>	<input type="text"/>
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4.11A <b>Financial documents</b>	92	<input type="text"/>	<input type="text"/>
4.12B <b>Sales receipt</b>	93	<input type="text"/>	<input type="text"/>
4.13C <b>Financial language</b>	94	<input type="text"/>	<input type="text"/>
4.14D <b>Mobile bill</b>	95	<input type="text"/>	<input type="text"/>
4.16A <b>Banking - Deposit accounts</b>	97	<input type="text"/>	<input type="text"/>
4.18B <b>Banking - Loans and credit</b>	99	<input type="text"/>	<input type="text"/>
4.19C <b>Savings and loans</b>	100-101	<input type="text"/>	<input type="text"/>
4.22A <b>Playing it safe - Cash</b>	103	<input type="text"/>	<input type="text"/>
4.24B <b>Playing it safe - Digital</b>	105	<input type="text"/>	<input type="text"/>
<b>AT4 Financial Literacy</b>	106-107	<input type="text"/>	<input type="text"/>
4.27 <b>Self-Reflection</b>	108	<input type="text"/>	<input type="text"/>

Comments:

## 4.01 Dollars and Sense

### Dollars and sense

In Section 3 you used some key numerical skills to work with money. Money management (often called **personal financial management**) is an extremely important skill-set to have in order to make your own personal life more rewarding and successful.

Work-related tasks are driven by financial matters in **profit-making** businesses such as local cafés, shops, farms, trades and manufacturers; all the way through to large organisations such as Woolworths and McDonald's. You might have to use money

when dealing with customers and clients, ordering stock and supplies, preparing quotes to cost jobs and of course when being part of a successful business!

Many people also work for **not-for-profit** enterprises such as schools, hospitals and welfare organisations. Others work for **government agencies** such as local councils or government departments. Not-for-profits and government agencies are driven by strict budgetary constraints. So once again, the ability to deal effectively with money in work-related situations is vital.

And of course there is also the issue of the **wages** you earn, which are paid for your time, **labour**, skills and expertise. You need to know how to calculate your wages. You also need to be able to check that you are being paid correctly.

As part of your own personal financial management you also need to know how to manage your money wisely including the ability to plan and follow a **budget**.



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### Order of operations

When you work through some of the activities in this part of Numeracy Foundation you might have to combine calculations using addition, subtraction, multiplication and division. Doing so is a normal part of both personal and work-related money management.

*For example, you might earn \$10 an hour for 30 hours plus \$12 an hour for another 10 hours of overtime. Working out your total pay for the week combines both addition and multiplication. So, how might you set out the calculation to work this out?*

$$\text{e.g.} = \$10 \times 30 + \$12 \times 10 = \text{Total pay for the week} = ?$$



What answer did you get? Your teacher will discuss how to do this with the class and check to see who got it correct and who made the common mistake that many people do.

There is a set of rules that govern the order in which to do these type of calculations. This involves you following the correct **order of operations** for these types of calculations.

**Order, order**

When performing a calculation the order of operation is as follows.

1. You move from left to right performing any **multiplication** or **division**.  
It doesn't matter which of these you do first as long as you move from left to right.

$$\begin{aligned} \text{e.g. } 4 \times 5 + 3 \times 10 &= \\ &= 20 + 30 \end{aligned}$$

Tip: You can also show  
this as brackets ( ).

$$\text{e.g. } (4 \times 5) + (3 \times 10) =$$

2. Finally you move from left to right performing any **addition** or **subtraction**.  
(Once again it doesn't matter which of these you do first as long as you move from left to right.)  
 $= 50$  (and not 230!!)

**Advanced**

There is one other rule which comes before the others. You must always evaluate anything in **brackets** before doing anything else. You might not encounter this in the work your teacher sets you, but you might see this in the 'real' world.

$$\begin{aligned} \text{e.g. } 2 + (5 \times 6) &= \\ &= 2 + 30 \\ &= 32 \text{ (and not 42!!)} \end{aligned}$$

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**Order, order A**

Perform these calculations using the correct order of operations.

a. $3 + 4 \times 7 =$	
b. $10 \div 2 + 8 =$	
c. $14 \times 4 - 10 =$	
d. $10 \times 4 - 16 =$	
e. $2 + 2 + 2 \times 2 =$	
f. $2 + (2 + 2) + 2 =$	
g. $(2 + 2) \div 2 + 2 =$	
h. $(2 + 2) * (2 - 2) =$	



## 4.03 Dollars and Sense

### Income

So how's your income situation? Income is money that you earn from various sources. The most common form of income is from **wages** and **salaries** earned from being an **employee**. In Australia about 12 million people are 'employed'; and about 2 million of these earn **profits** as a result of owning and operating businesses. Other people might receive **transfer income** from the government through various **welfare payments** (such as aged pensions and the Newstart allowance). Many people also earn **investment income** in the form of:

- ✓ **interest** from savings
- ✓ **dividends** from owning shares
- ✓ **capital gains** from selling assets (shares, property, art, etc.) and
- ✓ **rent** from investment properties.

These various sources of income allow us to enjoy a **standard of living** whereby we can purchase goods and services, **save** for the future and achieve and maintain our chosen **lifestyle**.

**Gross income** (gross salary or gross wage) refers to the amount of income earned by an individual before any deductions such as income tax and superannuation contributions are taken out. Gross income is the amount an employer pays to employ a worker in that role. e.g. Gross salary of \$83 K/year for a gross wage of \$40/hour.

**Net income** (net salary or net wage) refers to the amount of income an employee has remaining after their employer has taken out these **deductions**. Sometimes people refer to net income as their '**take-home pay**'. Net income is what's left to take home after their employer sends the employee's tax to the ATO, and after the employer transfers superannuation amounts to a super fund to invest for the employee.

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Image: p\_saranya/  
iStock/Thinkstock

#### Wages

- ⇒ Wages are income amounts paid for an employee's labour and determined on an hourly basis.
- ⇒ Wages normally apply in trades, for skilled and semi-skilled employees and other employees.

#### Salaries

- ⇒ Salaries are income amounts paid to professionals and 'higher-skilled' or managerial employees.
- ⇒ Salaries are calculated (but not paid) on a yearly (annual) basis.

#### Commission/Retainer

- ⇒ A commission is an incentive payment usually based on a proportion of sales, fees or revenue, and is often used for people in sales roles.
- ⇒ A retainer is a base level of payment made in conjunction with a commission.

**Payment-in-kind**

- ⇒ Payment-in-kind refers to non-monetary payments given in return for labour.
- ⇒ For example, a caretaker who is employed at an isolated island resort might receive payment-in-kind of accommodation and food in addition to their wages.

**Income B**

Complete the following sentences using the most appropriate 'income' term. Then calculate the answers asked in the question.

a. Jon works at Splash Converters as a customer sales assistant. He is paid \$20 for each hour he works. John's form of income is called a \_\_\_\_\_.

How much does John earn for a standard 38 hour full-time week?

b. Jon's partner Amal works full time as a financial manager. She is paid according to an annual amount of \$52,000. Amal's form of income is called a \_\_\_\_\_.

How much does Amal earn (approximately) for a standard full-time working week?

c. Jon and Amal's housemate Sonya is a sales rep. Sonya is paid a \$20,000 annual amount plus 20% of the total sales value she makes to clients (all paid monthly). Sonya's form of income is called \_\_\_\_\_ & \_\_\_\_\_.

If Sonya averages \$200K of sales in a year, how much would she be paid for these sales; and also in total?

d. Sonya's brother Rodderick works as the maintenance caretaker for a holiday resort. He gets paid an annual salary of \$41,600 plus free accommodation (valued at \$400/week) and free meals and non-alcoholic beverages (valued at \$200/week). These extra income amounts are called \_\_\_\_\_.

So how much does Rodderick 'get' in income per week, and per year?

e. Afram earns \$800 per week and takes home \$650 after tax. How much is Afram's gross pay \_\_\_\_\_ and net pay \_\_\_\_\_?

f. Bessie is 77, doesn't work but is otherwise in good health. She receives a fortnightly welfare payment from the government of \$826. This payment is likely to be the \_\_\_\_\_.

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## 4.05 Personal Budgets

### Personal budgets

Being able to create and manage a **personal budget** is an essential component of your life. A budget will help you balance your '**money in**' (e.g. allowance, wages and so on) versus your '**money out**' (e.g. spending and other costs).

Many people find that their money out (their **expenditure**) far outweighs their money in (their **income**). As a result they have to go into **debt** - which can be a severe long-term problem!

It is essential that you manage your expenditure and minimise the use of **credit**; especially seemingly easy sources of credit such as credit cards, 'payday' or instant loans and interest-free purchase contracts.

You also need to explore income sources such as **wages** and **salaries**, interest income and **government benefits** and assistance.

Balancing your money out with your money in will enable you to better manage your day-to-day financial obligations. Doing so can also assist you to plan and **save** for longer-term spending requirements, such as a new phone, a holiday, a car or even to save for your future.

### Budgeting

A budget is a financial management planning tool that lists all of your forecasted income and expenses over a period of time. A budget allows you to:

- ⇒ estimate if you expect to have more money coming in, which is called a **surplus** (i.e. you earn more than you spend; so  $\text{income} > \text{expenses} = \text{surplus}$ )
- ⇒ estimate if you expect to have more money going out, which is called a **deficit** (i.e. you spend more than you earn, so  $\text{expenses} > \text{income} = \text{deficit}$ )
- ⇒ plan your spending more responsibly
- ⇒ take control of your finances

When budgeting it is important to be as accurate as possible and to list all of the expenditure items that you are likely to encounter.

You should also budget for 'other' expenses; some of these unknowns are likely to crop up unexpectedly.

An important aspect of budgeting is to compare your forecasted amounts with the actual amounts to see how much **variation** has occurred. By doing this you are checking to see how well you are going at managing your money, and if you are being realistic in your spending. This will help you plan more accurately in the future.



Image: Viola08/iStock/Thinkstock





1. What is a budget and why is a budget important?

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2. What are some of the most common sources of **income** (or **money in**) for a young person in your situation in life?

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3. What are some of the most common type of expenses (or **money out**) for a young person in your situation in life?

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4. What is the difference between a **surplus** and a **deficit**?

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5. Calculate the following budget monthly outcomes (surplus, deficit or balanced).

- a. Income: \$450, Expenses: \$375. Result is a \_\_\_\_\_ of = \$
- b. Income: \$1,250, Expenses: \$1,500. Result is a \_\_\_\_\_ of = \$
- c. Income: 2 x \$350, Expenses: \$950. Result is a \_\_\_\_\_ of = \$
- d. Income: \$800 x 3, Expenses: \$600 x 4. Result is a \_\_\_\_\_ of = \$
- e. Income: \$950, Expenses: \$850 + \$95. Result is a \_\_\_\_\_ of = \$
- f. Income: \$0, Expenses: \$50. Result is a \_\_\_\_\_ of = \$

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## 4.07 Personal Budgets

### B Feed the kitty

Consider this budget for 2 housemates, Revi and Singo. They both work as regular casuals but they can't predict their exact work hours for each week. The expenses in the budget represent the total amount that they have to contribute to the household kitty. Therefore this budget doesn't include their own personal expenses as part of their normal day-to-day lives.

1. Calculate whether they are likely to have a **surplus** or **deficit** for the month.
2. What would be some **other household expenses** they might have to meet?
3. Calculate whether they had an **actual surplus** or **deficit** for the month.
4. Why might this **variation** have occurred?
5. What are Revi and Singo going to have to do about their household budgeting and their own **financial management**?

Cash Budget/Financial Planner					
Name: Revi Marshall & Singo Berlingo (housemates)					
Situation: Household budget			Date(s): May, 2019		
Income	Forecast \$	Actual \$	Expenditure	Forecast \$	Actual \$
Revi's income week 1	275	275	Rent	1000	1000
Singo's income week 1	350	350	Electricity	125	175
Revi's income week 2	275	275	Gas	50	40
Singo's income week 2	50	100	Food & beverages	400	600
Revi's income week 3	325	325	Phone	50	50
Singo's income week 3	350	350	Household products	50	35
Revi's income week 4	400	325	Insurance	40	0
Singo's income week 4	50	0	Entertaining	100	150
Other:			Other:	25	25
			Other:	25	25
<b>Total Revenue</b>			<b>Total Expenditure</b>		
Forecasted Surplus			Forecasted Deficit		
Actual Surplus (savings)			or Actual Deficit (debt)		



# Personal budget C

1. Use this planner to forecast a monthly budget for yourself based on your current lifestyle situation.
2. Keep track of your income and expenses. Then at the end of the month you can compare your **budget estimates** to your **actual income** and **actual expenses** to see how accurate you were.

Cash Budget/Financial Planner					
Name: _____					
Situation: _____				Date(s): _____	
Income items	Forecast \$	Actual \$	Expense items	Forecast \$	Actual \$
Total Revenue			Total Expenditure		
Forecasted Surplus			Forecasted Deficit		
Actual Surplus (savings)			or Actual Deficit (debt)		

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## Research

Go online and find some budgeting tools and apps. Try these to see how useful they are for young people at your stage of life. Report back to the class. (Be careful some of these free tools are actually trying to sell you a product such as a budgeting service - which is not likely to be free at all!)

## 4.09 Pay Slips

### Pay slip

A pay slip is a hard copy or digital document that must be issued by law for each pay period. Pay slips should include the following.

#### Basic information:

- ✓ employer's name and ABN
- ✓ employee's name.

#### Pay information:

- ✓ the pay period and date of payment
- ✓ amounts for gross and net pay.

#### Pay rate information:

- ✓ If the employee is paid an hourly rate (i.e. a wage):
  - ⇒ the ordinary hourly rate
  - ⇒ the number of hours worked at that rate during the pay period
  - ⇒ the total dollar amount of pay at that rate for the pay period.
- ✓ Or if the employee is paid a salary - the annual gross salary amount.
- ✓ A pay slip usually will also include:
  - ⇒ loadings, allowances, bonuses, incentive, penalty rates, other entitlements, leave balances, etc., and other information.

#### Deduction information:

- ✓ amount and description of each deduction (such as income tax and employee superannuation contributions), as well as total deductions made
- ✓ any superannuation contributions made by the employer for the employee
- ✓ details of the superannuation fund to which contributions have been made.

#### Summary information:

- ✓ The total gross and net payments made for the pay period.



**"Which day do all workers like most - pay day of course!"**

Image: kritchanut/  
Depositphotos.com

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<b>P&amp;Q Enterprises</b>		<b>ABN: 45 214 4875</b>	<b>Date:</b>	<b>June 16, 2019</b>
<b>Employee: Glonsork Elver</b>			<b>Period:</b>	<b>June 9-13, 2019</b>
<u>Entitlements</u>			<u>Deductions</u>	
<i>Ordinary hourly rate:</i>	<i>Total</i>	<i>Total</i>		
\$18.93	38	\$719.34		
<i>Overtime hourly rate:</i>				
\$28.40	4	\$113.60		
<b>Gross entitlement</b>		<b>\$832.94</b>	Tax deducted:	\$166.59
<b>Net entitlement</b>		<b>\$666.35</b>		
<i>Paid into bank account: 016 534360 BSB 023 145</i>				
Year to date		\$1332.70	Year to date	\$333.18
<u>Employer superannuation contribution</u>				
RESFund		\$79.13	Year to date	\$158.26

1. Use the information from the pay slip on p.90 to complete the information in this table.

Employer details	
Employee & bank account details	
Pay date/ pay period	
Ordinary hourly rate	
Ordinary hours worked	
Overtime/penalty rate(s)	
Hours worked	
Gross entitlement (pay)	
Tax deducted	
Net entitlement (pay)	
Net pay amount this year	
Employee's super fund	
Amount paid into fund this pay	
Amount paid into fund this year	
Other:	
Other:	
Other:	

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2. Do the same for a pay slip of your own, or one supplied by your teacher, or for a pay slip from a worker you know.

## 4.11 Financial Documents

### Financial documents

You will come into contact with many different financial documents as part of your personal and work-related activities. So it is important that you can interpret the numerical information that is used on these types of documents. Some of the most common financial documents that you need to be able to understand are listed below. So honestly now, how skilled are you at interpreting and making use of the information on these documents as part of your own financial literacy?



**Financial Documents**

pay slip

bank statement

sales receipt

purchase invoice

phone bill

electricity or gas bill

account statement

tax invoice



Preview Sample:

Can you add the numbers? Can you subtract?

Image: elenathewise/Depositphotos.com

### A Financial documents

- Match the examples of financial documents shown above with the appropriate description.
- Briefly discuss a situation when or how you make use of these documents.



A summary of calls, texts and data used issued by a business showing details of a customer's transaction and amount.	
A listing of all banking transactions and balances, normally issued on a monthly basis.	Issued to customers to summarise usage amounts, payment due and other information.
Required by law to show wages, wage rates and other information for a period of work.	A receipt of a sale or purchase that includes all relevant information for taxation purposes.
A bill that shows usage and charges for services and amounts used for utilities.	A formal document generally used for B2B transactions to authorise and detail commercial purchases.



## Sales receipt B

Markie's boss sent him out to buy lunch from the local fish'n'chip shop for the staff. The boss is paying with his own cash so he needs Markie to bring back a tax invoice receipt for the business's records. The fish'n'chip shop uses a system where orders are handwritten using a pre-printed carbon receipt book.

1. Use the sales receipt to complete the information for this table.

Sales Receipt: #125

M: July D: 17 Y: 2019

Ordered: 13:07 For: Markie

Cashier: Suze

FILBERTO'S  
FISH 'N' CHIP RESTAURANT  
SHOP 7, GORGE MALL  
THOMASVOIR  
(03) 9919 2156  
ABN: 41 2452 2100

6 flake 30  
12 P. cakes 12  
4 Dimmies - steamed 4  
1 Corndog 4  
XL Chips 7  
2 large cokes 4  
2 Mt franklin still 4

Total: \$70

Plus GST: \$7

Total GST inc: \$77

Paid: 13.29 By: Cash

- TAX INVOICE -

THANK YOU COME AGAIN AND  
TELL YOUR FRIENDS.

Name of supplier:

ABN:

Date of purchase:

Items purchased, quantities and prices:

Items that attract a GST:

Total purchase amount:

Total GST in purchase amount:

Other information:

2. There's a mistake on this receipt (ignore the ABN and phone with too many digits). What is the mistake?

## 4.13 Financial Documents

### Financial language

Financial documents often use a shared numerical language such as debit, credit, balance, payment terms, GST inc., balance due or payment due, due date, usage monitor, charges, fees, service charges, usage charges, expiry date and many more.

Understanding these financial terms and phrases can go a long way in helping you to better interpret these documents. Then you can make more informed financial decisions.



Image: 72soul/  
Depositphotos.com

### C Financial language

1. Consider a bill or an account statement you might get for something that you pay for, such as a mobile phone bill.
  - a. Which of debit or credit is an amount added to your bill, e.g. a charge by the supplier?
  - b. Which of debit or credit is an amount deducted from your bill, e.g. a payment made by you?
  - c. Which of debit or credit means that you owe money on the bill?
  - d. Which of debit or credit means that your account has a positive balance?
2. Match the correct *Financial language* terms with the most appropriate description. Add 2 more that you are aware of, or that you find on financial documents.

The amount in an account or the amount owed on an account.	The last day by when a payment is required.
The amount owing on an account.	A summary showing the different services and amounts you used.
A fixed charge (i.e. monthly) for having a service.	A variable charge depending on the amount and type of usage on an account.
An explanation or statement outlining how, and by when, payment must be made.	A date by when something runs out or is no longer valid or available.

Mobile bill D

Interpreting mobile phone bills is an applied numerical skill that everyone needs. But making sense of your account is easier said than done!

If you pay by direct debit you are only likely to get emailed a summary of your monthly charges. However, if you log in to your account you can see the full information related to your bill.

Get hold of a mobile phone bill, or use your own.

Everywhere on the bill that there is a number, such as *amount due*, *due date*, *call rate*, *texts to Australia*, *local calls* and so on, record these in the table. Write the words and the numbers.

Your teacher is going to lead you in making sense of these terms and numerical information. This can help you be prepared for variations in bills.

Share your information with 2 other class members. Identify where the type of information shown on the bill from different providers is the 'same'.

<div>Preview Sample: Do Not Copy</div>		

Extension:

What is 'bill shock'? What types of mobile usage are most likely to cause huge and 'unexpected phone charges? What can you do to minimise bill shock?

## 4.15 Savings and Loans

### Deposit accounts

Banks, financial institutions and credit unions are a key part of the economy and play a major role throughout our lives. People use various banking products to make **transactions** and to **save** for the future through **deposit accounts**. People also **borrow** money from banks through **credit cards** and various **loan products**.

Nearly all workers will have their wages or salaries paid (or **deposited**) into a bank account. We use these **transaction accounts** to pay for goods and services using a debit card, EFTPOS, PayWave, online banking and an increasing range of digital apps. People also withdraw cash from their bank accounts; however, the use of cash is declining in this digital age. What do you use?

As people start to earn money throughout their lives they are likely to open a savings account.



Image: AntonioFrancois/  
Depositphotos.com

# Preview

Transaction accounts are the main type of everyday banking accounts.

- 😊 These accounts are convenient for managing your day-to-day life.
- 😊 Wages and any government payments will be credited to this type of account.
- 😊 People use these types of accounts to withdraw cash, make EFTPOS, PayPass and PayWave purchases and for direct debits, online and mobile payments.

Beware:

- 😞 You will need to watch out for high transaction fees if you make too many transactions.
- 😞 You will need to be careful of overspending, especially using e-payment methods, as your bank balance can run down very quickly; and you can be hit with large fees for being overdrawn.
- 😞 Don't expect much, if any, interest on these accounts.
- 😞 The fees for just a few ATM withdrawals (from unsupported machines) can be higher than any interest you might ever earn on this account!

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### Savings accounts

A savings account usually pays a higher interest rate. This can help you to save for a long-term goal such as a bike, a phone or even a car!

The savings account might require a minimum deposit amount to get started, as well as a minimum amount that needs to be deposited regularly (e.g. monthly).

People use savings accounts to separate their money. They hold some money in transaction accounts to pay for their day-to-day lives, and put their left over money in their savings accounts.

A **term deposit** is a special kind of savings account where you 'lock your money' away for a period of time (e.g. six months) in return for higher interest. This imposes financial discipline, as you can't waste your money on things you don't need!

Banking - Deposit accounts **A**

Complete the following tasks in your workbooks.

1. What is the difference between a transaction account and a savings account?

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2. What type of account is your bank account? Why so?

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3. How often do you use your bank account, and for what purposes?

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4. What interest rates, and fees and charges, apply to your account?

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5. Use these transactions to calculate the balance of Jez's account at the end of the week. What would you recommend Jez do to improve his money management? You could use a spreadsheet and calculate a running balance as well.

Mar 21	Opening balance	\$1.45	Mar 25	eTap - Coffe Splurge	\$6.00
Mar 21	Wages - Tinko p/l	\$264.55	Mar 25	Apple Store	\$6.99
Mar 21	Non-bank ATM withdrawal	\$50.00	Mar 25	eTap - Shake and Cake	\$9.50
Mar 21	Non-bank ATM fee	\$2.50	Mar 25	eTap - Village Cinema	\$18.50
Mar 21	eTap - Coles	\$18.00	Mar 26	eTap - Coffe Splurge	\$6.00
Mar 22	eTap - Coffe Splurge	\$6.00	Mar 26	eTap - Pizza Maven	\$15.00
Mar 22	eTap - Dandy's Doodahs	\$25.00	Mar 27	Direct Debit - Stan	\$10.00
Mar 23	eTap - Coffe Splurge	\$6.00	Mar 27	Online transfer to BG Rattly	\$17.50
Mar 24	Myki top-up	\$15.00	Mar 27	eTap - Lunchie Bytes	\$12.20
Mar 24	eTap - Coffe Splurge	\$6.00	Mar 27	eTap - Roasties Toasties	\$12.00
Mar 24	eTap - Buster's Bites	\$14.25	Mar 27	eTap - Hungry Macs	\$9.50



## 4.17 Savings and Loans

### Loans and credit

Well wouldn't it be nice if we all had enough money to be able to buy everything we want! Unfortunately that type of wishful thinking belongs in fairytales.

The reality of life is that people borrow to buy goods and services. People do this because they don't have, or earn, enough money to purchase everything they need and want as part of their preferred lifestyle.

So banks, credit unions and other financial institutions are happy to lend people money. But naturally they don't give their money away for free. In return for lending people money they will charge some fees. And of course let's not forget the interest they charge on these loans.

#### Credit cards

Put simply: Buy now, pay later!

Credit cards are useful because they give people the flexibility to buy groceries, personal items, consumer items, entertainment and gifts. Credit cards can also be used to pay for emergencies such as car repairs and medical bills.

But using credit cards come at a high price. Credit cards are only handy as long as you pay off your debt before the interest-free period expires. Otherwise you will be up for a BIG interest bill!

A lot of people experience severe credit card debt and cannot even pay off the interest they owe; so their debt keeps on growing every day!

Put even more simply: Buy now, pay much, much more later!

Image: stuartmiles/Depositphotos.com

#### Personal loans

Personal loans are a very common type of loan.

People often take out personal loans to pay for cars, household items, holidays, weddings and big-ticket items.

The loan is repaid with regular repayments, including interest, over a period of perhaps 3-5 years.

But it is not good financial management to use personal loans to buy luxuries, such as holidays, that are consumed immediately.

Nor is it wise to use personal loans for products such as computers and tech devices that date quickly. Why not?

#### Home loans

A mortgage or housing loan is a long-term loan used to buy a house (and land). Some people have to borrow huge amounts to enter the housing market as the cost of houses (and land) has risen significantly over recent years.

Home loans are normally taken out over 25-30 years. Mortgages are a pretty good use of credit because the value of the house and land will usually go up in the long-term; but not necessarily in the shorter term.

People take out home loans because they gain utility (by living in the house) while building an investment (the value of the house and land increasing).

But many people who over-borrow struggle to pay back their home loan.

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## Banking - Loans and credit B

## Part A: Loans and credit

1. Why do people borrow money from banks and other financial institutions? Will you? Why or why not?

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2. Discuss the good points and bad points of each of these types of credit and loans.

Type	Good points	Bad points
Credit card	Preview Sample: Do Not Copy	
Personal loan		
Home loan		

3. 'Digital lay-by' methods such as *Afterpay* (and others) are one of the fastest growing types of 'credit'. Find out about *Afterpay*. How does *Afterpay* work? Would you recommend it? Why/why not?



## Part B: Personal loan comparison

Go online and find out the different rates (and other charges) for 3 personal loans from 3 different lenders. Complete the table below.



Use the online personal loan calculator at ASIC's MoneySmart, [www.moneysmart.gov.au](http://www.moneysmart.gov.au) to work out the monthly repayments and total amount to be repaid. Loan = \$5,000, length of loan = 5 years.

Bank/lender	Loan name	Interest rate	Other charges	Monthly \$	Total \$

## 4.19 Savings and Loans

### C Savings and loans

Calculate the interest amounts on these savings and loans transactions.

You are going to use the **simple interest** calculation. In reality banks and financial institutions use a **compound interest** formula. Keep in mind that with compound interest you are likely to earn more than the simple interest amount on your deposits; but you will also have to pay more interest on loans and credit - much more!

*Part A: Savings accounts*

Situation	Calculation	Answer
e.g. Andy has \$1,000 in the bank for a year. How much interest does he earn at 1% for that year?	$\$1,000 \times 1\%$	\$10
Boz has \$2,000 in the bank for 2 years. How much interest does she earn at 2% annually, and in total?		
Caro has \$3,000 in the bank for 3 years. How much interest does she earn at 4% per year, and in total?		
Diet has \$10,000 in the bank for 1.5 years. How much interest does he earn at 3% per year, and in total?		
Egbert takes out half of his \$30,000 in the bank. His interest drops from 3% to 1.5%. How much would he now earn in interest per year?		
Flossie invests \$1,000 in the bank at 1% interest. Every year she adds another \$1,000. How much interest does she earn for each of 5 years, and in total?		
Gina has a six-month term deposit of \$50,000 at 4% interest. How much interest does she earn for 6 months; and also for a year if she rolls the term deposit over?		

*Extension:*

You could now use the [Compound Interest Calculator](https://www.moneysmart.gov.au/tools-and-resources) at ASIC's MoneySmart, available through [www.moneysmart.gov.au/tools-and-resources](https://www.moneysmart.gov.au/tools-and-resources)



Compare the compound interest and total amounts to your simple interest calculations above. What do you notice? Discuss as a class.

## Part B: Credit and loans

Situation	Calculation(s)	Answer(s)
e.g. Hans takes out a personal loan for \$1,000 at 20% interest for a year. How much is the interest amount?	$\$1,000 \times 20\%$	\$200
Ilya takes out a personal loan for \$2,000 at 10% interest for a year. How much is the interest amount?		
Janz takes out a personal loan of \$3,000 for 3 years at 15% interest per year. How much is the annual interest, and total interest amount?		
Klem takes out a personal loan of \$10,000 over 5 years at 10% interest annually. How much is the annual interest, and total interest amount?		
Lannie takes out a personal loan of \$20,000 over 5 years at 25% interest annually. How much is the annual interest, and total interest amount?		
Malak takes out a variable rate personal loan at 10% interest for 5 years. In the 3rd year the interest rises to 15%. How much is the annual interest, and total interest amount?		

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## Extension:

You could now use the Personal Loan Calculator at ASIC's MoneySmart, available through [www.moneysmart.gov.au/tools-and-resources](http://www.moneysmart.gov.au/tools-and-resources)

Compare the compound interest and total amounts payable to your simple interest calculations above. What do you notice? Discuss as a class.

## Extension: Instant or payday loans

**Warning!!! Instant or payday loans!!! Achtung!!! Keep away from these!!!**

Go online and find out why these are a BAD source of credit! Your teacher will lead a discussion about the problems with these types of loans.

Why do these loan providers use cool or cute names and make it seem so easy to borrow money?

## 4.21 Keeping It Safe

### Safety and security

It is your responsibility to look after the security of your money. This means keeping your money safe both manually, i.e. your cash; and also making sure that you make safe digital transactions. There are a lot of unscrupulous characters out there who are more than happy to steal from you if they see an opportunity to do so. Indeed some of these people actually make a 'living' from being a crook. So don't be one of their victims.

### Cash security

Cash is the most convenient and portable form of financial value. Given this, it is one of the easiest ways to be ripped off. So be cash smart!

- ☹ Only carry the cash you need.
- ☹ Don't store too much cash at home. That is what the bank is for!
- ☹ Use a good quality wallet, purse, handbag, money carrier, etc..
- ☹ Carry your wallet, purse, handbag, etc. in a safe manner - not sticking out of your back pocket or slung back over your shoulder.
- ☹ Separate big notes from little notes so that when you open up your money stash only a small amount can be seen.
- ☹ Don't tell people about all your cash - and certainly don't show them.
- ☹ When travelling, or in large busy crowds, shopping centres, at ATMs, or on public transport, AND ON YOUR MOBILE, be aware of pickpockets and wallet/bag lifters (who often operate in teams).
- ☹ Don't leave a wallet, purse, handbag, etc. unattended; thieves can swoop before you even know it.
- ☹ Be careful what you say about your money on social media. Do you know the character of your friends-of-friends?
- ☹ Limit the cash you carry when going to the beach, playing sport, going to the gym and other situations where you have to leave your stuff unattended.
- ☹ Always be wary of people you don't know, or barely know, asking about your money situation. You can ask them *"You seem very interested in my money - why do you want to know that?"* If they get defensive - then be on your guard.

**Lots of people get ripped-off when they are on the phone because their attention is elsewhere. Don't let this be you!**

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Image: VitalikRadko/Depositphotos.com



## Playing it safe - Cash A

1. Your teacher will discuss all of the **cash security methods** with the class. Add others that are also important.



2. Develop a list of the top 5 tips for **keeping cash safe**. Add images and other visual elements and set this up as a poster or multimedia work. You might do this in pairs or as a group.

Preview

*Start drafting your ideas here.*

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3. In pairs or groups develop and act out a series of role play scenarios about **safe cash security**.

- a. Develop a range of scenarios in common situations featuring some or all of the following:

- ☐ people your age
- ☐ people generally, such as your family
- ☐ older people
- ☐ people travelling, or in unfamiliar places or situations.

- b. Take turns playing roles such as the person with the cash, the crook or scammer, and other relevant people.

- c. You might also video your best scenario and show this to the class.

- d. Report back to the class about your best tips and guidelines for keeping **cash safe**.

## 4.23 Keeping It Safe

### Digital security

One of the problems with contemporary methods of banking and paying electronically is that there are so many ways to get ripped off! Scammers and crooks have devised many strategies to steal money from unsuspecting, naive, greedy or even trusting people. Here are just some of the many ripoff methods for you to be on the lookout for.



Image: macrovector/Depositphotos.com

- ☹ Don't tell people your PIN, except relevant adults (i.e. family). No-one in the workplace, shops or in other situations can ever demand your PIN.
- ☹ Don't store your PIN and/or password with your card.
- ☹ With PayWave and other tap methods your card or phone provides easy access to your bank account for crooks. They can quickly make a lot of small transactions using your money. So keep your card, phone or watch safe!
- ☹ Use a transaction account for digital and online banking which only has a small portion of your funds as a safeguard.
- ☹ Keep your cards safe when not using them (prefer to methods for carrying cash).
- ☹ Don't lend your cards to other people. If you are helping them out by giving them some money, then you make the transaction, not them.
- ☹ When your card is out of your hands, watch it carefully.
- ☹ If your card is lost or stolen, report this to the bank immediately. This will help cover you for any purchases that a crook might ring up using your account.
- ☹ Your phone might include many one-touch apps to make transactions. So what happens if your phone gets lifted? Crooks can start spending all your money. So know where your phone is at all times.
- ☹ Log out of one-touch apps; only log-in when you are using them.
- ☹ Be very wary of who you lend your phone to.
- ☹ Protect your phone and bank accounts with difficult passwords.
- ☹ If you are using a public computer or device (or someone else's) to make a transaction, then make sure you log out of the online portal when you are finished. Otherwise the next person could access your accounts.
- ☹ Don't post your PIN (duh!), your account details or your signature on social media. This includes photos that might have these in the background.
- ☹ Be very, very careful of different online payment methods. These must be safe, secure and verified (usually with a https).
- ☹ Don't ever disclose account details, card numbers, passwords or PINs to people calling or emailing you and asking for these details. These scammers will often pretend they're from a bank, the Australian Taxation Office, Centrelink or some other authority. The real organisations will NEVER, EVER do this.

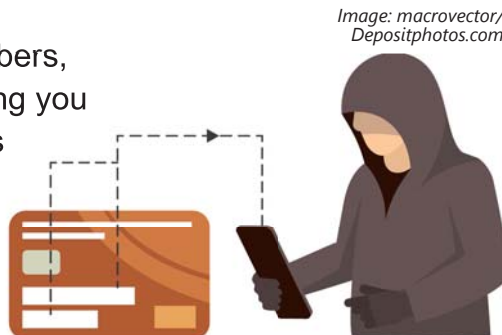


Image: macrovector/Depositphotos.com



## Playing it safe - Digital B

1. Your teacher will discuss all of the **digital financial security** methods with the class. Add others that are also important.



2. Develop a list of the top **8 tips** for achieving **digital financial security**. Add images and other visual elements and set this up as a poster or multimedia work. You might do this in pairs or as a group.

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3. In pairs or groups develop and act out a series of role play scenarios about **digital financial security**.

- a. Develop a range of scenarios in common situations featuring some or all of the following:

- ☐ people your age
- ☐ people generally, such as your family
- ☐ older people
- ☐ people travelling, or in unfamiliar places or situations.

- b. Take turns playing roles such as the person using digital financial methods, the crook or scammer, and other relevant people.
- c. You might also video your best scenario and show this to the class.
- d. Report back to the class about your best tips and guidelines for achieving **digital financial security**.

## 4.25 Assessment Task

### AT4 Financial Literacy

#### Overview

For this assessment task you are required to complete a number of activities as directed by your teacher. You might have completed some of these already during your studies of this topic.

#### Part A: Financial Literacy

- i. Explain the difference between a **transaction deposit account** and a **savings deposit account**.
- ii. **Compare** the different features, fees, interest rates and other features of a **transaction account** with those of a **savings account**.
- iii. Explain the **purpose** of a **personal loan**.
- iv. **Compare** the different fees, interest rates and other features for **2 personal loans** from different loan providers.
- v. Explain the purpose of a **pay slip**.
- vi. Interpret and explain the **key numerical information** contained on **2** different **pay slips**.

#### Part B: My Budget

- i. You are required to complete a **personal budget for yourself** that reflects your **current financial situation**.
- ii. You will then make estimates and predictions to enable you to complete a **2nd budget** that will support you in **reaching a savings goal**.
- iii. Comment on the **changes** and **sacrifices** you will have to make to **reach your savings goal**.



#### Part C: Security Report

- i. Summarise the most important strategies for **keeping cash safe**.
- ii. Summarise the most important strategies for maintaining **digital financial security**.

#### This task focuses on:

- ⇒ **explaining and comparing deposit accounts and personal loan options**
- ⇒ **interpreting and explaining numerical information on pay slips**
- ⇒ **completing a personal budget**
- ⇒ **describing methods to keep money safe.**

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Name(s):

Key dates:

**Tasks - AT4: Financial Literacy**

Re-  
quired

Due by

Done

Teacher  
initials

**Part A: Financial literacy**

- ⇒ Negotiate the task details with your teacher.
- i. Explain difference between a transaction account and a savings account.
- ii. Compare the interest rates, fees and features of a transaction and a savings account.
- iii. Explain the purpose of a personal loan.
- iv. Compare interest rates, fees and features for personal loans.
- v. Explain the purpose of a pay slip.
- vi. Interpret and explain information on 2 pay slips.

**Part B: My Budget**

- i. Complete a budget of your current financial situation.
- ii. Complete a budget to reach a savings goal.
- iii. Comment on the changes and sacrifices needed.

**Part C: Security Report**

- i. Summarise strategies for keeping cash safe.
- ii. Summarise strategies for digital financial security.

**Reporting**

- ⇒ Prepare a draft of your report.
- ⇒ Use appropriate numerical language.
- ⇒ Prepare your final report.
- ⇒ Present your report (if required).

Additional information:

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

4.27 Self-Reflection

Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→

→

→

How have the skills of numeracy helped improve my personal life?

→

→

How have the skills of numeracy helped my development of work-related skills?

→

→

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# It's About Time

5

## Contents

5.01 Time .....	110	5.13 Planning and Organising .....	122
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5.09 Being Organised .....	118	5.19 Self-Reflection.....	128

## Activities 5: Time

	p.	Due date/Done?	Comment
5.02A <b>A world of time</b>	111	<input type="text"/>	<input type="text"/>
5.04B <b>What's the time?</b>	113	<input type="text"/>	<input type="text"/>
5.05C <b>24-hour time</b>	114	<input type="text"/>	<input type="text"/>
5.06D <b>My daily time</b>	115	<input type="text"/>	<input type="text"/>
5.08A <b>Converting time</b>	117	<input type="text"/>	<input type="text"/>
5.10A <b>Being organised</b>	119	<input type="text"/>	<input type="text"/>
5.12B <b>Getting ready</b>	121	<input type="text"/>	<input type="text"/>
5.14A <b>To-do list</b>	123	<input type="text"/>	<input type="text"/>
5.16B <b>Timelines</b>	125	<input type="text"/>	<input type="text"/>
<b>AT5 Plan it Out</b>	126-127	<input type="text"/>	<input type="text"/>
5.19 <b>Self-Reflection</b>	128	<input type="text"/>	<input type="text"/>

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Comments:

## 5.01 Time

### Time

Time is a method of counting. Time breaks duration down into equal amounts. Our contemporary 'Western' time system uses seconds, minutes, hours, days, months, years, etc.. This system is based on the Gregorian calendar of 1582.

A day has a duration of 24 hours. This is the approximate time it takes the earth to rotate on its axis. The 24-hour day is thought to originate from an ancient Egyptian method of base 12 counting and reflects the use of a sundial.

An hour is broken into 60 minutes, each of which is broken into 60 seconds. So there are 86,400 seconds in a day ( $60 \times 60 \times 24$ ). That's a lot of seconds to use wisely.

A year is 365 days. This is the approximate time it takes The Earth to orbit The Sun! This orbit actually takes about 6 extra hours per year, hence we have a leap year every four years to add this extra day ( $4 \times 6$  hours)!

Time is the only resource which we all have the same amount of. We each have 24 hours a day, 7 days a week, 52.18 weeks a years and about 82 years a lifetime. So how do you use your time?



How well do you relate to time?

Image: cindygo/Depositphotos.com

# Preview Sample: Do Not Copy

**Got no time.**

- ⇒ Time is an arbitrary construct which breaks life down into years, hours, minutes, seconds and so on.
- ⇒ Time is a counting tool. e.g. You can count how many minutes it takes you to get ready for school.
- ⇒ Time is also an estimating tool. e.g. You can estimate how long it should take you to boil an egg for your breakfast.
- ⇒ Time is also a measuring tool. e.g. You can measure how long it will take you to travel to school.
- ⇒ Time is vital for success in the commercial world. You've all heard that 'time is money'. But what does that really mean?



Image: lenta/iStock/Thinkstock



## A world of time A

Match each of these terms to the correct statement related to time. Discuss these as a class by talking about how these concepts relate to your own lives.



- |                                       |                                   |                                     |
|---------------------------------------|-----------------------------------|-------------------------------------|
| <input type="checkbox"/> 24-hour time | <input type="checkbox"/> duration | <input type="checkbox"/> seconds    |
| <input type="checkbox"/> analogue     | <input type="checkbox"/> ETA      | <input type="checkbox"/> timesheet  |
| <input type="checkbox"/> appointment  | <input type="checkbox"/> hours    | <input type="checkbox"/> time zones |
| <input type="checkbox"/> calendar     | <input type="checkbox"/> minutes  | <input type="checkbox"/> wage       |
| <input type="checkbox"/> digital      | <input type="checkbox"/> roster   | <input type="checkbox"/> week       |

There's just over 52 of these in a year.

\_\_\_\_\_

There's 60 of these in a minute.

\_\_\_\_\_

There's 60 of these in an hour.

\_\_\_\_\_

There's 24 of these in a day.

\_\_\_\_\_

This is the 'clock face' type of time.

\_\_\_\_\_

This is the 'number' type of time.

\_\_\_\_\_

This is the 'continuous number' showing of time.

\_\_\_\_\_

This word describes how long something goes for.

\_\_\_\_\_

This is the amount paid to workers for hours worked.

\_\_\_\_\_

This term describes when something is expected to arrive.

\_\_\_\_\_

This is a system of days and dates used to standardise time.

\_\_\_\_\_

You need this to book another person's time.

\_\_\_\_\_

This sets out relative time based on where you are in the world.

\_\_\_\_\_

This work schedule shows when, and for how long, employees work.

\_\_\_\_\_

This is a summary of weekly hours worked and relevant pay rates.

\_\_\_\_\_

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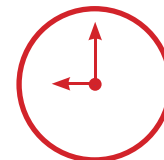
## 5.03 Time

### 'Telling' the time

Time can be commonly shown in **analogue** terms using hands and numbers on a 12-hour clockface or a manual watch, or in **digital** terms using numbers. Some people prefer to use **24-hour time**. Time is also the 4th dimension!

### Analogue time

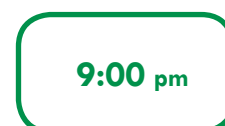
Analogue time generally refers to the traditional method of 'telling' time as shown on a clock or on a watch. Analogue time uses a 12-hour clockface with an hour hand, a minute hand and sometimes even a second hand.



Many people use analogue timepieces in their professions, including doctors and nurses who may have to count seconds. Some people such as pilots and divers prefer analogue timepieces for their precision.

### Digital time

Digital time seems to be the most common way of telling time. People use digital devices such as their mobile phones, digital clocks, digital watches and other time devices to read time in a numerical format. Digital devices normally also indicate am or pm.



### 24-hour time

24-hour time treats the day as 24 hours and counts the hours from 0 to 24 (or 23:59:59). The day starts at 0:00 hours (which is midnight) and goes through to 24:00. (Note: 24:00 is also regarded as midnight). 12:00 hours is midday. 13:00 hours is 1 pm and so on. Each pm hour adds 1 to the number 12. Sometimes 24-hour time is communicated as "14 hundred hours" (i.e. 2pm).



Many industries use a 24-hour clock to communicate and record time for activities associated with routes, work shifts, transport, automated tasks and many other work-related activities.

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### AM and PM

- ⇒ a.m. refers to the time between 12:00pm (midnight) and 12 (noon). am stands for ante meridiem (before midday).
- ⇒ p.m. refers to the time between 12:00 noon and 12 midnight. pm stands for post meridiem (past midday).
- ⇒ You can write 'a.m.' and 'p.m.' as just am and pm without the full stops.
- ⇒ am and pm are important when using a 12-hour clock, otherwise people (and computers!) might get confused whether the time is signifying morning or night.
- ⇒ When using a 24-hour clock we don't have to worry about am and pm as the higher numbers (above 12) are the pm numbers.

## What's the time? B

1. Interpret these analogue clockfaces to estimate the time. (You might want to show key numbers on the clockface to help you).
2. Show the correct time on the blank clockfaces.

*Tip: Remember that the hour hand does move continuously between numbers (but slightly) as the minute hand goes round an hour.*

7:30	10:15	Half past nine
A quarter to four	Noon	The current time

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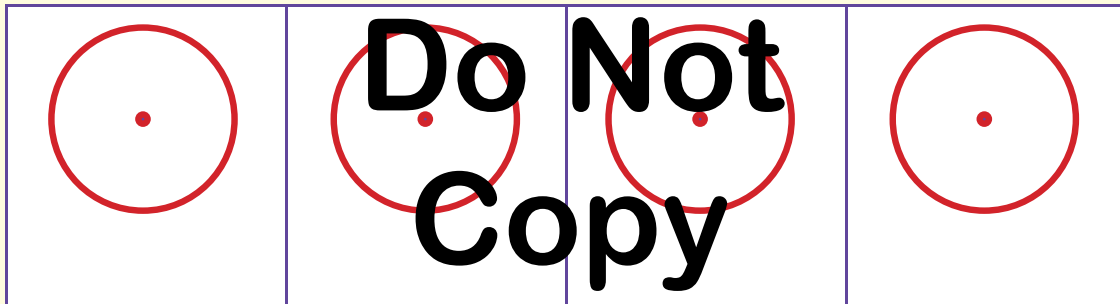
## 5.05 Time

### C 24-hour time

- a. Use the signifiers of am and pm to interpret these 24-hour digital displays as 12-hour time.

13:56	15:35	21:30	23:15
07:00	03:55	11:30	20:30
19:00	00:00	12:00	24:00

- b. Choose 4 of these 24-hour examples and show the correct time on a 12-hour clockface. Make sure to also include am or pm.



- c. What time do you usually get up and go to bed? Show these times on a 12-hour clockface, as digital time and as 24-hour time.

	<div style="border: 1px solid green; border-radius: 10px; padding: 5px; width: 100px; text-align: center;">M</div>	<div style="border: 1px solid blue; border-radius: 10px; padding: 5px; width: 100px; text-align: center;">:</div>
	<div style="border: 1px solid green; border-radius: 10px; padding: 5px; width: 100px; text-align: center;">M</div>	<div style="border: 1px solid blue; border-radius: 10px; padding: 5px; width: 100px; text-align: center;">:</div>

## My daily time D

1. So how does time impact on your life? Consider your personal life, your school life, your working life, your social life, your family life and your recreational life.

For each of these different aspects of your life, identify at least 3 examples whereby time impacts on, or influences, what you do.

e.g. School: - On a school day I have to get up at 7am.

- The school day goes from 8:45am to 3:30pm.

- On my VET day I have to be at TAFE by 8:30am.

My personal life	My school life	My working life
i.	i.	i.
ii.	ii.	ii.
iii.	iii.	iii.
My social life	My family life	My recreational life
i.	i.	i.
ii.	ii.	ii.
iii.	iii.	iii.

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2. As a class discuss strategies and tools that you could use to help you organise, plan and use your time better.



## 5.07 Converting Time

### Converting time

At times we have to convert hours into minutes, or minute into hours, or even minutes into seconds; as well as different conversions using other units of time. The major units for recording time are hours, minutes and seconds. But the breakdown for counting time is different from our usual decimal counting method. With hours, minutes (and seconds) we need to remember that there are 60 seconds in a minute and 60 minutes in an hour. So:

- ⇒ 1 full hour is 60 minutes
- ⇒ 1 half of an hour is 30 minutes
- ⇒ 1 quarter of an hour is 15 minutes
- ⇒ 3 quarters of an hour is 45 minutes
- ⇒ 1 full minute is 60 seconds
- ⇒ 1 half of a minute is 30 seconds (and so on).



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### Converting time

#### i. Hours to minutes

To convert from hours to minutes we simply **multiply** the number of hours by 60. For example:

- ⇒ 3 hours =  $3 \times 60 \text{ minutes} = 180 \text{ minutes}$
- ⇒ 20 hours =  $20 \times 60 \text{ minutes} = 1,200 \text{ minutes}$
- ⇒ 2 and a half hours = ? (So let's do the calculation)  
=  $2 \times 60 \text{ minutes plus another half of an hour}$   
=  $120 \text{ minutes} + 30 \text{ minutes}$   
=  $150 \text{ minutes}$

#### ii. Minutes to hours

To convert from minutes to hours we perform a **division** calculation.

We divide the total minutes by 60 (which equals 1 full hour).

- ⇒  $240 \text{ minutes} = 240 / 60 = 4 \text{ hours}$
- ⇒  $540 \text{ minutes} = 540 / 60 = 9 \text{ hours}$
- ⇒  $900 \text{ minutes} = 900 / 60 = 15 \text{ hours}$

#### Minutes to hours (cont.)

With many time conversions we are likely to get a **remainder**, because few tasks take 'exact' hours to complete.

- ⇒  $150 \text{ minutes} = 150 / 60$   
=  $2 \text{ hours } 30 \text{ minutes (or } 2 \frac{1}{2} \text{ hrs)}$

#### Adding time

To add time we add the hours first and then we add the minutes. e.g.

- ⇒  $1 \text{ hr } 30 \text{ mins} + 1 \text{ hr } 15 \text{ mins} = 2 \text{ hrs } 45 \text{ mins}$

If the total minutes part of the answer is greater than 60 then that is a whole other hour. So we have to take 60 away from this 'minutes' total and add it back as 1 hour to the 'hours' part of the calculation.

- ⇒  $1 \text{ hr } 30 \text{ mins} + 1 \text{ hr } 45 \text{ mins}$   
=  $2 \text{ hrs and } 75 \text{ mins}$   
=  $2 \text{ hrs and } (75 - 60 \text{ mins})$   
=  $(2 + 1 \text{ hrs}) \text{ and } 15 \text{ mins}$   
=  $3 \text{ hours and } 15 \text{ minutes}$

NUM  
SUPER  
SKILLS

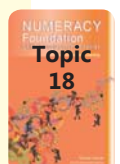


1. Calculate the time for the following situations.

1 hour in minutes	2 hours in minutes	1 hour 15 minutes in minutes	4 and a half hours in minutes
4 hours in minutes	20 hours in minutes	2 1/4 hours in minutes	1 day in minutes
120 minutes in hours	180 minutes in hours	330 minutes in hours	495 minutes in hours
600 minutes in hours	960 minutes in hours	990 minutes in hours	15 minutes in hours

2. Calculate the total time in hours and minutes for the following situations.

1 hour + 2 hours	1 hour 30 mins + 2 hours 15 mins	3 hours + 30 mins + 45 mins
2 hrs 45 mins + 3 hrs 30 mins	30 mins + 3 hrs 15 mins + 1 hr 15 mins	45 mins + 75 mins + 120 mins



## 5.09 Being Organised

### Personal organisation

Time management as part of being organised is a key **enterprise behaviour**.

People who are more organised find that they can better manage their personal, family, social and educational commitments so as to improve their life and get more done.

We can say that these people are more **efficient** at using their time. This doesn't mean that they rush, but rather that they **plan** their time more accurately and waste less time.

Being organised in your personal, social and educational activities can assist you to develop and demonstrate **personal competencies** that can be transferred to work-related situations.

This helps to make you a more **reliable** and **conscientious** worker. Hopefully, this will also enable you to be more **employable** in the future.

Personal organisation is a planning and doing skill which requires **foresight** and the ability to access and interpret **information**. Becoming more organised is also a good way to develop and apply your **numerical skills**.

💡 The key characteristics of an organised person are shown below. But can you think of any more that can be added to these?

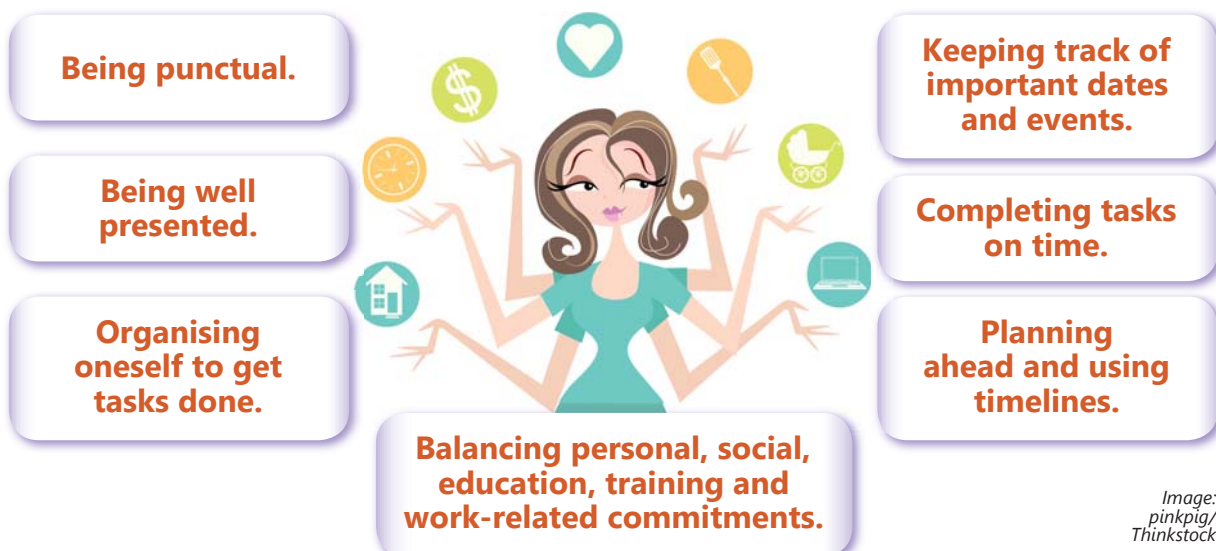


**Is this what you are like in the morning? Perhaps you need to be better organised!**

*Image: Digital Vision/Photodisc/Thinkstock*

# Preview Sample: Do Not Copy

### Being Organised - Characteristics



*Image: pinkpig/Thinkstock*

### Organisational skills

There are a range of numerical skills that can assist you to become more organised. Some of the main ones are as follows.

- ⇒ Estimating how much time tasks are likely to take to get done.
- ⇒ Planning the best order in which to do tasks.
- ⇒ Prioritising tasks that are urgent.
- ⇒ Calculating how much time you have available to allocate to different responsibilities.
- ⇒ Organising resources, such as time, to create a plan, schedule or roster.
- ⇒ Interpreting external information such as timetables, opening and access hours, rosters, schedules and so on.
- ⇒ Estimating and/calculating travel times (and distances).
- ⇒ Breaking time down into smaller units, such as quarter hours for a short project, full hours for a mid-term project, or days/weeks for a longer-term project.
- ⇒ Comparing timeframes to identify tasks that are shorter, longer, consecutive (in a particular order, such as getting dressed) or concurrent (at the same time, such as making your toast and a coffee).

## Sample: Being organised A

1. Write 4 key characteristics of being organised in the table. For each one rank yourself from 'very low' to 'very high' based on your own organisational capabilities

i.	ii.
iii.	iv.

2. Your teacher will discuss the concepts of 'urgency', 'prioritising', 'consecutive' and 'concurrent' with you.

List examples of tasks you might do that match each of these concepts.

<i>urgency</i>	<i>prioritising</i>
<i>consecutive</i>	<i>concurrent</i>

## 5.11 Being Organised

### Being organised

People have to juggle personal, social, education and work commitments. So they have to think into the future and plan accordingly.

To support this people need to know **deadlines** and **timelines** and need to be able to **estimate** how long tasks are likely to take.

People have personal responsibilities, and some of those have greater priority than others; such as work and study responsibilities, childcare duties and keeping professional appointments.

People often use both hard copy and e-dairies to support their personal organisation and time management.

At work, employees have **responsibilities** that they must meet including being **punctual**, meeting deadlines and working with others to complete tasks.

The commercial world runs on strict timelines. i.e. Time is money!

Therefore bosses and co-workers do not like employees who are not punctual. Being **punctual** for time is a sign of good organisation and planning. It is also a mark of respect.

Schools and workplaces use timetables, rosters, schedules and other tools to manage time. So what happens to you if you arrive late to class or to school?

Given these varied responsibilities it is important to plan and organise your time carefully, and in advance. This means using the calculating skills you have developed earlier in the year.

You also need to be able to **prioritise** what is urgent (or needs to be done first) and deal immediately with those tasks.



**People have to juggle personal, family and work responsibilities as part of managing their time.**

Image: MIXA next/  
Thinkstock

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### Planning timeframes

Most tasks (or objectives) can be classified into 3 different timeframes. The timespan will change depending on the length of the overall or long-term objective. (i.e. Hours, days, weeks, months or even years!)

- ⇒ **Short-term:** These are things that need to be done immediately or that need to be done first before other things can be done. (e.g. Get your L's.)
- ⇒ **Mid-term:** These are the tasks that require some time to achieve and normally involve broader goals. (e.g. Get your driving hours up!)
- ⇒ **Long-term:** This is the overall task objective that is achieved as a result of successfully completing all the mid-term and short-term tasks and objectives. (e.g. Get your license by passing all components of the test which might take 2-3 years in total since first getting your L's!)

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SKILLS

## Getting ready B

You are required to estimate and then document your personal routine related to getting up in the morning and preparing for, and getting to, school.

- Break the timespan into 15 minute intervals (e.g. 7:00am to 8:15am which = 5 x 15 minute intervals. Note: The first interval actually has 16 minutes!).
- Briefly outline what you think you do during these time intervals and **estimate** how much time different tasks might take (e.g. showering 7 mins, brushing teeth, 3 mins).
- Calculate the **total estimated time** you spend getting ready in the morning and going to school.
- Now, document your **actual experiences** in the morning. Compare your estimated times to your actual times. How accurately did you estimate?
- Note any **variations** and the reasons for these variations. Explain the possible reasons for these variations.
- Outline ways that you could improve your use of time. Consider tasks that could be done at the same time.

Sample: Do Not Copy

Name: _____		Day: _____		Date: _____	
Activity: _____					
Times	Task/estimated task time	Task/actual task time	Task/actual task time	Task/actual task time	Reason for variation
e.g. 6.00am-6.15am	Alarm rings. Snooze for 15 mins.	15 mins	Alarm rings. Snooze for 15 mins.	15 mins	I never get up when my alarm goes off.
	Total estimated time:		Total actual time:		

## 5.13 Planning and Organising

### Planning and organising

Planning is about knowing what to do and when to do it. Organising is about actually doing these tasks. All the plans in the world will come to nothing unless people organise themselves appropriately.

Organising involves setting **short-term** or day-to-day **goals** using tools such as calendars, daily planners and to-do lists. Organising means knowing how long tasks will take, task deadlines and which tasks to do first (prioritising).

Organising is about using **resources** to achieve goals and objectives. This means weighing up alternatives and making sacrifices. Developing **timelines** can assist you to plan and organise your time much better.

Personal organising involves using your time to meet all of your different personal, family, social, recreational and educational commitments and responsibilities.

By planning and organising you can achieve a better balance between personal, work-related and other professional commitments. This helps you to:

- ⇒ set and achieve short-term, mid-term and longer-term **goals**
- ⇒ use your time more **efficiently** and get more done
- ⇒ improve your **punctuality** and **reliability**
- ⇒ meet **deadlines** and complete tasks more **productively**
- ⇒ achieve a better **work/life balance**, and
- ⇒ improve your own **personal wellbeing**.



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iStock/Thinkstock

### Planning tools

There are a range of planning tools that people can use to plan and organise their time. These come in both hard copy and digital forms.

It is important to realise that although digital planning devices are good, you don't need to use an app to plan and organise your time. However, e-diary reminders are a good way to keep you on track. **Calendars, to-do lists** and **timeline planners** are tools that you can easily make use of.

#### i. Calendars

A calendar is the most common and basic method of recording and measuring dates and time. Calendars are normally organised as a universally accepted 'year of dates' broken into months. Each month shows its specific days and dates. Some people also follow religious calendars. We use the internationally recognised Gregorian Calendar with weeks starting on a Monday.

Some people prefer hard copy calendars on a wall, fridge or in a workplace. Others prefer desktop diaries. People use e-calendars on their computers, phones and other devices to plan and track dates and record important information by setting reminder notifications and alarms. Many email programs use calendars to record dates and times of meetings, appointments and deadlines.



## ii. To-do list

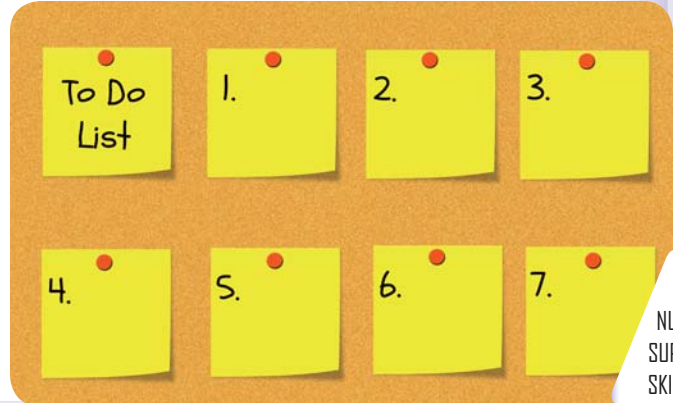
A to-do list is the most useful tool you can use at the first stage of planning and organising.

A to-do list involves the following steps.

- i. Identify the key tasks (or steps) you need to do so as to achieve the overall goal.
- ii. Number these key tasks in order.
- iii. Estimate how long it is likely to take to do each task.

You can use a diary or notebook, Post-It Notes, or the 'note' function on an e-device.

Image: mybaitshop/  
Depositphotos.com



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SKILLS

# Preview

To-do list A

1. Construct a to-do list for the following overall task.

*Organise the details for a work or volunteer placement.*

Identify the key smaller tasks or steps, put these steps in order, then estimate the how long it is likely to take you to do each task or step.

In your workbooks write all of the tasks as one complete to-do list!

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2. Use Post-It Notes to complete another to-do list for a task related to your school program, such as an assignment or a responsibility you have to meet.

## 5.15 Planning and Organising

### iii. Timelines

Another useful tool you can use to help plan and organise is a timeline. A **timeline** acts as an overall **activity** (or **task**) **organiser**. You set out the timeline using equal time periods (i.e. either hours, days, weeks or even months - depending on the length of the task).

You then use the information from your to-do list to put the tasks in the most appropriate order. You should also note down the estimated time you need to complete each task. As you achieve each task you can tick it off as 'completed'. These can be recorded in your calendar diary.

You can also note other information including people from whom you might need to get help and support; such as suppliers you have to contact (or make appointments with), and others that you need to book deliveries from.

*For example, consider the planning that goes into organising a big event such as a wedding and all the external people who need to be contacted, (but not for you yet, you are way too young to worry about that)!*

A timeline is a very useful tool because it enables you to record the process visually using words, numbers, times, costs and even pictures! You can then enter or record key dates in your diary or e-planner and set reminder notices with e-diaries.

As part of your timeline you might also have to create further to-do lists so as to break bigger tasks down into short-term or immediate tasks. And each of these might require its own mini-timeline.

*For example, consider the specific task of organising the wedding cake, which is just one smaller task as part of the overall wedding!*

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Image: jukai5/Depositphotos.com

### Timelines

All tasks or projects have a start time or date, a completion period and an end time or date.

- ⇒ Draw a timeline noting the start date or time, and the end date or time.
- ⇒ Break the timeline into fairly equal time periods that match the length of the project (e.g. short-term, mid-term or long-term).
- ⇒ Use your to-do list to write down key milestone tasks, in the correct order, that must be completed along the way.
- ⇒ Estimate when these tasks will need to be completed. Set reminders and/or make notes in your diary and/or e-devices.
- ⇒ Note down any other information such as external people or suppliers who may need to be contacted and involved.
- ⇒ Check to make sure that you are progressing according to your timeline, and if needed, make adjustments.

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SKILLS

Use the timeline below to answer the following questions in your workbooks.

1. What is the overall activity being planned?
2. What is the overall timeframe of the activity?
3. What smaller specific tasks are involved, and by when?
4. Show the smaller tasks on a to-do list.
5. Are there any other tasks that you would include?
6. Plan a timeline for a similar event/activity.

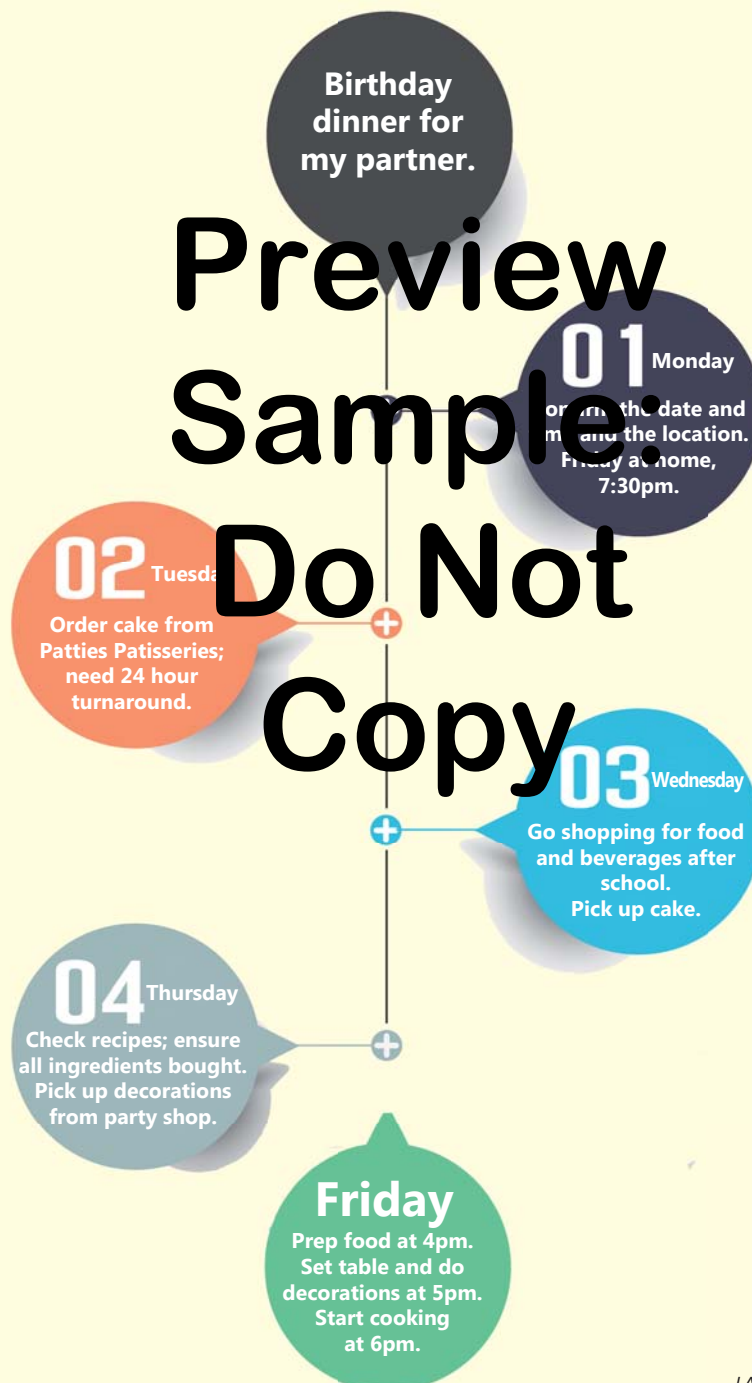


Image: Adapted from:  
LABBELMAN/Depositphotos.com

## 5.17 Assessment Task

### AT5 Plan it Out

#### Overview

You are going to plan and organise a surprise birthday party for a good friend for next Friday.

- ⇒ What would you do?
- ⇒ What food, drink, entertainment and other party favours will you need to organise?
- ⇒ Who will you invite - and to where - and at what time?
- ⇒ And what about the cost of all of this?



Use your workbooks to complete this activity. Your teacher might get you to work in pairs. You will present a final report to your teacher and perhaps an oral report to the class.

#### Required

1. Develop a **to-do list** of the key tasks required for the surprise party and place these in the correct order.
2. Prepare a **timeline** to help you plan to organise the surprise party.
  - ☐ Choose appropriate time periods and time zone.
  - ☐ Identify **key tasks** required to be done by each time period (or milestone).
  - ☐ Estimate the **time needed** to complete these key (milestone) tasks.
  - ☐ List **external people and suppliers** you might need to deal with and contact. Note any important contact information.
  - ☐ Tick off **milestone tasks** as you achieve them.
  - ☐ Create **specific to-do lists** for shared tasks as required.
  - ☐ Estimate the **costs** associated with the party. List these down and then calculate a **total**. Comment on the total cost involved.
  - ☐ **Check** to see that you have organised everything you need to do.
3. Final report
  - ☐ Submit your written plans and summary comments to your teacher.
  - ☐ If required present your plans to the class as an oral report using multimedia and get feedback.



*Numerical language alert.*

So what does 'next Friday' mean? In Australia it doesn't actually mean 'the next' Friday. 'The next Friday' is called 'this Friday'. 'Next Friday' means two Friday's away. But imagine negotiating a timeline with a supplier from a different culture who thinks that 'next Friday' is 'the next Friday', which as we commonly say, is actually 'this Friday!' Now that might cause some problems with dates and timelines!

Got it? Try not to be confused - it's just how people talk - as long as everyone knows which date they are talking about!

#### This task focuses on:

- ⇒ **planning and organising according to deadlines**
- ⇒ **creating to-do lists**
- ⇒ **estimating times for tasks**
- ⇒ **developing a timeline**
- ⇒ **checking task progress**
- ⇒ **finding numerical information**
- ⇒ **estimating costs.**

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Name(s):

Key date(s):

Tasks - AT5: Plan it Out

Re-  
quired

Due by

Done

Teacher  
initials

Stage 1: To-do list

⇒ Negotiate the task details with your teacher.

i. Develop to-do list.

ii. Order tasks on your to-do list.

iii.

Stage 2: Timeline

i. Choose time periods and draft a timeline.

ii. Identify key tasks and estimate time needed for each.

iii. List external people/suppliers required.

iv. Create specific to-do list for smaller tasks.

v. Estimate and comment on costs associated with party.

vi. Check and review your progress.

vii.

Stage 3: Final report

⇒ Prepare a draft of your report.

⇒ Use appropriate numerical language.

⇒ Prepare your final report.

⇒ Present your report (if required).

Additional information:

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## 5.19 Self-Reflection

### Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→ \_\_\_\_\_

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped improve my personal life?

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped my development of work-related skills?

→ \_\_\_\_\_

→ \_\_\_\_\_

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Getting Around

6

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6.09 Maps.....	138	6.23 Self-Reflection.....	152
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Activities 6: Getting Around	p.	Due date/Done?	Comment
6.02A <b>Directions</b>	131	<input type="checkbox"/>	
6.03A <b>Compass directions</b>	132	<input type="checkbox"/>	
6.04B <b>Describing location</b>	133	<input type="checkbox"/>	
6.05C <b>Language of location</b>	134	<input type="checkbox"/>	
6.06D <b>Giving directions</b>	135	<input type="checkbox"/>	
6.07E <b>Directions in action</b>	136-137	<input type="checkbox"/>	
6.11A <b>Whereabouts?</b>	140-141	<input type="checkbox"/>	
6.14A <b>Distance</b>	143	<input type="checkbox"/>	
6.16B <b>Distance and time</b>	145	<input type="checkbox"/>	
6.18A <b>Site maps</b>	147	<input type="checkbox"/>	
6.19B <b>Site map features</b>	148	<input type="checkbox"/>	
6.20C <b>Site maps</b>	149	<input type="checkbox"/>	
<b>AT6 Draw a Map</b>	150-151	<input type="checkbox"/>	
6.23 <b>Self-Reflection</b>	152	<input type="checkbox"/>	

Comments:

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## 6.01 Getting Around

### Directions

A very important set of numerical skills includes the ability to be able to both give and follow directions so as to navigate (find your way) around. Directions may be in the following forms.

- ⇒ **Oral:** Verbally, such as asking someone the way to the nearest train station.
- ⇒ **Written:** By following a sequence of directions from a starting point to a destination.
- ⇒ **Visual:** Using a print or digital map to find your way around a location, such as using a store layout map when in IKEA.
- ⇒ **Digital:** Using GPS in a car, or a maps feature, or an app on your phone to find key landmarks while on holiday in an unfamiliar city.
- ⇒ **Physical:** Showing, pointing or leading someone so as to 'act out' appropriate directions.

When we both give and receive instructions we usually use a combination of these methods. However, people have different communication styles; and also different preferred learning styles for understanding information. Some people like to be shown, some like to be told, some like to follow a map while others simply just like 'being lost' and stumbling upon something new! The world is full of diversity. People might have different language proficiency; for example, how would you ask for directions in China? People may be differently-abled; for example, how would you guide a visually-impaired person to the nearest McDonald's? And some people may be in a rush! So how would you respond to a frantic driver who calls out to you while stopped at a set of traffic lights and begs you to tell him the location of the nearest hospital because his wife is going into labour in the back seat!?

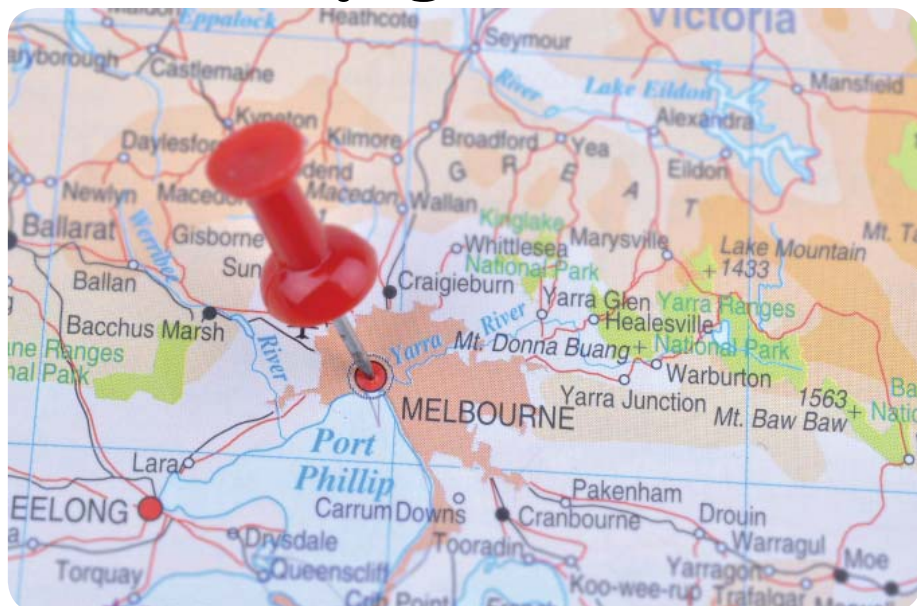


Image: s-o-s/  
iStock/Thinkstock

## Directions A

1. So what type of method for giving 'directions' do you prefer to use when **you are trying to get around**? Comment on each of these methods (for or against) to describe your preferences, and give an example to show this.

Method	Explanation for me	Example
e.g. Digital	<i>I like to use a map on my phone because I can set my location and see the directions on my screen.</i>	<i>When I travelled to my appointment for work experience in the city I put the address in my phone and followed its directions very easily.</i>
Oral		
Written		
Visual		
Digital		
Physical		

2. What type of method for giving 'directions' do you prefer to use when you are **helping someone else get around**? Comment on each of these methods (for or against) to describe your preferences, and give an example.

Method	Explanation for me	Example
e.g. Physical	<i>When someone asks me how to find a place I point in the direction and also screw my arm around if they need to turn a corner.</i>	<i>An old man asked me how to get to the Centrelink nearby. I pointed up the road a long way and then screwed my arm left to show he had to turn.</i>
Oral		
Written		
Visual		
Digital		
Physical		

## 6.03 Directions

### The language of directions

When giving and following oral directions we often use, and listen for, certain language to describe 'where' and 'how' related to location and directions. We also often combine oral directions with physical gestures such as pointing.

**Compass** directions use terms such as north, south, east and west, or north-east, south-west and so on. But most of us usually don't use this more formal way of speaking, and many times we don't even know which direction is which, unless we have a map, or have prior knowledge of an area.

So instead we often use **directional** words that are relevant to our position. These can include words such as "left" or "right", "up" or "down", "over there", "behind", "in front", "beside", "here", or even "up the street and around the corner"! We can say that these types of descriptions describe **relative position**.

We also use **descriptors** that give an indication of how far, such as "pretty soon", "3-blocks", "half-a-kilometre", "in 5 minutes" or simply even, "go just up the street and you'll find it".



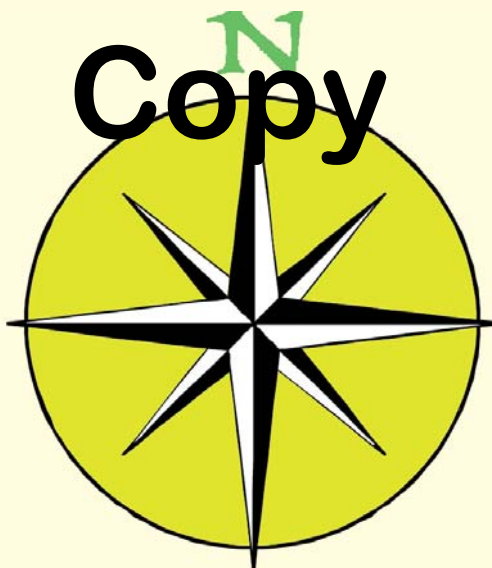
So what about you? What type of language do you use to describe location and how to get around?

# Preview Sample:

## A Compass directions

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1. Label the compass pointers with the appropriate directions.



2. Using a compass, place this page flat on the desk in front of you. Use the compass to draw an arrow showing north on this page. In which direction is your home? The school will be the opposite direction to your home. So what direction is that? In which direction is the city?



Describing location **B**

It is important that you develop a vocabulary of location so as to describe the **relative position** of people, features and objects with one another.

This helps when following and giving directions, when helping people deal with spatial issues; and in work-related situations such as helping co-workers to use equipment, or to position themselves around work stations, and also when guiding a customer to find different items in a store.

For each of these situations use appropriate language to describe the relative location of the people, objects and equipment shown. e.g. Left, right, behind, next to and so on! You choose the language that suits.



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DigitalVision/Thinkstock

# Preview Sample:

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Image: Pavlo61/  
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## 6.05 Directions

### C Language of location



1. For this activity you will need to work in a group of 4. As a group you are going to use oral instructions to describe the relative position of each person by arranging yourself in different patterns.

For example: (Note: These are not based on the picture below!).

- ⇒ *Billie, Albo and Try stand side by side left to right, at arms length. Greig is sitting about 3 metres directly behind Albo.*
- ⇒ *Sue stands about 1 metre in front of Howie. About 3 steps directly behind Howie, is Van and Zelda.*
- ⇒ *Frida is to the left of Johan. Standing opposite them is Maxi. Adut is 5 metres behind Maxi and about 5 metres to the right of Johan.*

You need to describe 10 arrangements in your workbooks

You should also take photos of each arrangement and match these to your descriptions.

**Talitha is standing in front of the group, between Roni, who is on the left of Drax, and Jurgen who is at the back of the group about 3 metres behind Talitha's left shoulder. Drax is furthest away from Jurgen and there is about 5 metres between those 2 guys.**



Image:  
monkeybusiness/  
Depositphotos.com



2. Close your eyes and picture your bedroom. Take a few minutes to recall the key objects and their location in relation with each other. Open your eyes and describe the most important spatial elements of your bedroom using short sentences. Note some key elements below.



## Giving directions D

So now let's investigate the type of language you use to give directions. It's also quite likely that this is the language you prefer when you are being given directions.

*A new student starts at your school. They ask you how to get from your classroom to the canteen and to the 'best' toilets.*

*Your cousin is staying with you at home. In the case of an emergency at night, in the dark, they want to know how to get out of the front door from where they are most likely to be sleeping.*

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*Paola is visually impaired and uses an assistance dog. You're meeting her at your school library and she is waiting at the main gate. She needs clear and easy to follow directions to get to the library in one phone message, including approximate walking times and/or distances.*

3. For each of these situations suggest better ways that you could use to help these people get around more easily and effectively.

## 6.07 Directions

### Directions in action

As you have experienced, we normally use more than one method for giving directions.

One of the most common combinations is through using visual directions such as a map, combined with oral instructions and perhaps even supported by some physical pointers.

*For example, Roberto is walking along the main shopping street in his town. A backpacker comes along, and in broken English asks Roberto how to get to the train station. The backpacker has a map of the local area on his phone but can't seem to work out which way to walk.*

*Roberto looks at the phone and takes it from the backpacker and turns the phone upside down. Roberto then points in the direction the phone is now oriented and says, "train that way".*

*Roberto draws the attention of the backpacker to the phone and traces the route on the map while at the same time saying the words out loud:*

*"Straight - 5 minutes, turn left - 3 minutes, cross over bridge (Roberto makes an arc with his arm), turn right - 5 minutes; and there!"*

*At which Roberto points down the road with his finger at the station on the phone map.*

*"Got it?"*

*The backpacker nods and overs.*

*"Thanks, gidday beaudy mate," and marches off in the correct direction.*

*Roberto smiles but is a little perplexed. He hasn't heard anyone say "gidday beaudy mate" before and wonders what the rest of the world must think of Australians!*

Image:  
toxawww/  
Depositphotos.com



### E Directions in action

1. Which methods for giving directions did Roberto use? Give examples.

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2. How effective were the directions given by Roberto? Why so?

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3. Explain whether you would use the same methods for giving directions that Roberto used, or whether you would use different methods.

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Sample:

4. What digital devices and apps exist that can help people and tourists get around in unfamiliar or foreign places?

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*Extension:*

Choose a place in your suburb or town where you might get asked directions to a local landmark such as a train or bus station or some other important landmark.

In your workbooks give directions from where you are located to help a tourist get to this landmark.

What methods would you use? Explain why.

*Note: You could role play this for the class using a partner and relevant tools such as a map and/or phone.*



## 6.09 Maps

### Using maps

Whether you are using maps to get around or you are drawing a map to help others, you have to make the map functional so that it can be **effective**. This means that the map must guide the person as to how to get from their **origin** to their **destination**.

The map should also be **efficient**. This means that the map needs to enable the person to quickly and easily work out how to get from their origin to their destination. Three key mapping features that make a map more usable (i.e. both more effective and more efficient) are **pathways**, **landmarks** and **scale**.

### Pathways


When using or creating a map you are likely to be going to trace a travel route (or a pathway). A pathway is the **route** that includes the ways to get from 'point A' to 'point B'.

A person might mark the route on the map that they are going to follow. Or they may trace it with their finger to commit this into memory.

GPS, street directories and map pathway routes might include roads, streets, highways, freeways and other methods of travel.

Many GPS and e-devices will come up with a pathway route when you enter in your destination. These devices might also communicate the route aloud. In fact many people follow these verbal instructions when travelling.

Pathways are also important as escape routes for emergency evacuation procedures. Have you noticed any of these, usually as green

 arrows, around your school?

Pathways might also include public transport routes, bike paths, pedestrian traffic areas, waterways, terminals and exchanges (e.g. airports) and so on.

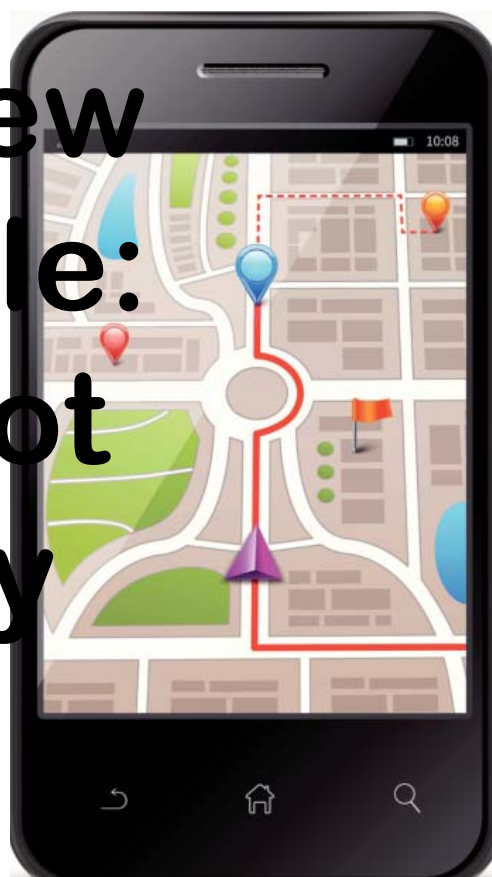


Image: macrovector/  
iStock/Thinkstock

### Features and landmarks

Most maps will include common or key features or landmarks. These **landmark** features might include places of interest, government buildings and services, emergency facilities, green areas, schools, signs, landmarks and other distinguishing and useful features.

Landmarks might be located in the correct spot on the map but may not be drawn to scale. So map features help people by getting them to look out for key landmarks that they might notice on their journey. For example:

- ⇒ “If you reach the canteen then you’ve gone too far.”
- ⇒ “Turn left at the traffic lights.”
- ⇒ “When you come to the double-storey house keep going because mine is three doors down.”



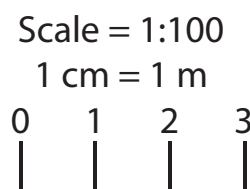
Image: tovovan/  
iStock/Thinkstock

## Scale

Most maps are usually drawn to scale. This means that the distance shown on the map corresponds with a distance in real life. Scale allows the user of a map to make a visual estimate of travel distance and time. Therefore it helps us to get our spatial bearings.

However, not all maps are drawn to scale nor do they need to be. So when you are using a map see if it is to scale or close to scale. Also, if you are constructing a map, then try to make it close to scale so that people can estimate approximate distance and time. Your teacher will help you with this.

If the map is for a short distance then the scale will be quite generous, e.g. 1cm = 1m (i.e. a school or shop map). If the map is for a large distance the scale will be quite economical, e.g. 1cm = 1km (a street or town map).



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## Using maps

When you are using or creating maps you need to make use of these three key features - pathways, features and landmarks, and scale. These all help make maps both more effective and more efficient.

**Pathways:** When using or creating a map look for and show the most effective pathways route that suits that type of transportation mode being used by the person; e.g. walking, car, public transport, cycling, etc..

**Features (and landmarks):** Show key features and landmarks that the map user will look out for. These help a person gain a visual understanding of where they are. Key features on a map also help build location-memory.

**Scale:** A scale measures a ratio such as 1cm = 1km. This means that 1cm on the map corresponds with 1 km in real life (this map will be suitable for a long distance journey). Scale might be written as 1:100 (e.g. 1cm = 1m). Try to make a map close to scale so that it properly represents travel distance and/or time.

NUM  
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## 6.11 Maps



Image: WINS86/Depositphotos.com

### A Whereabouts?

Use the map shown above to identify the location of the features and landmarks and other information in the table on p.141.

The map is not exactly to scale, but it is pretty close.

Of course the size of people, vehicles and other features may not be that large - especially the duck - duck's don't come that big!

You could do this working in pairs, but each of you should fill in the table.





On which 'roadway' is the train station?	On which 'roadway' is the fire station?	On which 'roadway' is the pier?
On which 'roadway' is the airport?	On which 'roadway' is the shopping mall?	On which 'roadway' is the hospital?
On which 'roadway' is the petrol (gas) station?	On which 'roadway' is the garbage tip?	On which 'roadway' is the city edge?
On which 'roadway' is the church?	On which 'roadway' is the police station?	On which 'roadway' is the viewing tower?
What is the nearest intersection to the hotdog van?	What is the nearest intersection to the church?	What is the nearest intersection to the duck pond park?
What is the nearest intersection to the railway bridge?	What is the nearest intersection to the bus stop?	What is the nearest intersection to the taxi rank?
Which 'roadways' run north-south?	Which 'roadways' run east-west?	On which side of town is the water?
On which side of town is the boundary?	At which end of town would you enter and leave a roadway?	The train only runs in one direction. From which direction does it enter town?
What is the direction of the police station relative to the hospital?	What is the direction of the airport relative to the train station?	What is the direction of the shipping port relative to the airport?
Give directions for someone walking from the mall to the police station.		Give directions for someone driving from the airport to the hotel.
Assume Boundary Road is 1km long. How long might it take to walk, cycle and drive?		Assume Park Road is 0.5km long. How long might it take to walk from the hospital to the tip?
Where is the no-through road? Why?		Is there any vehicle access allowed between Tower Street and Airport Drive? Explain?
Where's the beach? How could you get to it?		Where should you avoid swimming? Why?

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## 6.13 Distance and Time

### Distance

As you already know, distance is a 'how far' sort of measure.

*"How far is it to the Melbourne CBD?"*

For some of you, not very far, especially if you live locally in one of the city's nearby inner suburbs!

What about people in Melbourne's expanding outer west? And those living east, west, south, outer east, or north, or north east or south east? What about those in Bendigo,

Wangaratta, Benalla, Yarram or Bairnsdale? How about those in Mallacoota, Mildura, Wodonga or Swan Hill? And let's not forget about those of you in another state.



Image: goglik83/Depositphotos.com



So what do you reckon? How far - from where you are sitting right now - to the city? How will you know?

### Time

When we are travelling, knowing the distance of our journey from our **origin** to **destination** is only one part of the equation. The second and perhaps more important number that we need to work out is the time it might take to travel that distance. In fact, sometimes we don't even need to worry about the distance.

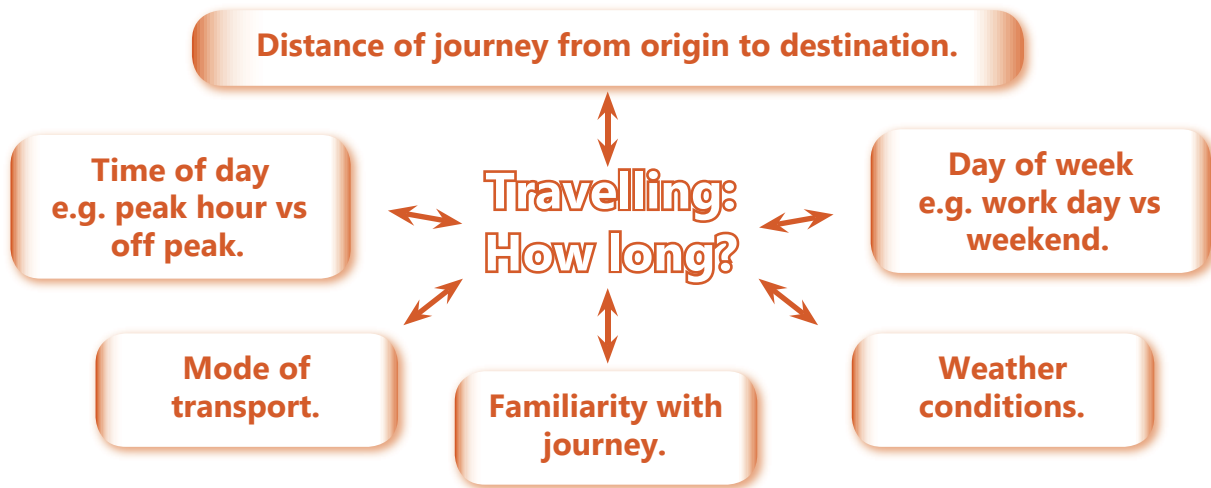
If you are catching a train to the city for a job interview you don't really worry about how far you have to travel. What you are likely to be more concerned with is how long it takes you to complete the journey. If you are travelling by public transport you will check **timetables**. If you are travelling by car you will rely on someone else's expertise to advise you, because they are likely to be able to estimate travel time based on their own **knowledge** and **past experience** of travelling at this time of the day.

However, if you are getting there under your own power, such as by cycling, then you will need to know the distance. You will factor in how fast you usually cycle - let's say an average of 20km per hour.

Then the distance - let's say 20km. So that's 20km/ 20kmh which actually equals 1 hour! (Your teacher will show how to do this calculation).

You will need to add more time for traffic conditions, traffic lights, getting lost in the city, parking and locking your bike, freshening up, changing clothes, finding the building, getting to the right place in the building and so on. So what time is the appointment? Better give it another 30 minutes at least to do those other things. Also better hope it doesn't rain; and you don't want a puncture. So that's lots of things to consider!

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**Distance A**

1. Calculate the distance travelled for these different transport modes.  
Which mode might this be?

60kmh for 1 hour	90 kmh for 2 hours	1 kmh for 30 min	5kmh for 2.5 hours
------------------	--------------------	------------------	--------------------

2. Estimate the distance to each of these destinations.  
3. How long do you think it will take you to travel to these destinations using the travel modes listed?

Journey	Estimated distance	Journey time: by car	Journey time: by public transport	Journey time: by your choice
i. Your school to your home.				
ii. Your home to the nearest train station.				
iii. Your home to the CBD.				
iv. Your home to the airport.				
v. Your home to your workplace or (a place you'd like to work).				

4. Research these distances and times using maps, GPS or other resources.  
Set up another table in your workbooks. How well did you estimate?



## 6.15 Distance and Time

### Issue to consider

One of the main reasons for using maps is to estimate travel distance and time so that you can organise yourself and others better. As you know, a **scale** shows the distance ratio that a map represents to real life. Most properly prepared printed maps, such as street directories will use an accurate scale. Digital maps use Global Positioning System (**GPS**) satellite data to calculate distance.

However, not all maps are drawn to scale, especially site maps and retail maps. And when using maps to plan your travel you have to take into account travel time issues such as peak traffic flows, congestion, local knowledge and other issues.

One advantage of digital mapping devices such as sat navs is that they can give you a travel time estimate. This is especially good for longer trips and driving through regional areas. And you can usually choose alternate routes to see different variations.

However, digital maps can be quite inaccurate for shorter city trips which might have more hold-ups especially around peak times, such as to and from work and school. And the alternative routes often just give you more of the same issues.



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A travel speed represents the ratio between one quantity (**distance**) and a second quantity (**time**). This relationship can be expressed as a **rate** such as kilometres per hour (km/h or kmph), or metres per second (m/s or mps).

e.g. An international passenger jet travels at about 700–900 km per hour. That's pretty fast over a sustained distance. Usain Bolt can sprint at just under 10 m/s for a short distance – up to about 200m. For a human, that's really bolting along! And in 2011 Kurt Fearnley wheeled the Boston Marathon in just under 79 minutes at an average speed of about 32 km/h. That's really moving!

- ⇒ Strolling: 2-3kmh
- ⇒ Walking: 4kmh
- ⇒ Brisk walking: 6kmh
- ⇒ Easy jog: 6-8kmh
- ⇒ Skating: 7-10kmh
- ⇒ Fast jog: 9-12kmh
- ⇒ Running: 13+kmh
- ⇒ Cycling easy: 10kmh
- ⇒ Cycling moderate: 15-25kmh
- ⇒ Cycling hard: 25+kmh
- ⇒ Driving peak hour inner: 15-25kmh
- ⇒ Driving metro: 25-40kmh
- ⇒ Driving outer metro: 30-50kmh
- ⇒ Driving highway/freeway: 60-90kmh
- ⇒ Train 25-45kmh: regional much faster
- ⇒ Tram 15-35kmh: faster offpeak
- ⇒ Bus 20-40kmh: regional much faster

Many commuters cycle to work which can be much faster than peak hour driving!



Image: PinkBadger/Depositphotos.com

1. Calculate the following travel times.

Distance: 60km at 60kmh	Distance: 30km at 60kmh	Distance: 25km at 100kmh
Distance: 12km at 6kmh	Distance: 7km at 21kmh	Distance: 10km at 2kmh

2. Estimate how long it would take you to travel these distances using these different travel modes. What would be the average speed of each?

	Walk/wheel	Jog	Skate	Cycle
1km				
3km				
5km				
10km				
20km				
50km				
100km				

	Public transport Choice 1	Public transport Choice 2	Car	Other
1km				
3km				
5km				
10km				
20km				
50km				
100km				

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## 6.17 Site Maps

### Site maps

There are many other types of maps that you might encounter in your personal and work lives. These maps are designed to show the layout or location of particular items, products and facilities. We are going to refer to these maps by the general term '**site maps**'. These site maps include maps such as the following; (but there are other examples which you can discuss as a class).

- ⇒ **Retail or store maps** which show where products are located within a store, or where shops and facilities are located within a shopping centre.
- ⇒ **Facilities maps** such as in hospitals, airports and other large complexes that help you navigate the different sectors that exist.
- ⇒ **Building maps** that show the location of commercial tenants or departments in different sectors or on different floors.
- ⇒ **Venue maps** such as at a zoo or a theme park which show the layout of various attractions.
- ⇒ **Seating maps** which show seating arrangements at ticketed events such as concerts, sporting events or performances.
- ⇒ **Work environment maps** at workplaces which show different work stations, location of departments and the overall work environment including hazards.
- ⇒ **Transport maps** which show the transport system such as trainlines, tramlines and bus networks.



Image: Sentavio/  
Depositphotos.com



1. Briefly outline when you might need to use different site maps in your personal and/or work life?


2. Find 2 examples of site maps and include these in your workbooks.



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### Use of 'site maps'

Site maps are likely to use a mix of visual images, text, instructions, grid references (such as G7), pathways, colours and other design elements to make them easy to interpret.

But, unfortunately, they are not always easy to 'read'. They usually feature a 'you are here' marker, which does help you to establish where you are, but they are not always successful at helping you to get to where you are going - especially with multi-levelled facilities. These site maps also use visual images and symbols to show common facilities such as toilets. Site maps usually have a combination of design elements that indicate:

- ⇒ how to navigate around a site or venue
- ⇒ the location of key buildings, features or locations
- ⇒ where you can find facilities such as toilets and refreshments
- ⇒ wheelchair ramps, lifts and other accessibility features
- ⇒ emergency exits and emergency equipment.

Site maps might also include other key elements specific to the type of features that are related to that particular type of 'site'.

Image:  
kchungtw/Depositphotos.com



6.19 Site Maps

B Site map features

Find examples from your own experience, or go online to source some site maps. (Your teacher might supply these).



- 1. Identify the types of features commonly shown on these maps.
- 2. Explain why it is important to include these features on a site map.
- 3. Collect or create an image that shows these features.

Feature	Why important?	Image
toilets		
lifts		
emergency exits		

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You need to do this task very quickly. Just from your memory sketch a site map of your school. Be sure to include the key features that are important.

After you have finished take a tour and compare your map to reality. How well did you go?

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## 6.21 Assessment Task

### AT6 Draw a Map

#### Overview

You are going to create a map that directs a friend from your school to your home (or to another destination).

You can use the page opposite to create a draft map.

You should construct your final map using multimedia or your hand-design skills.

#### Tasks

- Find out the **travel mode** the person is using, i.e. are they walking, riding, using public transport, etc.?
- Find out if the person has any **mobility issues** or needs. e.g. Consider distance, wheelchair accessibility, stairs, etc.. Take these into consideration when designing your map and planning the most suitable pathway/route.
- Estimate the distance and time to be travelled. Determine whether the **distance** is too far, or too short, or inappropriate for that travel mode. If required, recommend other **methods of transport** that might be needed.
- Consider the **scale** of your map. It doesn't have to be exact. But if you are good at design you might make the map to scale.
- Trace a **pathways route** on your map. Consider labelling key routes, roads, pathways, etc.. You should also include some estimates of distance and/or time.
- Include (and label) some **landmarks** on your map. These will help the person navigate the route more easily.
- Consider some **instructions** such as turn left, travel north, etc.. Choose suitable language that suits you and the user. (ie. How many people really know which way is north when they are walking down the road?)
- When finished, **compare** your map to a printed map or to an e-map. How did you go? What was **good** about your map and **not so good**? How could you **improve** your mapping skills for the future?

Note: Your teacher may even get you, as a pair, to try out your map. If so, answer the same questions as in 'h'.

Record any other important task information below such as due dates, other requirements, safety issues and so on, as directed by your teacher.

Other task information

#### This task focuses on:

- ⇒ creating a map
- ⇒ considering needs of the user
- ⇒ estimating distances and times
- ⇒ developing a pathways route
- ⇒ identifying key landmarks
- ⇒ creating instructions and directions
- ⇒ comparing hard copy and digital maps.

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**Name(s):** \_\_\_\_\_

**Map of:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Scale: 10mm:** \_\_\_\_\_

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## 6.23 Self-Reflection

### Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→ \_\_\_\_\_

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped improve my personal life?

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped my development of work-related skills?

→ \_\_\_\_\_

→ \_\_\_\_\_

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Measuring

7

## Contents

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Activities 7: Measuring	p.	Due date/Done?	Comment
7.01A <b>Measuring up</b>	154	<input type="checkbox"/>	
7.02B <b>Measuring out</b>	155	<input type="checkbox"/>	
7.04A <b>Measuring length</b>	157	<input type="checkbox"/>	
7.05A <b>Perimeter</b>	158	<input type="checkbox"/>	
7.06B <b>Circumference</b>	159	<input type="checkbox"/>	
7.08A <b>Measuring weight (mass)</b>	160	<input type="checkbox"/>	
7.09A <b>Area</b>	162	<input type="checkbox"/>	
7.10A <b>Area - circle</b>	163	<input type="checkbox"/>	
7.12A <b>Measuring capacity</b>	165	<input type="checkbox"/>	
7.14A <b>Measuring volume</b>	167	<input type="checkbox"/>	
7.16A <b>Estimating vs measuring</b>	169	<input type="checkbox"/>	
7.17B <b>Estimating and measuring</b>	170-171	<input type="checkbox"/>	
<b>AT8 Measure by Measure</b>	172-173	<input type="checkbox"/>	
7.21 <b>Self-Reflection</b>	174	<input type="checkbox"/>	

Comments:

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## 7.01 Measuring Up

### Measuring up

One very important set of numeracy skills involves the ability to make estimates or sometimes accurate measurements related to **length** (and distance), **mass** (or weight), **capacity** (or volume) and **area**.

We encounter these key measurements as part of our everyday personal and working lives. You need to learn how to make these measurements by choosing and using appropriate **measuring devices**.

You also need to be able to **estimate** key measurements when you don't have appropriate measuring devices available. And of course you need to be able to understand appropriate **units of measurements** such as mm, cm, and metres, grams and kg, mls and litres.

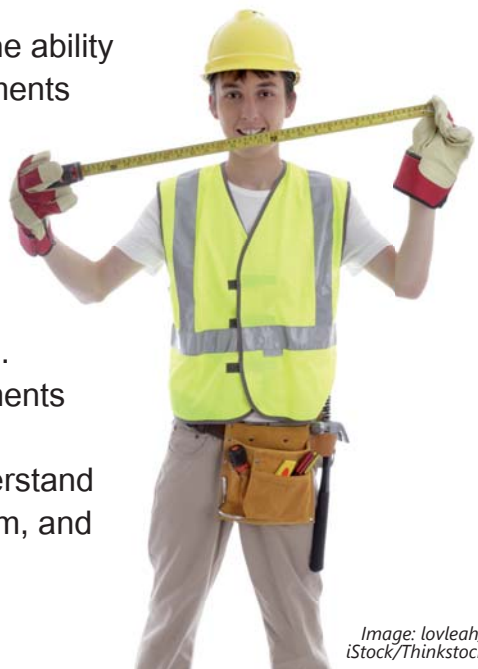


Image: lovleah/iStock/Thinkstock

### A Measuring up

1. Match the type of measurement (e.g. length, mass (weight), capacity or temperature) with the appropriate description. Add 1 of your own.
2. Identify the most suitable measuring device for each.
3. List the appropriate units for measurement.

Description	Measurement	Example	Device	Unit
How light something is.	e.g. mass (weight)	A pair of high quality runners might weigh about 200 grams.	scale	grams
How long something is.				
How hot something is.				
How tall something is.				
How heavy something is.				
How far away a location is.				
How much fluid something can hold.				
How cold something needs to be.				
How much load a vehicle can carry.				
Other				

1. For each of these situations identify what the people are measuring.
2. Identify the measuring devices they are using and estimate the approximate length, mass, capacity or temperature of the key elements shown in the images.



Image: SimpleFoto/  
Depositphotos.com

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Image: Dmitry Poch/  
Depositphotos.com

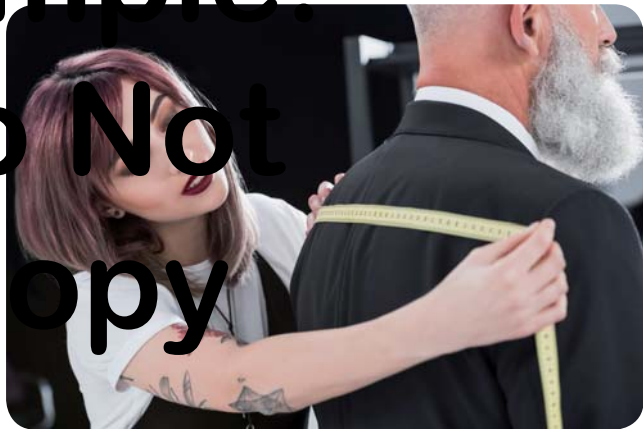
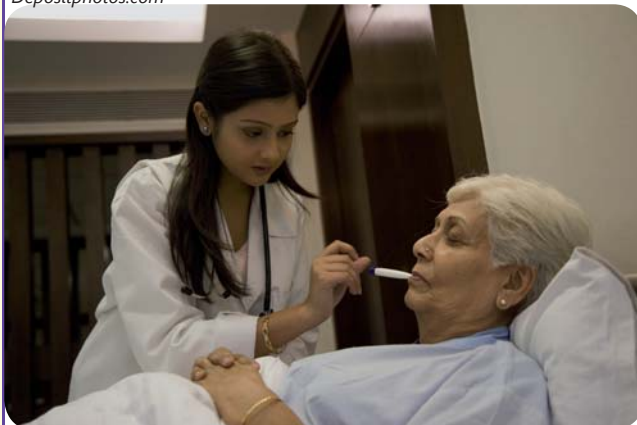


Image: iphemant/  
Depositphotos.com



## 7.03 Length and Distance

### Length

Length is a **linear** measurement that tells us how long, or high or wide something is; or how far away (or how close) something is from us.

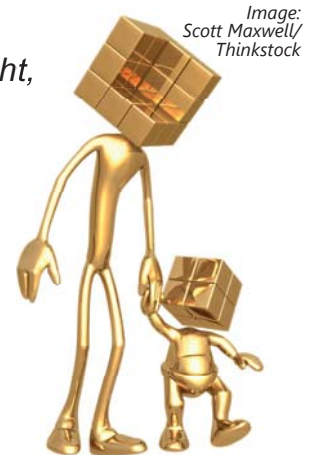
We often make length estimates as part of our everyday lives such as when moving our bodies, when cycling or driving, and when working with and using physical objects. We use devices such as **rulers** and **measuring tapes** to measure length. Length is usually expressed in **centimetres** (cm), or in **millimetres** (mm) for trades and in **metres** (m) or **kilometres** (km) for travel distances.

*e.g. How tall are you? In this case you are measuring your height, which is the total length from the top of your head to the bottom of your feet. We usually measure height in centimetres. And we are likely to use a tape measure or another similar measuring device to measure this length.*

*So if a 17 year-old person is 180cm tall they are:*

- ⇒ above average height
- ⇒ quite tall compared to people 50 years ago
- ⇒ quite small for an AFL male footballer
- ⇒ quite tall for an AFL female footballer.

So as you can see, length can be used to measure height, and may be described as how tall or perhaps even how short, a person is.




**Height is a measurement of length. So what do you estimate the height of these cyber-creatures to be?**



**Preview Sample: Do Not Copy**

### Length dimensions

Measuring length is important when you need to know the size of an object. For example, if you are booking online to send a package by courier you will normally be asked to provide the object's length in 3 dimensions. These 3 **dimensions** are **width**, **depth** and **height** - so width, depth and height are essentially all examples of length.

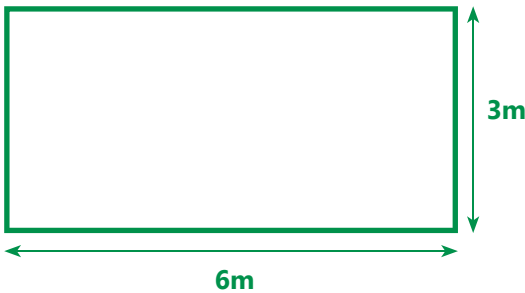
 Length, when expressed as height or width or depth is an important measurement for many situations. Some are listed below, but you could think of others.

- ⇒ What size bed to buy.
- ⇒ Whether a couch will fit in a space in the lounge room.
- ⇒ Whether a truck will fit in a parking space.
- ⇒ Knowing whether a vehicle will fit under a low bridge.
- ⇒ How to pack a moving or courier van.
- ⇒ Working out amounts of materials for construction, such as timber.
- ⇒ Making clothes and other items from patterns.



## Measuring length A

Estimate and then measure the following lengths. You are likely to need to work with a partner using a measuring tape. Note: There are 10mm in 1cm; 100cm in 1 metre & 1,000 metres in 1 kilometre.

i. Your height. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>	ii. Your height seated. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>
iii. The length of your arm from inside shoulder (armpit) to fingertip. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>	iv. The length of your lower body from your hips (top of your legs) down. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>
v. The length of your arm span from fingertip to fingertip. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>	vi. Your reach with one arm fully stretched above your head. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>
vii. The height, width and depth of your school table/desk. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>	viii. The height and width of the doorway of the classroom. <i>Estimate:</i> <i>Measurement (mm):</i> <i>Measurement (cm):</i> <i>Measurement (m):</i>
ix. Calculate the perimeter of this rectangle. <div style="text-align: center;">  </div>	



## 7.05 Perimeter

### Perimeter

One common measure of length (or distance) is perimeter. The **perimeter** measures the total distance around an object.

*For example, if you walked around a soccer pitch (which is usually rectangular) then you are walking around its perimeter. The total distance walked will be the length of each of the four sides you walked.*

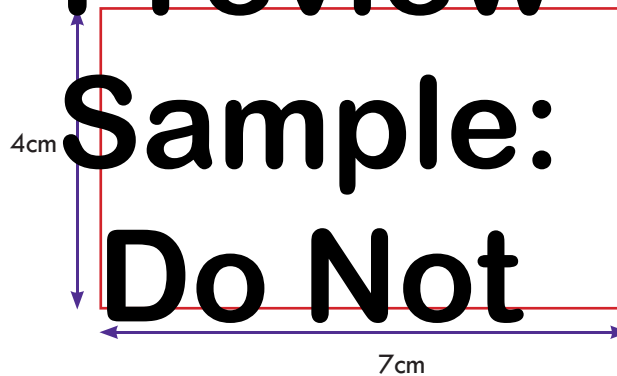
So to calculate perimeter we simply add up the length of all sides of an object.

$$\begin{aligned}\text{perimeter} &= \text{length} + \text{width} + \text{length} + \text{width} \quad (\text{or}) \\ &= l + w + l + w \quad \text{or} \\ &= 2l + 2w \quad (\text{for a rectangle})\end{aligned}$$



### Perimeter: Rectangle

**Preview**



⇒ perimeter of rectangle =  $4\text{cm} + 7\text{cm} + 4\text{cm} + 7\text{cm}$   
perimeter =  $22\text{cm}$  or  $220\text{mm}$  (Note: nearly all trades use mm as measurements rather than cm).

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### A Perimeter

1. Calculate the perimeter of the soccer pitch shown above (100m x 60m).
2. How long do you think it would take you to walk/wheel, jog and then run around this?



## Perimeter: Circles

We can also calculate the perimeter of other shapes. The perimeter of a circle has its own name - **circumference**. You might remember learning about that at some other time in your schooling. The circumference measures the total distance around a closed curve (i.e. a circle!).

The distance around a circle (the circumference) will **always** equal the distance across a circle (the **diameter**) multiplied by a **constant amount**. This is true no matter how big or small the circle is. Can you remember

the name of that constant amount?



**Circumference: Circle**  
 $\text{circumference} = \text{diameter} \times 3.142$  (which is pi or  $\pi$ )  
 or  $c = d\pi$

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⇒ So for the circle above:

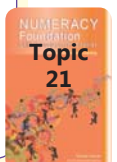
$$\text{circumference} = 5\text{cm} \times 3.142$$

$$\text{circumference} = 15.7\text{cm or } 157\text{mm}$$

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## Circumference B

1. Calculate the circumference of the pizza shown above (diameter = 30cm).
2. What are the different circumferences of the pizzas in your local shop?



## 7.07 Weight (Mass)

### Weight (mass)

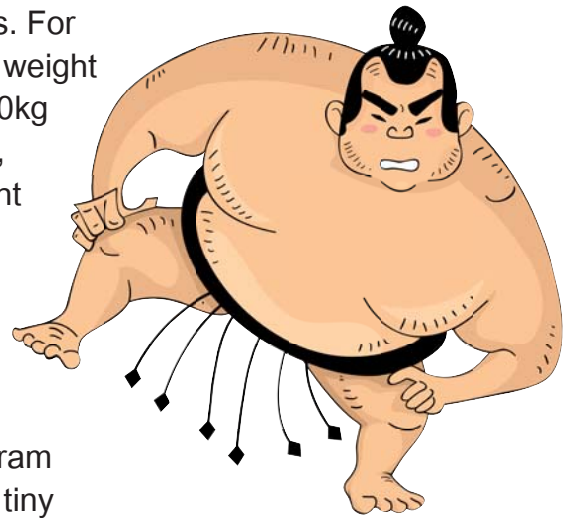
**Weight** simply refers to how heavy an object is. For example, when you buy a 1kg bag of sugar its weight is 1kg. If you jump on the scale and it shows 70kg then your weight is 70kg. A very small amount, such as a teaspoon of sugar, might have a weight of just 5 grams.

Weight is usually measured in **grams** (g), **kilograms** (kg) and **tonnes** (t). There are 1,000 grams in a kilogram and 1,000 kilograms in a tonne. So 1 tonne (which is very heavy) = 1,000kg; and 1 kg = 1,000g. 1 gram can be broken into **micrograms** (ug), and this tiny measurement of weight might be used in pharmacy medications because absolutely exact small quantities might be needed.

We measure weight using a **scale**, which will be calibrated with appropriate units such as grams and kilograms.

In our personal and working lives we often use the word '**weight**' when describing how heavy an object is, although technically this term is incorrect. This is because weight describes the force of gravity on an object. If you recall the astronauts from the moon landing, you might have seen them leaping about very easily. They could do this because they 'weighed' much less on the moon than on Earth, and were able to jump higher and longer. Technically, we should use the term **mass**. But imagine going to the deli and saying, "I want to buy some spiced olives with a mass of 500 grams." The deli server will think you are a bit strange!

However, in some industries such as transport and logistics they may use the term mass, especially for transport vehicles such as trucks and ships. But for nearly all situations you encounter, the heaviness of an object will be described by its weight. So you can use this term from now on.



**"I weigh over 200 kgs which is fine, because in my line of work I need to be mass-ive!"**

Image: lenmdp/  
Depositphotos.com

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### Mass (and weight)

- ⇒ Mass (weight) is usually measured in g, kg, and t.
- ⇒ 1,000g = 1 kg; 1,000 kg = 1 tonne.
- ⇒ We measure mass (weight) using scales.
- ⇒ Cooking 'weights' might use amounts expressed in teaspoons, tablespoons and cups.
- ⇒ We can use language such as *how heavy*, *how light*, *how much*, *how little* and so on. Essentially these are all measurements of weight.



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Measuring weight (mass) A

Estimate and then measure these 'weights'. Some you will have to research.

Note: There are 1,000 grams in a kilogram and 1,000 kg in a tonne.



<p>i. Your 'weight'.</p> <p>Estimate:</p> <p>Weight (kg):</p> <p>Weight (g):</p>	<p>ii. The weight of your favourite pet.</p> <p>Estimate:</p> <p>Weight (kg):</p> <p>Weight (g):</p>
<p>iii. The total weight of your usual filled schoolbag.</p> <p>Estimate:</p> <p>Weight (kg):</p> <p>Weight (g):</p>	<p>iv. The total weight of your family's usual grocery shopping bags.</p> <p>Estimate:</p> <p>Weight (kg):</p> <p>Weight (g):</p>
<p>v. The weight of your family's main motor vehicle.</p> <p>Estimate:</p> <p>Weight (kg):</p> <p>Weight (t):</p>	<p>vi. The weight of your favourite take-away meal.</p> <p>Estimate:</p> <p>Weight (g):</p> <p>Weight (kg):</p>
<p>vii. The weight of your mobile.</p> <p>Estimate:</p> <p>Weight (g):</p> <p>Weight (kg):</p>	<p>viii. The weight of your favourite footwear.</p> <p>Estimate:</p> <p>Weight (g):</p> <p>Weight (kg):</p>
<p>ix. Estimate the weight of this motor scooter, the weight of the young woman riding it (without a helmet!) and the combined weight.</p>	



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## 7.09 Area

### Measuring area: Rectangles

Area is a 'how much' sort of calculation because it shows how much 'space' something covers. For example, what area is covered by a box lid? To calculate area of a rectangle we simply multiply length by width.


⇒ Area of rectangle (A) = length  $\times$  width



Image: imagedb\_seller/  
Depositphotos.com

**Area: Rectangle**

Area of rectangle (A) = length (l)  $\times$  width (w)



⇒ Area of rectangle = 6cm  $\times$  4cm

$A = 24\text{cm}^2$  (or 2,400mm<sup>2</sup>)

Note: Here the unit, cm, is squared! That's because cm is multiplied two times in the calculation (i.e. cm  $\times$  cm). And of course you are working in 2 dimensions with area, hence cm<sup>2</sup>!

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### A Area

1. Calculate the area of the gift box lid shown above (15cm  $\times$  8cm).
2. How much wrapping paper would you need to wrap this entire gift box?  
(You will need to calculate the area of: the top & bottom sides, the left and right sides and the front and back sides. (Assume box height is 5cm).

### Measuring area: Circles

When measuring the area of circles it becomes a bit harder because they don't have straight lines. However, once again we can use the Pi ( $\pi$ ) formula to measure the area of a circle.

We calculate the area of a circle using the formula:

$$\Rightarrow \text{Area of circle (A)} = \pi r^2$$

R = the **radius** of the circle, which you get by drawing a straight line across the circle (diameter) and halving it (i.e. the distance from the centre of a circle to its edge.)



Image: imagedb\_seller/  
Depositphotos.com

### Area: Circle

$$\text{Area of circle (A)} = \pi \times \text{radius}^2$$

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Note: The radius 'r' is half the diameter, and in this case is half of 10cm. So  $r = 5\text{cm}$

$$\Rightarrow \text{Area of circle} = \pi r^2$$

$$A = 3.142 \times (5\text{cm})^2$$

$$A = 3.142 \times 25\text{cm}^2$$

$$A = 78.6\text{cm}^2$$

Note: Here the unit, cm, is squared ( $^2$ ). That's because cm is multiplied two times in the calculation (i.e.  $\text{cm} \times \text{cm}$ ). And of course you are working in 2 dimensions with area, hence  $\text{cm}^2$ !

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### Area - circle B

1. Calculate the area of the glass window in the image shown above. The diameter of the glass window is 80cm.
2. Calculate the area needed for a hole in the wall to fit the glass window and the window frame. The width of the window frame is 10cm.





## 7.11 Volume - Fluids

### Capacity

Capacity is a measure of how much material a 3 dimensional object can hold. Essentially capacity is another word for **volume** (but not the loudness volume for sound as that is an entirely different measure).

Capacity can relate to fluid volumes such as with drink bottles; and solid volumes such as with packing boxes.

Capacity (or volume) measures are very important in our everyday lives for cooking, medicine and of course, for fluid containers.

Think about different capacities of soft drink containers. You can buy 375 millilitre (ml) cans, 600ml plastic bottles as well as larger bottles with a capacity of 1.25 and 2 litres (l).

Most fluids are measured in millilitres (ml) and 1,000ml equals 1 litre. A millilitre is the same volume as a cubic centimetre (cc), which is a measure that is often used in medical fluids.



Preview  
Sample:  
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What do you think are the capacities (volumes) of each of the containers shown here?

Image: godruma/  
Depositphotos.com

### Cooking capacity

Cooking uses metric measurements for volume and this is important when you are buying ingredients. For example, 150ml of olive oil, 500ml of milk, 250g of butter and 1kg of flour.

However, many recipes actually use amounts that were based on the old-style imperial measures such as ounce, pound and fluid ounce.

We can convert fluid measures to our metric system using the guide opposite.

#### Fluids

- ⇒ 1 teaspoon = 5 ml
- ⇒ 1 tablespoon = 20 ml
- ⇒ 1 cup = 250ml
- ⇒ 1 fluid ounce = 28.41ml
- ⇒ 1 pint = 568.26 ml
- ⇒ 1 gallon = 4.564 litres



#### Capacity (volume)

- ⇒ Fluid capacity (volume) is usually measured in ml and l.
- ⇒ 1,000 millilitres = 1 litre.
- ⇒ Solid capacity (for containers) is usually measured in g and kg.
- ⇒ Cooking 'weights' might use amounts expressed in teaspoons, tablespoons and cups.
- ⇒ Object volume (such as packing boxes) can be measured using length x width x height and is expressed in cubic cm (cm<sup>3</sup>) or cubic metres (m<sup>3</sup>).

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## Measuring capacity A

Complete these tasks related to capacity. Some you will have to research.

Note: There are 1,000 millilitres in a litre and 1 million litres in a megalitre.

- |  |   |
|--|---|
| i. How many mls of fluid normally represent 1 tablespoon? What type of fluids might be measured using a spoon? | ii. Find out or (estimate) how many megalitres of water your family uses in a quarter (3 months). |
|--|---|

- iii. Estimate the amount of fluid you drink in an average week. Use categories of water, soft drink, fruit juice and other fluids as required.

# Preview

- iv. Look at the measuring jug (or one of your own). List the capacity measurements. Why does the capacity change for liquids compared to solids? What else about this jug makes it very useful?

Image:  
emmeci74/  
Depositphotos.com

# Sample: Do Not Copy



- v. List examples from your own life when it is OK to estimate fluid volume; and also when you need to measure fluid volumes more exactly.



## 7.13 Volume - Solids

### Volume

When you learned about measuring area you were working in 2 dimensions, length x width. However, in the real world, objects come in 3 dimensions.

Sometimes we might need to estimate or measure how much space an object takes up in each of its **3 dimensions**; **length**, **width** and **height** (or depth). Consider situations involving a courier van, supermarket shelves or a packing box. These situations involve packing and fitting objects into a pre-determined space.

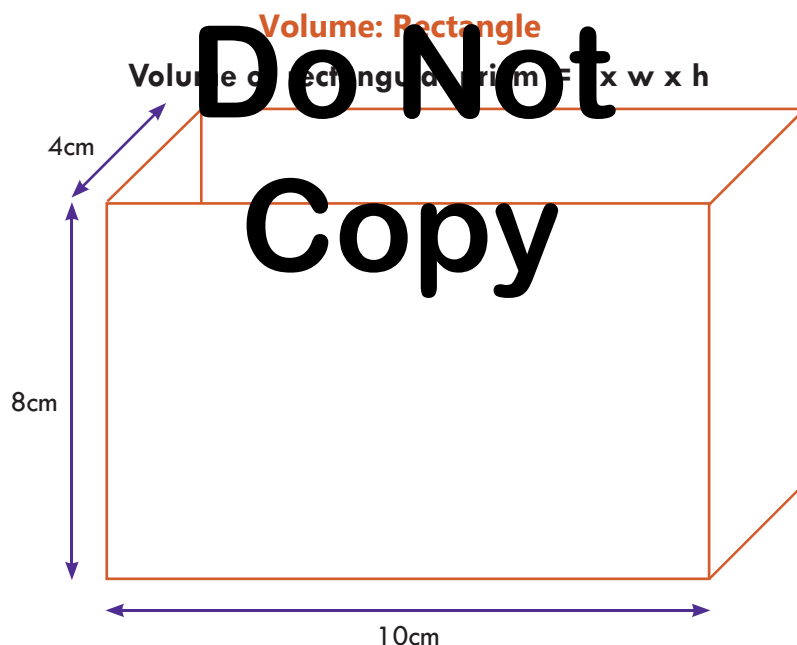
We can measure this 'space' using volume. The **volume** of an object refers to how much space it occupies. It might be helpful to think of an object's volume as its **capacity**, or how much it holds (i.e. how many soft toys can you cram into a claw machine?)



Image: lenmdp/Depositphotos.com

**Preview Sample:**

These kids are trying their luck at a claw machine. The space inside the glass with the prizes has a certain volume. The operator could fit more toys in and make more money. But in reality the operator wouldn't want to put too many prizes in. Why not?



⇒ volume of rectangular prism (object) =  $4\text{cm} \times 10\text{cm} \times 8\text{cm}$   
volume (v) =  $320\text{cm}^3$

Note: Here the unit, cm, is cubed ( $^3$ ). That's because cm is multiplied three times in the calculation (i.e.  $\text{cm} \times \text{cm} \times \text{cm}$ ). And of course you are working in 3 dimensions with volume, hence  $\text{cm}^3$ !

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Measuring volume **A**

In life we often estimate volume. For example, you might take a punt on how many items you fit in a shopping basket, how many suitcases you can fit in a car boot, or even how many chips you can fit in your mouth!

1. Use estimates of volume for these situations.

i. How many shopping items can you fit in a shopping basket? What does this depend on? What would be in your shopping basket? And will these fit in your green bag?

ii. Estimate how many of these smaller boxes would fit into the huge packing box being carried (unsafely) by the dude. When might you need to be able to estimate/or calculate this?



Images: t: olly18/ b: ptasha/  
Depositphotos.com

2. Calculate these volumes. Try making these objects out of card.

a. A box measuring 3cm x 10cm x 20cm.

b. A cube 5cm in size.

3. List examples where you estimate volumes 'naturally' in your everyday life. Share with the class.



## 7.15 Estimating vs Measuring

### Estimating vs measuring

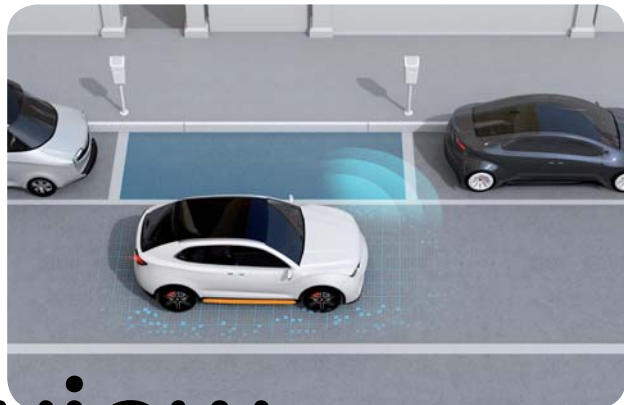
When it comes to measuring quantities for personal and work-related situations you might have to make estimates, make calculations or even do both!

Estimates and calculations might involve food ingredients, building materials, heights and weights, lengths and distances - even how much hair to trim!

💡 So have a think about when you rely on estimates for quantities; and when you instead use calculations for quantities.

For some situations it is easier, and more convenient, to make **estimates** rather than doing exact calculations.

*For example, when parallel parking a car you're not going to get out with a tape measure and measure each parking space, measure your car and then calculate which space to try for. Instead you will make an estimate - and over time, with experience, you will become better at making this estimate.*



*If you are parking you will estimate distance and angles. However, automated parking systems will make many exact calculations.*

Image: chesky\_w/Depositphotos.com

However, for other situations it is actually easier to make **measurements** to calculate amounts.

*For example, if you need to buy a garden drip-watering system you will need to measure the lengths and widths of the garden areas in which the system will be installed. If you rely only on estimates you might purchase too little hosing and come up short needing to go back and buy a bigger length, wasting both time and money. Alternatively you might buy too much hosing and waste money and resources.*

And of course some situations require **exact measurements**.

*For example, if you are following a difficult recipe, such as baking a souffle, you will need to use quite exact measurements. You can be a couple of grams or millilitres out here or there, but in reality you will use measuring instruments and devices to make sure your measurements are as close to exact as possible.*

### To Estimate or To Measure?

Cost of materials

Your experience

Quality issues

Can you add more?

Waste

Time/Urgency

Danger

Can you take away?

Image: Kuzmafoto/Depositphotos.com

## Estimating vs measuring A

1. List examples of when you make measurement estimates, and when you need to calculate exact measurements.

Estimates of measurements	Calculate exact measurements

2. Give an example for each of these occupations when they could make an estimate, and then when they would need to calculate exact measurements.

Truck driver: Estimate of measurements	Truck driver: Exact measurements
Doctor: Estimate of measurements	Doctor: Exact measurements
Hairdresser: Estimate of measurements	Hairdresser: Exact measurements
Chef: Estimate of measurements	Chef: Exact measurements
Builder: Estimate of measurements	Builder: Exact measurements

3. List examples for each of these situations when a person could estimate measurements, or when they would need to calculate measurements.

Cost of materials	Your experience	Quality issues	Waste
Time/urgency	Danger	Can you add more?	Can you take away?



## 7.17 Estimating vs Measuring

### B Estimating and measuring

#### Part A

1. Estimate the size of this bedroom.
2. What visual information will you use to make your estimates?
3. Do you think that this image is drawn to scale? Why/why not?
4. How would the size of the room compare to your own bedroom? You should sketch your own bedroom to help.
5. What visual and numerical information can you use to make your comparison?





## Part B

1. For this situation make estimates of any items or amounts needed.
2. Use the numeracy techniques you have learned to calculate exact measurements.
3. Which do you think was the better and/or more useful method - estimating or calculating? Discuss why.



Selene has been given the job of buying soft drinks for the grand final party. She can buy cans, but large bottles are more cost effective, and this means she'll have more drink to go around. They've got plenty of cups and glasses for the guests.

Her mate Ange reckons 20 people are coming, and of course being the grand final, they're going to be there for quite a few hours - and it's thirsty work cheering on your team!

*Estimate the following.*

- a. How long are the guests likely to be here?
- b. How much soft drink might Selene need to buy?
- c. How many cups/glasses will this make?
- d. How much drink could each person have?
- e. How much might this soft drink cost?

*Calculate the following.*

- f. Selene's got \$20 to buy the drinks and she's headed off on her skateboard. Calculate the amount she needs to buy for the thirsty guests.
- g. Calculate how much this would cost.
- h. What brands/types should she buy? Why?
- i. Can you predict any problems Selene might have? Explain.

The game is just about to start and the cheer squad puts up the banner. It looks huge. The crowd is screaming and the players are coming down the race.

- j. Estimate what size you think the banner would be.
- k. Use your estimates to calculate the perimeter of the banner.
- l. Use your estimates to calculate the area of the banner.

The cheer squad is holding on tight to the poles of the banner but the wind is too strong and rips the banner apart before the players are on the field. There's distress all round, tears streaming down faces and a lot of wailing.

- m. Why might surface area be an important consideration when making something like a banner? Think of sailing to help you.
- n. Got any advice for the cheer squad for next time?



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## 7.19 Assessment Task

### AT7 Measure by Measure

#### Overview

For this task you are required to identify personal and work tasks that rely on you making appropriate measurements.

#### Part A: Estimating and Measuring

You are required to describe examples of when you need to make appropriate measurements for length, volume, area and weight (mass) in both your personal and work-related activities.

- i. Describe both a **personal situation** and a **work-related situation** where you need to make **length** (or **distance**) estimates and/or measurements.  
(For example, estimate and then measure (calculate) the travel distance from home to school; and then from school to a work placement.)
- ii. Describe both a **personal situation** and a **work-related situation** where you need to make **volume** (or **capacity**) estimates and/or measurements.
- iii. Describe both a **personal situation** and a **work-related situation** where you need to make **area** estimates and/or measurements.
- iv. Describe both a **personal situation** and a **work-related situation** where you need to make **weight** (mass) estimates and/or measurements.

For each of your 8 examples do the following (you could set up tables).

- ☐ Make initial **estimates** of the **length**, **volume**, **area** and **weight**.
- ☐ Use appropriate **units of measurements** for your estimates.
- ☐ Select **measuring devices** or **techniques** you will use to make measurements.
- ☐ Outline and use suitable **techniques** and **processes** to do the **measurements**.
- ☐ Compare your **measurements** to your **estimates** and comment on the results.

You could use images or videos to illustrate these examples.

#### Part B: Report

You must prepare a final report that includes these 4 sections.

- ☐ Describe your 8 measuring examples (from Part A).
- ☐ Identify key measuring devices and units of measurements.
- ☐ Outline the process you used to accurately do these measurements.
- ☐ Comment on the comparisons between your estimates and your measurements.

#### This task focuses on:

- ⇒ **estimating and measuring length, volume, area and weight for personal situations**
- ⇒ **estimating and measuring length, volume, area and weight for work-related situations**
- ⇒ **using measuring devices appropriately**
- ⇒ **communicating using numerical measuring units**
- ⇒ **checking for accuracy of estimates and measurements.**

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Tasks - AT7: Measure by Measure					Re- quired	Due by	Done	Teacher initials
<b>Part A: Measuring</b>								
⇒ Negotiate the task details with your teacher.								
i. Describe personal and work-related <b>length</b> /distance examples.					✓			
Estimate personal and work-related <b>lengths</b> /distances.					✓			
Measure personal and work-related <b>lengths</b> /distances.					✓			
Compare estimates and measurements of <b>length</b> /distance.					✓			
ii. Describe personal and work-related <b>volume</b> examples.					✓			
Estimate personal and work-related <b>volumes</b> .					✓			
Measure personal and work-related <b>volumes</b> .					✓			
Compare estimates and measurements of <b>volumes</b> .					✓			
iii. Describe personal and work-related <b>area</b> examples.					✓			
Estimate personal and work-related <b>areas</b> .					✓			
Measure personal and work-related <b>areas</b> .					✓			
Compare estimates and measurements of <b>area</b> .					✓			
iv. Describe personal and work-related <b>weight</b> examples.								
Estimate personal and work-related <b>weights</b> .								
Measure personal and work-related <b>weights</b> .								
Compare estimates and measurements of <b>weights</b> .								
<b>Part B: Report</b>								
⇒ Prepare a draft of your report.					✓			
⇒ Use appropriate numerical language.					✓			
⇒ Prepare your final report.					✓			
⇒ Present your report (if required).								

Additional information:

7.21 Self-Reflection

Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→

→

→

How have the skills of numeracy helped improve my personal life?

→

→

How have the skills of numeracy helped my development of work-related skills?

→

→

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Objects and Design

8

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## 8.01 Shapes

### Shapes

Shapes are an important part of our lives and form the basis of design.

Some shapes are uniform and are easy to recognise. These include squares, rectangles, circles, triangles and other common shapes. We might encounter these shapes as road signs, as buttons on apps, as sporting fields and as the basic building blocks of 3D objects.

People who have well-developed visual-spatial awareness are good at recognising and manipulating different shapes and often go on to work in design, technical, practical and other similar types of work.

*Image:  
theseamuss/  
Thinkstock*




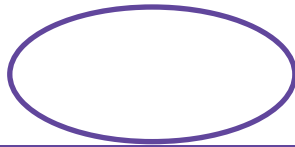
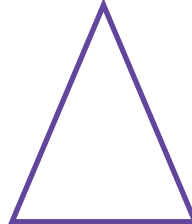
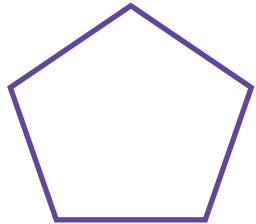
### A Basic shapes

Can you name each of these shapes?



1. Name these basic shapes.
2. List 2 objects that you come into contact with in your life that have each shape. (Try to list a small object and a large object).

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1. Draw the following objects and then describe their basic shape. Add 2 more of your own including images.
2. Estimate the size of these objects and then research to check your estimates.



i. A single bed.

ii. An iPad screen.

iii. An AFL football playing football.

iv. A pizza tray.

v. A 'Give Way' sign.

vi. A BB gun.

vii. Describe the shapes that make up this outdoor studio shed. Also have a go at estimating its size.



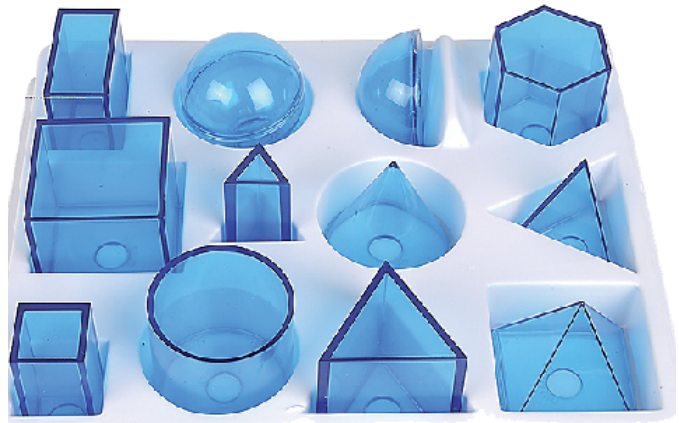
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## 8.03 Shapes

### Objects

When we see and describe shapes such as squares, rectangles and circles we are usually operating in just 2 dimensions. In other words we are seeing these shapes as flat.

This is fine when drawing on paper or viewing on a screen because those are 2D media. This means that we are seeing the outline of the shapes. However, we are not taking into account that the shapes we see 'in the real world' have depth, because they are '**objects**'.



When we refer to objects we are referring to the reality of the **3D** world in which we live. In the 3D world, (our world), all objects have **height, width** and **depth** - the 3 dimensions.

So in design terms an object is the end result of describing anything that has 3 dimensional depth. This includes all living creatures, all naturally occurring things in the world and space, and all man-made objects such as a large bus, a packing box or even a micro electronic circuit. So that covers just about everything that is real in the physical world.

### C Shapes into objects

1. Choose 4 shapes and create them as 3D objects.
2. List things that you come into contact with in your life that resemble each object.


1. Describe the 2D shape of each of these objects, as well as their 3D form.
2. Draw both the 2D shape and 3D object.
3. Find an image of the object, affix it here (or in your workbooks) and describe the object's size and colour.



i. An orange

ii. A die (one dice)

iii. A TV screen

iv. A pyramid

**Preview  
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4. Describe the shape of 5 objects from your classroom; and 5 from your bedroom.

## 8.05 Shapes

### Compound shapes

In life you might encounter many objects that are simple and **uniform** such as packing boxes, soft drink cans and packaged food.

The commercial world tries to make use of uniform shapes so as to make it easy and **efficient** for packing, storage, transport and sale.



Image: Stockernumber2/  
Depositphotos.com

**What are the shapes that make up this house?**



And if the objects are themselves not uniform, then enterprises will design their **packaging** to try and make the objects more uniform for sale, such as by using blister packs and other standardised packaging.

However, in reality many of the objects we experience in life are made up of **compound shapes**. These might include:

- ⇒ a square with a triangle (picture a simple house)
- ⇒ a circle on top of a triangle (picture an ice-cream cone)
- ⇒ a rectangle with a smaller rectangle on top, with 2 circles almost at each end of the bigger rectangle (picture a simple car).

Complex **manufactured items** consist of many components of different **shapes** and **sizes**. Have a think about the dozens of **components** that might go into making a bicycle - and then what about the hundreds or even thousands of components in a car!

And in **nature** things don't grow, develop and form into regular or uniform shapes or sizes. Although we can see that some natural features, animals and plants do resemble the shapes we know, in essence we are imposing this shape upon them.

Just have a think about the 'look' of the fruit and vegetables for sale in your supermarket. They are definitely not a uniform shape. Although (and it might shock you) many supermarkets insist that the fruit and vegetables that are supplied to them fit a more uniform shape and size. One prime example is with bananas. Did you know that your supermarket bananas can't be too big, nor even too bent? That's not really the banana's fault now, is it! So blame nature, just don't sell nature! What do you think about that!

**Bananas being rejected for too being big or too bent! Find out more by watching Craig Reucassel's 2017 series; War on Waste.**










Image: Baloncici/  
Depositphotos.com



**Describing objects** **E**

Describe the shape of the following objects. Try to do this using compound shapes, which are the smaller shapes that go into forming the overall object. Add 1 more object of your own choosing.

Image: Stockernumber2/  
Depositphotos.com

<p>i.</p> 	<p>ii.</p> 
<p>iii.</p> 	<p>iv.</p> 
<p>v.</p> 	<p>vi.</p> 
<p>vii.</p> 	<p>viii.</p>

**Preview  
Sample:  
Do Not  
Copy**

## 8.07 Size and Colour

### Size

Objects come in all shapes, sizes and colours. Some of these features are naturally occurring as part of nature. Living creatures, which really shouldn't be called objects, are diverse. Consider the size of your pet cat, dog or bird and compare this with a lion, a timber wolf or a wedge-tailed eagle.

And have a think about the plants, tree, rivers, oceans, mountains and all the other **naturally occurring features** that exist. They are of varied size and contain every colour on the earth (of course)!



Image: picksell/  
Depositphotos.com

**"Look at how the shape, style and colour of our mobiles has changed. What's next?"**



**Man-made objects** also vary in size and colour. Consider an ocean liner, the Sydney Harbour Bridge, a flashy red Ferrari, your home, your clothing, your phone and even the fries you may gobble down without even thinking about them.

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### Functionality and utility

The size of man-made objects relates to their functionality and to their utility.

**Functionality** simply refers to the purpose for which these objects were designed. This purpose can differ between industrial, commercial and personal use.

**Utility** refers to how well the object serves its purpose; or, is the object of a suitable size for the people using it and does it do what it promises?

*For example, family cars used to be larger with more room for passenger seating. This was because people had large families. Some sedans could even safely seat six people. The function these types of cars served was for family transport. You didn't buy a motor scooter as your family vehicle if you had four kids to cart around. Families made use of (or utilised) the extra space given to them from a large family car, including boot space. Features such as seating and roominess offered specific **utility** for large families. But times have changed.*

Megastructures such as skyscrapers, airports, sporting arenas and shopping centres are designed to service humankind through their function and their utility. Smaller structures such as houses and apartments have a size that reflects their own different function and utility; i.e. people have to live in them.

Vehicles such as trains, trucks, cars, motorbikes and scooters also reflect function and utility - especially utes (an Aussie invention)!



Of course we shouldn't neglect to mention the influence of **fashion** on the design of objects. You could come up with hundreds of examples of how fashion has dictated how an object looks. How about discussing this as a class?



1. Use appropriate language to compare the size of each of these pets. Identify each animal. Are they pictured to scale? Name them if you like.



2. Describe how a man-made object has had its size decrease over time. Explain why this might be the case. Find an image for your workbooks from the past, and a current image, to illustrate your description.



Blank area for student response.

## 8.09 Size and Colour

### Colour

Another important design element is colour. Colour can be used for a variety of purposes.

- ⇒ A design or fashion feature, e.g. pink iPhones or tortoise shell spectacles.
- ⇒ A warning, e.g. using red in danger signs, stop signs or traffic lights.
- ⇒ An instruction, e.g. green emergency exit signs or go lights.
- ⇒ Camouflage, e.g. military uniforms and vehicles.
- ⇒ A signifier of level, rank or purpose, e.g. a Karate brown belt, a store uniform or a soccer goalkeeper's jersey.
- ⇒ An identifier, e.g. a football jumper.
- ⇒ A symbol, e.g. green for the environment, red for fire, blue for water.

💡 What other examples can you think of?



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### B Colour

Find 4 images that show how colour is an important design feature or function of an object. Briefly describe why colour is an important design feature for this object, (e.g. safety).



## Changing size and colour C



Have a close look at the image above then answer the following questions.

1. What is the image depicting in general?

---



---

2. What is the image showing more specifically?

---



---

3. Use descriptive words and terms to describe the changes to the 'object' depicted in the image.

---



---

4. Why do you think these changes might have happened over time? Suggest possible time periods to match the picture.

---



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5. As a class discuss other 'objects' (or products) that have changed over time.



**Preview**  
**Sample:**  
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**Copy**

## 8.11 Changing Size

### Representing size

When drawing and designing you might often have to represent shapes and objects as different sizes from what they actually are. You will usually have to show large-sized shapes and objects as smaller design elements or images. Although at other times you might have to do this representation the other way around, and make smaller shapes and objects bigger.

Two important numerical techniques that you can use involve **scale** and **ratio**.

### Scale and ratio

A scale is used to represent the relative distance or size of a map, diagram, shape or object compared to itself in real life.

Scales use quantity ratios, e.g. 1:4, 1:20, 1:10,000 or even 2:1!

A map scale of 1:10 (in cm) means that every 1 cm on the map represents 10 cm in real life. Or, the map is 1/10th the size of real life.

An action figure might be in 1:6 scale. This means that every 1 cm of the action figure represents 6 cm in real life. So the action figure is 1/6th the size of the character it is representing.

A small object such as fly might be drawn at 4:1. This means that the drawing is increasing the real life size of the fly by a factor of 4.

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*e.g. Tul draws a 3 cm square at a ratio of 1:1*

*Measure this square to see how well he has done.*

*Now Tul draws the 3 cm square at a ratio of 2:1. He has doubled the size of the square.*

*Measure this square to see how well he has done.*

*Finally Tul draws the original 3 cm square at a ratio of 1:2. Now he has halved the size of the square.*

*How well did he do with this drawing?*

*Consider:*

*One thing you will notice about these scaled drawings is that the square that has doubled in size (2:1) actually looks a lot bigger than simply being doubled. Do you agree?*

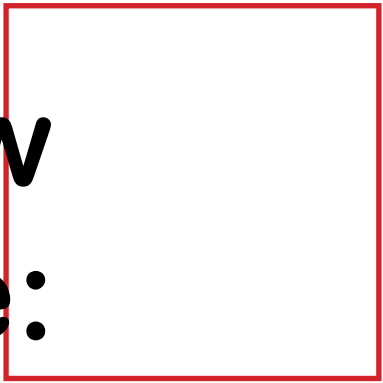
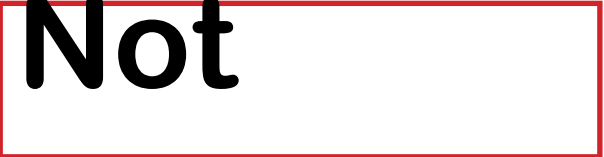
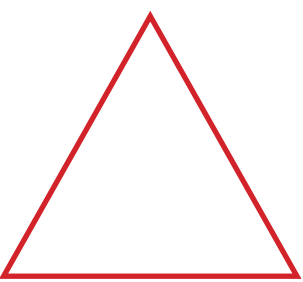
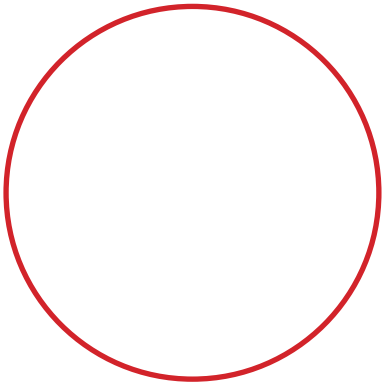
*And the square that is half the original size (1:2) looks much smaller than being halved. And it looks much, much smaller than the 2:1 square.*

*(The 2:1 square is actually 4 times the size of the smaller 1:2 square but it looks much larger than that!)*

*The reason for this 'difference' relates to measurements of area.*

## Changing shape size A

1. Estimate the dimensions (size) of these shapes.
2. Measure these shapes. How did you go with your estimates?
3. In your workbooks, or by using multimedia, convert these shapes by:
  - ⇒ doubling their size
  - ⇒ halving their size.
4. Check your answers by measuring the new dimensions of your enlarged and reduced shapes. How did you go?

Estimates	Measurements	Shape
		
		
		
		

**Preview  
Sample:  
Do Not  
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## 8.13 Changing Size

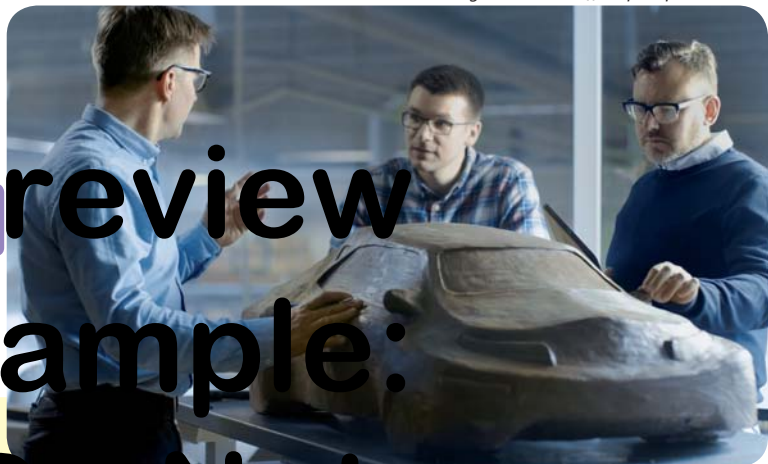
### Representing size - 3D

As you have just demonstrated, it's not too hard to change the size of **2D** shapes. And you will see those types of techniques in use in sketches, diagrams, maps, digital interfaces and many other forms of graphical representation.

Another numeracy skill is to be able to reduce or enlarge objects. This means that you will need to work in **3 dimensions** - **height**, **width** and **depth**. Remember, everything that exists physically in the world is actually an **object** because it has 3 dimensions.

Many people make representations of real-life objects and this skill is important in situations such as design (both manual and computer-based), modelling, practical arts and crafts, cooking and baking, advertising and visual merchandising, film and video production, building and construction, motor vehicle design and development, product design and development, and many more examples.

Image: Gorodenkoff/Depositphotos.com



Modellers will make 3D clay prototype models of cars in the design and development stage. There's some great videos of these on YouTube.

### B 2D into 3D

Give an example of how each of these occupations might have to turn 2D drawings into 3D objects or vice versa. Add 2 more examples of your own.

Architect	Modeller/model-maker	Car designer
Dressmaker/tailor	Sculptor	Theatre set designer
Jewellery-maker	Cake-maker	Filmmaker
Toymaker		



## Changing object size C

*Part A: Is bigger better?*

One way to have a go at showing objects at their correct size is by using a common item such as coins. The coins in this image are not shown at their correct size, nor at the correct scale in relation to each other.

1. What is the correct size of these coins in order from smallest to largest?

2. In your workbooks redraw the coins at their correct size.

*Extension:*

Measure the size of Australia's coins.

Create a ratio scale that shows each coin in relative size to the \$1 coin.

*Part B: Great cats*

1. Name each of these great cats. List the cats in 'real-world' size order.
2. Redraw 3 of these great cats scaled by their relative size to one another. What is the numerical scale you will use?



Image: andegraund548/  
Depositphotos.com

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## 8.15 Design and Modelling

### Design

Some people naturally 'think' using pictures, shapes and visual elements. And other people can understand numerical information more easily if it is communicated in a

visual form using a sketch, plan or diagram. Do you?

Many work-related tasks rely on effective design to communicate information. Examples of workers include tradies, gardeners, builders, architects, engineers, restaurant managers, event and function coordinators, safety officers, sports trainers and coaches, and many more. Specific design workers include graphic designers, multimedia designers, fashion designers, product designers, industrial designers, cartographers, artists, animators, illustrators and more.

### Sketches

A sketch is a rough drawing often done quickly. People make sketches so as to represent numerical information in a visual format. The key is to represent the size and location of the important visual elements.

e.g. A builder might make a quick sketch of how a new kitchen will look. They might just use shapes to represent objects. The important thing is to show how each object is located in relation to the room and to other objects.

e.g. A caterer might make a sketch of a wedding seating layout. The clients will then allocate guests to different tables.

e.g. A football coach might sketch where players position themselves for a set play such as a centre bounce or a kick-in after a behind is scored.

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Sketches and diagrams can help visualise a 'dream'.

Image: sergeypeterman/Depositphotos.com

### Diagrams

A diagram is a visual representation of numerical information. Some diagrams combine numerical, written and visual elements. But in a diagram it is often the visual information that is the key communication element.

There are many different types of diagrams. Common examples might be used to:

- ⇒ give instructions (e.g. how-to-open guide, assembly instructions)
- ⇒ inform customers (e.g. stadium seating plans, aeroplane seating plan)
- ⇒ outline a process (e.g. flowcharts, instructions, plans)
- ⇒ aid navigation (e.g. maps, travel routes, site maps)
- ⇒ communicate summary information (e.g. graphs, charts and infographics)
- ⇒ communicate safety information (e.g. safety instructions, emergency exits).

### Plans

Plans tend to be formal technical drawings that make use of scale, size, relative position and other visual elements to produce a working document.

Plans are usually produced as the final stage of the design process. Some plans are still drawn by hand, but many are now developed using sophisticated multimedia design software.

Designers create plans and then other workers use these plans to create objects by building, making or rendering.

Plans are used for houses, buildings, consumer products, electronics, machinery, vehicles, clothing - you name it - everything that is manufactured or constructed will have been done so using a plan. However, plans are not used by Mother Nature; so bananas can grow crooked if they like!

### Plans and diagrams A

1. This image shows a high quality rendering of a lounge/living room floor plan. (But the furniture is way too small!) List all objects you can identify.
2. Develop a similar floorplan for your own lounge/living room. It is fine to use simple shapes to represent the objects. But if you have the skills you might try to develop a more sophisticated image.

*Image: scovad/Depositphotos.com*



3. Design a step-by step diagram or flowchart to communicate the process of how to do one (or more) of the following.
  - ☐ Make a tasty cheese and tomato toasty.
  - ☐ Make a paper aeroplane (that can fly!).
  - ☐ Change a car tyre safely and effectively.
  - ☐ Change a baby's nappy.





## 8.17 Design and Modelling

### Modelling

Modelling involves the creation of an object. So in essence, modelling involves turning **2D** shapes into **3D** objects.

Modellers often work from sketches, diagrams, computer-aided design programs and other 2D forms to make their objects in life size (such as an industrial modeller), at a reduced size (such as an action figure modeller), or at a larger size (such as a jewellery modeller, or a microbiological/medical modeller).

Some people also model in their everyday lives. Some people like to make fancy cakes that resemble their dog, their car or even their favourite Star Wars character. Others like to build objects and structures such as a storage box, a doghouse or a snowman.

Most people who work with their hands end up crafting some type of 3D structure from a house to a dress, or a clay teapot to an item of jewellery.

Some people have good **visual-spatial skills** and can visualise how 3D plans and diagrams, or even words, can be made into a real-life 3D model. These people are often good at practical, manual, technical, design and craft-based tasks.

And of course there's **3D printing**. How is that evolving?

### Modelling

- ⇒ Make measurements in all 3 dimensions, height, width and depth.
- ⇒ Choose a scale ratio e.g. 1:4 or at a quarter size; or 2:1 which is double the size.
- ⇒ Look at size ratios between the parts of the object. e.g. Above hips is just over 1/3 of the height. Below the hips is just under 2/3s of the height.
- ⇒ For living creatures people often make the head too small or too large. Measure these carefully.
- ⇒ Dummy artist models are usually very slim and streamlined. Humans tend to have a bit more bulk and shape to them.
- ⇒ Sketch lightly using shapes rather than lines. Then refine the shapes into more of a line rendering later on.
- ⇒ Modelling into 3D requires a lot of skill. You can use clay or Plasticine to try to shape depth. Then squash it and start again until the form takes shape.

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Image:  
wingnutdesigns/  
Depositphotos.com



You've probably seen one of these dummy artist models before and might even have worked from them.

1. Using the image on p.192, measure the key dimensions of the model.



2. Create a hand or computer-rendered drawing of this model at half the size of your measurement.
3. Get hold of a 3D dummy artist model. Take the key measurements of the model in all three dimensions.

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4. Draw this 3D dummy as accurately as you can. If you have good visual-spatial and drawing skills you can add perspective to make the drawing look more lifelike.

*Extension:*

- a. Compare the dummy and your drawing to your own size and dimensions. How might you look as a dummy artist model?
- b. Choose 2 objects, one to render larger, such as a phone; and another to render smaller, such as a vehicle.

Measure these objects and then create new drawings at a larger size (e.g. double, or 2:1, for the smaller object); and at a smaller size (e.g. half or 1:2, or even smaller such as 1:10, for the larger object).

## 8.19 Assessment Task

### AT8 Back to the Future

#### Overview

For this task you are required to investigate a made-made object (i.e. a product) that has experienced changes in its 'look' and design over time.

As part of your investigation you need to explore changes in size, shape and other elements.

You need to find images of the object and compare these changes over time.

You will organise your investigation into a report to the class using visual graphics and/or multimedia.

#### Required

##### Stage 1: Now

- Choose a **product** that provides some functionality in your own life. This could be spectacles, a bike, a car, a phone, a computer or even a house. There are many things you could choose from.
- Describe the object in its **current form**. Focus on shape, size, etc.. Collect suitable images to illustrate your description.
- Explain how the **design** of this object makes it **functional**, i.e. useful for you or for others.

##### Stage 2: Then

- Go back in time and find images and/or descriptions of the object as it **looked in the past**. Pick a suitable time period to go back to, i.e. 15 years.
- Describe the object in its **past form**. Focus on its shape, size, etc.. Collect suitable images to illustrate your description.
- Explain how the **past design** of this object made it more **functional**, or less functional, for users.
- Outline key **reasons** why this object may have been **different** back in the past.

##### Stage 3: The future


- Project into the future and **predict** how the object may continue to change and evolve in terms of its size, shape, colour, etc..
- Describe the object in its possible **future form**. Focus on its shape, size, etc.. Create a suitable image(s) to illustrate your description.
- Explain how the **future design** of this object might make it more **functional**, (or perhaps even less functional) for you or for other others.

#### This task focuses on:

- ⇒ **investigating features of design**
- ⇒ **describing and explaining object functionality in the past as well as for the present**
- ⇒ **predicting and describing design features and object functionality for the future**
- ⇒ **comparing and discussing design features and functionality.**

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Name(s):				
Product:		Key dates:		
Tasks - AT8: Now, Then and Back to the Future	Re- quired	Due by	Done	Teacher initials
<b>Stage A: Now</b>				
⇒ Negotiate the task details with your teacher.	✓			
i. Choose a product to describe; with images.	✓			
ii. Describe the object in its current form.	✓			
iii. Explain how the object's design makes it functional.	✓			
iv.				
<b>Stage B: Then</b>				
i. Find past images/descriptions of the object.	✓			
ii. Describe the object in its past form.	✓			
iii. Explain how its design made it more or less functional.	✓			
iv. Outline reasons why this object would be seen	✓			
v.				
<b>Stage C: The future</b>				
i. Predict how the object may change/evolve in the future.	✓			
ii. Describe the object in its future form; create image(s).	✓			
iii. Explain how the design makes it more or less functional.	✓			
iv.				
<b>Report</b>				
⇒ Prepare a draft of your report.	✓			
⇒ Use appropriate numerical language.	✓			
⇒ Prepare your final report.	✓			
⇒ Present your report using images/multimedia. 	✓			
Additional information:				

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## 8.21 Self-Reflection

### Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→ \_\_\_\_\_

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped improve my personal life?

→ \_\_\_\_\_

→ \_\_\_\_\_

How have the skills of numeracy helped my development of work-related skills?

→ \_\_\_\_\_

→ \_\_\_\_\_

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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# Preparing For Work 9

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9.02A Preparing for work	199	<input type="checkbox"/>	
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9.08B Timesheet	205	<input type="checkbox"/>	
9.09A Personal banking	206	<input type="checkbox"/>	
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9.16B Award rates	213	<input type="checkbox"/>	
9.17C Registered agreement rates	214	<input type="checkbox"/>	
9.19D Traineeship pay rates	216	<input type="checkbox"/>	
9.20E Comparing pay rates	217	<input type="checkbox"/>	
AT9 Preparing For Work	218-219	<input type="checkbox"/>	
9.23 Self-Reflection	220	<input type="checkbox"/>	

Comments:

## 9.01 Preparing For Work

### Preparing for work

During this year you are likely to participate in work placements. Indeed some of you might already have done so. You might also be continuing to go out on regular work and community placements throughout the semester as part of your VCAL, applied learning or work education study program. Some of you will even be lucky enough to already have a casual paid job.

A range of numeracy skills is vital in workplace situations. You will use applied numerical skills as part of your day-to-day job tasks, such as managing time, dealing with money, preparing customer orders and services, estimating and measuring materials, and many other tasks specific to your work and/or community setting.

You also need to apply your numerical skills to prepare yourself and get ready to enter the workforce. You will need to manage a bank account, fill out tax-related forms, understand, calculate and check pay amounts as well as many other tasks.

This section is about you preparing for work. So treat each of the topics and activities that you are asked to investigate and do, as helping you to get one step closer to being work ready.

# Preview Sample: Do Not Preparing for Work Copy

**Tax File Number  
(TFN)**

**Tax File Number  
declaration**

**Tax File Number  
application**

**Bank account**

**Pay rates**

**Apprenticeship**

**Traineeship**

**Awards**

**Registered  
agreements**

**National Training  
Wage**

**Roster**

**Timesheet**

*Image: michaeljung/  
Depositphotos.com*

1. Explain the meaning of each of these terms. You might only know a few of these right at this moment. That's OK.
2. As you work through the material in this unit you will come back and add to the information in this table. Your teacher will guide you in this.



Term	Explanation	What do I need to find out/ or do?
Tax File Number (TFN)		
Tax File Number application		
Tax File Number declaration		
Apprenticeship		
Traineeship		
Pay rates		
Roster		
Timesheet		
Awards		
Registered agreements		
National training wage		

**Preview  
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## 9.03 Tax File Number

### Tax File Number

When you first start employment your employer will require you to complete a **Tax File Declaration form** related to your tax status.

In order to do this you need to already have your **Tax File Number** (TFN).

Your TFN is used to manage all your tax affairs with the Australian Taxation Office (**ATO**) and stays with you for life. Your employer must lodge your Tax File Declaration Form when you start working.

So before you can fill out your TFN Declaration for your employer you need to have already applied for, and of course received, your tax file number from the ATO. To do this you must complete and lodge a **Tax File Number Application form**.

The TFN application process can take a while, sometimes a month or even more, for some people to get properly organised. So you need to apply for your TFN well before you start looking for work. And even when you have finished the TFN application process, it can still then take up to 28 days before you receive your TFN from the ATO!

If you don't apply for, or already have a TFN, then you will pay more tax; and you can't access government benefits. Also if you want to apply for an ABN (i.e. as an independent contractor) you will first need to have your TFN.

### TFN process

- ⇒ Forms are available online, at Centrelink or at Australia Post shops.
- ⇒ If you are 16 or older then you must sign your own TFN application form (except for some special circumstances where it will be your parent or guardian who signs).
- ⇒ If you are aged from 13 to 15 (under 16) then either you or your parent or guardian can sign the application.
- ⇒ You have to book and attend an interview at a participating post office (not all can do a TFN interview), or an ATO lockfront or Centrelink for government benefits).
- ⇒ For your interview you'll need to bring 3 original examples of **primary** and **secondary** proof of ID documents. At least one of these must be a primary document.
- ⇒ For people in remote areas you can use a mail order process involving certified copies of documents.

Go to: [www.ato.gov.au](http://www.ato.gov.au)  
(and search for Tax File Number).



Image: Pixelery.com/  
Depositphotos.com





**TFN Application proof of identify documents**

For applicants aged 16 and over, **primary documents** can include:

- ✓ Australian birth certificate (not an extract)
- ✓ Australian passport (or where relevant, overseas passport)
- ✓ Australian citizenship certificate (or Register of Citizenship extract).

For applicants aged 16 and over, **secondary documents** can include:

- ✓ Medicare card
- ✓ an ATM card, or a bank or financial institution account statement that is less than one year old (this must be a bank issued original hard copy and not a printout from your online account)
- ✓ Australian firearm licence with your signature and/or photo
- ✓ student ID card from a government accredited education authority (secondary or tertiary) with your photo
- ✓ Australian driver's licence
- ✓ Australian learner's permit
- ✓ state or territory government issued proof of age card
- ✓ state or territory government issued photo card.

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Preview

Sample:

Tax File Number

A

The Tax File Number process can be quite complex.

Your friend Rory has just started looking for work and he has come to you for help with the TFN process. He wants you to show him the TFN application process and timelines in a diagram so that he can see what he needs to do and by when.

Help Rory out by using your numeracy skills related to planning, organising and design. In your workbook, using multimedia, create a diagram (or flowchart) of the TFN application process with the key steps, information sources and relevant timelines and deadlines.



Put these steps in the correct order; and add others that are relevant.

- |   |   |
|---|---|
| <input type="checkbox"/> How will he get hold of a TFN Application form. From where?  | <input type="checkbox"/> How will he get help filling out the form? From whom?                                  |
| <input type="checkbox"/> Who will sign the form? Why?                                 | <input type="checkbox"/> How will he find a suitable Australia Post outlet; and where?                          |
| <input type="checkbox"/> When will he start looking for work?                         | <input type="checkbox"/> How will he gather suitable primary documents? Which ones?                             |
| <input type="checkbox"/> How will he gather suitable secondary documents? Which ones? | <input type="checkbox"/> How will he book an appointment with a suitable Australia Post outlet; where and when? |
| <input type="checkbox"/> How long will he wait for the TFN number to arrive?          | <input type="checkbox"/> How long might the entire process take?  |
| <input type="checkbox"/> When is he wanting to start working if he finds a job?       |   |

## 9.05 Rosters and Timesheets

### Rosters and timesheets

Two important time management tools that exist in work-related situations are rosters and timesheets. **Rosters** set-out and communicate employees' scheduled work hours. **Timesheets** record hours worked and usually includes a relevant rate of pay such as an hourly wage.

### Rosters

A roster is a planning and organising tool that sets out the labour needs of an organisation. Rosters are used to make sure the appropriate number of **staff** are available so as to effectively carry out the work roles and responsibilities needed. This includes workers with specific skills to do particular job roles, as well as supervisory and management staff.

- ⇒ Rosters need to be planned well in advance.
- ⇒ Rosters are often communicated using 24-hour time.
- ⇒ Rosters need to be communicated to all employees involved.
- ⇒ Rosters should ensure that an appropriate balance of skills, training and authority is covered by the workers.
- ⇒ Rosters must be fair and must not be used to favour or punish particular workers.

Preview  
Sample:

Gramble Newsagency: Weekly Roster						
Sunday May 19 - Saturday May 25, 2019						
Times	8-10am	10am-12pm	12-2pm	2-4pm	4-6pm	6-8pm
Sunday 19/5	Jo P.	Jo P.	Jo P.			
		Edwina F.	Edwina F.	Edwina F.	Edwina F.	
Monday 20/5	Edwina F.	Edwina F.	Edwina F.	Edwina F.		
	Reg. G.	Reg. G.				
Tuesday 21/5		Edwina F.	Edwina F.	Edwina F.	Edwina F.	
	Reg. G.	Reg. G.				
Wednesday 22/5		Adut N.	Adut N.	Adut N.	Adut N.	
	Edwina F.	Edwina F.	Edwina F.	Edwina F.		
Thursday 23/5			Edwina F.	Edwina F.	Edwina F.	
	Reg. G.	Reg. G.				
Friday 24/5		Adut N.	Adut N.	Adut N.	Adut N.	Adut N.
	Edwina F.	Edwina F.	Edwina F.	Jo P.	Jo P.	
Saturday 25/5	Jo P.	Jo P.	Jo P.	Aloysius Z.	Aloysius Z.	Aloysius Z.
	Reg. G.	Reg. G.	Frankie F.	Frankie F.	Frankie F.	

## Roster A

Jack Fromage works at Hungry Macs serving customers and sometimes helping out on one of the kitchen stations. The boss has just texted Jack with the roster for next week. Jack always thinks it's better to show information visually and he is also going to enter the roster in his e-calender. He'll also print this out and put it on his fridge as a reminder.

1. Use the information below to show Jack's roster for the upcoming week. How many hours will Jack work for the week?

*Sunday: 12pm to 4pm, Monday: 7am to 5pm, Tuesday: 11am to 7pm, Wednesday: On standby, Thursday: Day off, Friday: 12pm to 9pm, Saturday: 10am to 2pm then 6pm to 10pm.*

Name:	Dates:						
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7:00							
8:00							
9:00							
10:00							
11:00							
12:00							
13:00							
14:00							
15:00							
16:00							
17:00							
18:00							
19:00							
20:00							
21:00							
22:00							

2. Use the roster on p.202 for Gramble Newsagency to tally the weekly hours for each worker. How many hours do staff work in total? When is the newsagency less busy? How do you know? Which shifts would you prefer? Why so?



## 9.07 Rosters and Timesheets

### Timesheets

Timesheets exist in various forms and are used to record employee working hours, work days, break times, rates of pay as well as other information relevant to the particular work setting and employee. Timesheets often use a **24-hour clock**.

Timesheets show hours worked, when these hours are worked, overtime, and other information. They are used to calculate a weekly (or fortnightly) gross pay amount. It might be your responsibility to fill in your timesheets; and it is definitely your responsibility to check that your timesheets are correct.

### Wage rates

A timesheet (or perhaps a pay slip) will also include the relevant hourly wage rate for the hours that are worked. This hourly rate might differ depending on factors such as the following. See if you can identify any of these in the example below.

- ⇒ The award or registered agreement under which the employee is employed (or the minimum wage rate).
- ⇒ The occupational classification of the employee.
- ⇒ The age of the employee (for junior staff under 21 and for trainees and apprentices).
- ⇒ The time of day worked (if penalty rates apply).
- ⇒ The day of the week worked (if weekend penalty rates apply).
- ⇒ Extra hours worked (if overtime penalty rates apply).

🗣️ So how could you actually find out which rates and conditions apply to various jobs or for your own job? Discuss this with your teacher.

Colesworths Weekly Timesheet							
<b>Name:</b>	Glonsork Elver			<b>Work period:</b>	May 19 - May 25, 2019		
<b>Employee number:</b>	014256		<b>Classification:</b>	Retail Worker Level 1		<b>Age:</b>	17
	Date	Start	Finish	Break	Hours Worked	Rate	Total
Sunday	19/5	13:30	17:30	na	4	\$20	\$80
Monday	20/5	9:00	17:30	12:30-13:30	7.5	\$10	\$75
Tuesday	21/5	—	—	—	—	—	—
Wednesday	22/5	14:30	18:30	na	4	\$10	\$40
Thursday	23/5	—	—	—	—	—	—
Friday	24/5	12:00	19:30	16:00-17:00	6.5	\$10	\$65
Saturday	25/5	12:30	17:00	na	4.5	\$15	\$67.50
<b>Totals</b>					26.5		\$327.50

## Timesheet B

Complete this sample timesheet (in 24-hour time) with the correct calculations for a teenage employee working 40 hours for a week, Monday to Friday.

- ⇒ Sign-on is 8:00am (or 08:00 according to 24-hour time).
- ⇒ Unpaid lunch break is from 12:30pm to 1:30pm (or 12:30 to 13:30).
- ⇒ The employee is paid \$12/hour.

Name:		Period:					
	Date	Start	Finish	Break	Hours Worked	Rate	Total
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							
Sunday							
Totals							

2. Find an example of a timesheet for an occupation you are interested in. Use this timesheet to list other information that is missing from the timesheet above.

3. In your workbooks construct a weekly and monthly timesheet to show the following information. Calculate the weekly pay and the total 4-weekly pay.
  - ⇒ You are required to work a 38-hour week, Tuesday to Saturday (i.e. 40 hours/week with a 1 day RDO every 4 weeks).
  - ⇒ Sign-on is 9:00am.
  - ⇒ You can take your unpaid break 4 hours after sign-on.
  - ⇒ You're paid \$10 per hour standard or \$15 for working on Saturdays.
  - ⇒ Which day would you prefer to be rostered off? Why so?



## 9.09 Personal Banking

### Personal banking

By now you are likely to have a personal bank account that you use for deposits, transfers and accessing your money for cash and e-transactions.

It is your responsibility to take charge of your personal banking as part of your own financial literacy development. This means that you need to manage these issues.

- ⇒ Know your bank account name, number and bank BSB number.
- ⇒ Be aware of how much is in your bank account (i.e. your credit balance).
- ⇒ Know when deposits are made to your account such as your pay from work, and government payments.
- ⇒ Understand various fees and charges associated with your account.
- ⇒ Understand interest rates associated with your account and how and when these are calculated and paid by your bank.
- ⇒ Know the amounts and timing of various automatic withdrawals from your account that occur as part of digital and other subscriptions (debit amounts) that you have authorised.
- ⇒ Keep on top of your withdrawals and other spending so that you keep your account in credit.
- ⇒ Protect and secure your banking card and information including your PIN, online password and account number.

Preview  
Sample  
Do Not



Image: KONBIR/  
Depositphotos.com

### A Personal banking

Answer the following questions about your own personal bank account.

What's your account name, number and BSB? (But don't write these here; and why not?)	Do you know your account balance? (But once again don't write this here; why not?)
What deposits are made to your account; and when?	What automatic debits are made from your account; and when?
What interest rate applies to your account?	When is interest paid; and on what amount (i.e. minimum monthly balance)?
What fees and charges apply to your account, including transaction 'limits'?	What security measures should/do you take to keep your information secure?



## Different accounts

Many people maintain more than one bank account. They use one as a **transaction account** for their pay to be deposited into, to pay their bills from, for e-transactions and EFTPOS and to take cash out for day-to-day purchases. The best type of accounts for this purpose are those that have lower fees; but as a trade-off these have low interest rates.

The second account type is usually a **savings account** which is used to (hopefully) accumulate a deposit amount over a longer-term. These accounts are likely to have higher transaction fees but a higher interest rate. The aim for users is to make as few debit (withdrawal) transactions as possible from this account; and instead try to get the balance to accumulate over time by making regular deposits.

In order to 'qualify' for the higher interest rates account holders are often required to maintain minimum monthly balance amounts and/or regularly deposit amounts over a certain amount.



**Preview**  
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## Different accounts

B

1. What is the difference between a transaction account and a savings account? Which type of account(s) do you have?

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2. Find out the requirements for opening a new bank account. Answer the following questions.
  - a. Where can you find out information about possible accounts?
  - b. Which bank or financial institution would you choose? Why?
  - c. What type of account would you choose? Why?
  - d. What are the features of the account that attract you? Why?
  - e. What ID do you need? Have you got these?
  - f. What are the requirements, charges and fees associated with the account?
  - g. What are the interest rates, and the balance and deposit requirements of the account?
  - h. What other information is important?

## 9.11 Personal Banking

### Managing an account

A monthly (or periodic) **bank statement** is one of the best tools that you can utilise as part of your personal money management. This is even more important as you start working and get your **wages** paid directly (credited) into your account. When you are working you are also likely to have more spending transactions, especially **e-transactions**. Your statement can let you see all of those.

Although there are now **apps** that can let you see your **balance** and **running deposit totals** and **running withdrawal totals** at a glance, these account snapshots may not give you all the information you need to **manage your money** as part of effective financial literacy.

This means that you have to keep an eye on your day-to-day spending to make sure your account doesn't get **overdrawn** (negative), as an overdrawn account can attract significant fees and charges.

You can also use your statement to see

where you might be **overspending**

on goods and services that you really could easily do without.

You also need to check that the transactions that appear on your statement are **valid** and are the correct amounts.

Image: mjth/  
Depositphotos.com

Checking your statement is not the most exciting thing to do, but you should still do this each month. It's your money!

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Sample:  
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### C Managing an account

1. Using the following transactions complete the bank statement for Jaz Jansen opposite. Fill in all the required information in the correct order.

Deposits			Withdrawals		
Sep 2	Hungry Macs - Wages	125.00	Sep 1	VISA EFTPOS - Coles Sunscray	56.00
Sep 9	Hungry Macs - Wages	125.00	Sep 1	VISA EFTPOS - El Munchos	17.50
Sep 16	Hungry Macs - Wages	125.00	Sep 4	VISA EFTPOS - Lunchalots	12.00
Sep 23	Hungry Macs - Wages	250.00	Sep 8	DD 6252264 - iTunes	30.00
Sep 30	Hungry Macs - Wages	125.00	Sep 9	Footsville - ANZ - ATM	100.00
			Sep 10	VISA EFTPOS - El Munchos	14.00
			Sep 14	VISA EFTPOS - Scoffburgers	17.50
			Sep 16	VISA EFTPOS - Hungry Macs	11.00
			Sep 17	VISA EFTPOS - Pizza Glut	17.50
			Sep 19	VISA EFTPOS - El Munchos	10.00
			Sep 18	DD 2175268 - Stanflix	10.00
			Sep 20	VISA EFTPOS - D'Grubtruck	22.00
			Sep 23	Williamstona - NAB - ATM	80.00
			Sep 26	VISA EFTPOS - El Munchos	17.50
			Sep 28	VISA EFTPOS - El Munchos	17.50
			Sep 29	Non-bank ATM 758-259	100.00
			Sep 29	Non-bank ATM fee	3.00

2. Use numbers and words to communicate 5 pieces of information about the patterns of Jaz's banking, earnings, spending and types of transactions.

[illegible]

## 9.13 Australian Apprenticeships

### Australian Apprenticeships

One of the most common ways that young workers access entry-level employment opportunities is through an **Australian Apprenticeship**.

Australian Apprenticeships are structured **competency-based training** (CBT) that involve a combination of **on-the-job** and **off-the-job** training. An apprentice or a trainee is exposed to both the practical and theoretical aspects of their occupation through their training.

Training is offered by a **TAFE** or a **Registered Training Organisation**. Some employers are accredited and registered as RTOs themselves, as are some schools.

Many training providers are actually **Group Training Organisations** that employ apprentices and trainees and place them with host employers to gain on-job-training. A GTO may then organise or deliver some of the off-the-job training for the apprentice.



Australian Apprenticeships combine both on-the-job and off-the-job training.

Image: photography33/Depositphotos.com

So do you think an Australian Apprenticeship might be the way to go for you?

### Apprenticeships

- ⇒ Apprenticeships are the traditional 'trades' and usually take between 36-48 months to complete depending on the occupation.
- ⇒ They are usually awarded at certificate III level.
- ⇒ Common 'apprenticeships' include carpentry, plumbing, construction trades, electrical trades, electronic trades, metals engineering trades, mechanical trades, automotive trades, hairdressing, cookery and many, many more.
- ⇒ Many tradespersons also undertake further training (after their apprenticeship) for specific skills and areas, such as a plumber undertaking training in gasfitting.

### Traineeships

- ⇒ Traineeships usually require completion of a competency-based Australian Apprenticeship (traineeship) lasting approximately 12 to 18 months combining formal on-the-job and off-the-job training.
- ⇒ They could be awarded at varied certificate levels depending on the industry and job.
- ⇒ Some traineeships are specialised practical occupations that support trades such as a windscreen fitter, construction labourer and kitchenhand.
- ⇒ Whereas others are entry-level qualifications for service industries such as business, administration, ICT, retail, hospitality, community service and many other types of work.

1. What is the difference between an apprenticeship and a traineeship? Give some examples.

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2. Here is a passage featuring statistics about Australian Apprenticeships. Extract the key information and rewrite in a simpler form; e.g. dot point summaries and rounding the statistics. You could also calculate percentages.

In Australia as at March 31, 2018 there were 272,440 apprentices and trainees currently employed and in training. Of these 94,340 were 15-19 years old. Males represented 204,105 and there were 68,335 females.

174,195 Australian apprentices were employed in trade types of occupations and 98,250 were employed in non-trades types of occupations. The most common 'trade' industry was construction with 56,630 and the most common 'non-trade' industry was community and personal services with 11,120.

Of all the apprentices and trainees in training 139,523 were workers in new roles (and not existing workers), i.e. they were 'freshly' employed as an apprentice or trainee. 233,825 Australian Apprentices were completing qualifications at a Certificate III level.

Source: National Centre for Vocational Education Research (NCVER), National Apprentice and Trainee collection no. 96, June 2018 estimates, Australian Bureau of Statistics (ABS), Labour force, Australian, detailed quarterly, May 2018 (as at June), cat. no. 6291.0.55.003.

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3. How about finding the current statistics? Start at: [www.ncver.edu.au](http://www.ncver.edu.au)



## 9.15 Pay Rates

### Pay

Being paid is one of the most important reasons for working, and every worker deserves to be paid fairly for their labour. So it is important to know the pay you are likely to receive if you are lucky to secure an apprenticeship or traineeship.

Most workers will be paid either according to a **wage** (per hour) or a **salary** (per year). *Note: Refer to pp. 84-85 for other information about pay entitlements.*

Employees in most entry-level jobs such as **Australian Apprenticeships** will be paid a wage based on the number of hours worked. The wage rate is set down in an **award**, or a **registered agreement** or as part of the **National Wage Case**.

Some awards and registered agreements provide extra payments called **penalty rates**. These might apply when working shiftwork, odd hours, on weekends, during public holidays or for overtime.

Workers under 21 are normally paid a percentage of an adult rate based on their age. For example, most retail employees aged 16 usually receive 50-55% of the adult rate. **Apprentices** and **trainees** will be paid a proportional rate according to their job, stage of completion and/or age. These rates, and the relevant proportions of an adult rate, will be set down in the relevant award or the relevant registered agreement under which the apprentice or trainee is employed.

**Casual workers** are normally paid extra (usually 20-25%). However, in return they forego non-monetary conditions such as annual and personal and carers' leave.

### A Apprenticeship pay rates

Given below are rough approximations of what non-adult apprentices might earn at different stages of their training. Calculate how much each would earn per hour, per week (38 hours) and per year.

*Note: These percentages are only a general guide and are not relevant to all jobs and industries, nor do these include allowances, penalty rates and other conditions.*

'Adult' wage	1st year 55%	2nd year 60%	3rd year 80%	4th year 95%
\$20	Pay: \$11/hour	Pay:	Pay:	Pay:
	Week: \$418	Week:	Week:	Week:
	Year: \$21,736	Year:	Year:	Year:
\$25	Pay:	Pay: \$15/hour	Pay:	Pay:
	Week:	Week:	Week:	Week:
	Year:	Year:	Year:	Year:
\$30	Pay:	Pay:	Pay: \$24/hour	Pay:
	Week:	Week:	Week:	Week: \$1,083
	Year:	Year:	Year:	Year:



## Awards

Most employees in Australia are paid according to either a rate set down in an award (modern award) rate or according to a registered agreement.

Most awards are national awards and apply across an industry or industry sub-sector Australia-wide. Awards set down minimum rates of pay and other conditions for employees depending on their job classification. Apprentices, trainees and juniors will be paid a proportion of the adult rate.

Awards will also specify information about penalty rates, overtime, allowances and other pay-related issues. (Note: WA will have some employees covered under WA state awards).



## Award rates

B

Find out the correct information from 1 of the awards listed above. Also do this for an award that matches your own preferred occupation.

Award:		Current year:	
Non-adult apprentice pay percentages.			
Non-adult apprentice hourly pay amounts.			
Classifications		Juniors	
Casual rates		Penalty rates & overtime	
Shifts and breaks		Allowances	

## 9.17 Pay Rates

### Registered agreements

Many workers, including Australian Apprentices, are employed under a registered agreement. **Registered agreements** (sometimes still referred to as Enterprise Bargaining Agreements or EBAs) are normally negotiated between employers and unions (on behalf of workers) for similar enterprises in the same industry; or even for one specific enterprise (usually a larger enterprise).

What this means is that workers in the one business, or a particular geographic location or operation of a business, or in a group of similar businesses from the 'same' industry, are all covered by the one specific registered agreement.

Registered agreements must have minimum conditions that are at least as favourable as awards. As a result, many registered agreements do tend to have more favourable wages and conditions than awards.

For example, in retail there is the Coles Supermarkets Enterprise Agreement 2017, the Priceline Retail Employees Enterprise Agreement 2017, and many more.

Image: photography33/  
Depositphotos.com



# Preview

### C Registered agreement rates

Find out the correct information from the registered agreements listed above. Also do this for an agreement that matches your own preferred occupation. Start with [www.calculate.fairwork.gov.au](http://www.calculate.fairwork.gov.au)



Agreement:		Current year:	
Non-adult apprentice pay percentages.			
Non-adult apprentice hourly pay amounts.			
Classifications		Juniors	
Casual rates		Penalty rates & overtime	
Shifts and breaks		Allowances	

## Traineeships

Nearly all trainees are paid according to a pre-determined rate known as **The National Training Wage**. The **Fair Work Commission** has set down this rate in the *Miscellaneous Award 2010*.

This information is then used for all awards throughout other industries (except for nine specific modern awards). So nearly all awards will refer employers and employees to the National Training Wage rates and other conditions contained in **Schedule E** in the *Miscellaneous Award 2010*.

It is important to note that trainees will get their other entitlements such as **penalty rate** % loadings, **overtime** % loadings as well as specific job-related or industry-related **allowances** from the industry or occupation award that covers them.

There will still be some trainees who will have their wages and other conditions set down in a specific registered agreement.

And once again, the National Training Wage rates, just like all other minimum rates, are updated annually.

Different National Training Wage rates apply for **Wage Level A**, **Wage Level B** and **Wage Level C** trainees. This Wage Level classification varies according to industry type (and therefore job type) and also the qualification's certificate level.

There are varied National Training Wage pay rates based on number of years out of school (up until when a trainee becomes an adult).

There are also **part time** rates, rates related to **disability classification** and rates for **Australian School-based Apprentices**.

Nearly all trainees are paid according to the National Training Wage set down in Schedule E in the Miscellaneous Award 2010.

Preview  
Sample:  
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Image: photography33/  
Depositphotos.com

### Fair Work Infoline

- ⇒ The easiest way to get help about pay and conditions and to find out information about this complex area is by calling **Fair Work Infoline** on: **13 13 94** between 8:00am -5:30pm, Mon to Fri.
- ⇒ You should do this before starting a new job.
- ⇒ Fair Work also has an online Pay Calculator tool called PACT. But you'll need to know some key information to use this correctly. But have a go; what you have learned so far might help you find out some information. Your teacher can guide you through the PACT tool.

[www.calculate.fairwork.gov.au](http://www.calculate.fairwork.gov.au)



NUM  
SUPER  
SKILLS

## 9.19 Pay Rates

### D Traineeship pay rates

Given below are National Training Wage rates for a **non-adult** trainee as applicable to 2018/19, based on school level and years out of school.

1. Calculate how much a trainee would earn per hour and annually.

**To calculate wage per hour you will need to divide the weekly wage by 30.4 (and not 38) as a traineeship has a shorter 'working' week - 4 days instead of 5).**

National Training Wage Pay Rates: 2018/19 According to the Miscellaneous Award 2010, Schedule E			
School Leaver Wage Level A	...and has completed Year 10	...and has completed Year 11	...and has completed Year 12
Just left school	Week: \$323.10	Week: \$355.80	Week: \$423.90
	Hour: \$10.63	Hour:	Hour:
	Year: \$14,801	Year:	Year:
Plus 1 year out of school	Week: \$355.10	Week: \$423.90	Week: \$493.30
	Hour:	Hour: \$13.95	Hour:
	Year:	Year: \$82,423	Year:
Plus 2 years out of school	Week: \$423.70	Week: \$493.30	Week: \$574.10
	Hour:	Hour:	Hour: \$18.88
	Year:	Year:	Year: \$29,853

2. Find out the current rates for this year. Then complete the same type of table.

National Training Wage Pay Rates: 20__ / __ According to the Miscellaneous Award 2010, Schedule E			
School Leaver Wage Level A	...and has completed Year 10	...and has completed Year 11	...and has completed Year 12
Just left school	Week:	Week:	Week:
	Hour:	Hour:	Hour:
	Year:	Year:	Year:
Plus 1 year out of school	Week:	Week:	Week:
	Hour:	Hour:	Hour:
	Year:	Year:	Year:
Plus 2 years out of school	Week:	Week:	Week:
	Hour:	Hour:	Hour:
	Year:	Year:	Year:

## Comparing pay rates E

Two pals, Franklin and Buddy completed Year 12 last year and have just secured work. Franklin is going to do a retail traineeship at Colesworth Supermarket and Buddy has got an apprenticeship as a butcher there as well.

Find out and fill in the missing information in the table.

Then in your workbooks complete a similar table based on the current year's information.



2018/19	Franklin	Buddy
Job & Employer	Retail trainee at	Apprentice Butcher at
Job Classification/ level		
Qualification level/ length	Certificate III: 18 months - 2 years	Certificate III:
Award		
Starting pay amount hourly	\$13.95	\$12.12
Starting pay amount weekly		
Starting pay amount yearly		
1st Year (in work)	Weekly \$:	% rate and Weekly \$: 55% of adult
2nd Year (in work)	Weekly \$	% rate and Weekly \$
3rd Year (in work)	Adult rate	% rate and Weekly \$
4th Year (in work)		% rate and Weekly \$
Other conditions and information		

Preview  
Sample:  
Do Not  
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## 9.21 Assessment Task

### AT9 Preparing for Work Portfolio

#### Overview

For this assessment task you are required to complete a portfolio of activities that will assist you to get prepared for the workplace.

You may have completed some of these as part of the activities for Section 9. Others will require you to use what you did in these previous activities and then apply some further tasks, interpretation or analysis. Your teacher will guide you in this and also in how to present your final portfolio for submission.

#### This task focuses on:

- ⇒ researching and applying the requirements related to a Tax File Number
- ⇒ interpreting and completing work rosters and timesheets
- ⇒ comparing and working with personal bank accounts
- ⇒ calculating and comparing apprenticeship and traineeship pay rates.

#### Part A: Getting Ready for Portfolio

- i. Describe the **process** required to apply for a **Tax File Number**.
- ii. **Apply** for a **Tax File Number** (TFN).
- iii. Complete a sample **Employment Tax File Declaration** form using a TFN.
- iv. Complete and interpret a sample (or actual) **work roster**.
- v. Complete and interpret a sample (or actual) **work timesheet** including **break times**.

#### Part B: Personal Banking Portfolio

- i. Compare different types of bank **deposit accounts**.
- ii. Outline the **requirements** and **process** for opening a new **bank account**.
- iii. Complete and interpret a sample **bank statement** using **transactions** for a set period of time.

#### Part C: Pay Portfolio

- i. Undertake calculations based on **award pay rates** for **apprenticeships**.
- ii. Undertake calculations based on **award pay rates** for **traineeships**.
- iii. Compare **pay rates** between **apprenticeships** and **traineeships**.
- iv. Complete a **work timesheet** using appropriate **pay rates**.


*Due dates and other information:*

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Do Not  
Copy



**Name(s):**

**Key dates:**

Tasks - AT9: Preparing for Work Portfolio	Re-quired	Due by	Done	Teacher initials
<b>Part A: Getting Ready Portfolio</b>				
⇒ Negotiate the task details with your teacher.	✓			
i. Describe TFN application process.	✓			
ii. Apply for a (TFN).	✓			
iii. Complete work roster.	✓			
iv. Complete work timesheet including break times.	✓			
<b>Part B: Personal Banking Portfolio</b>				
i. Compare bank deposit accounts.	✓			
ii. Outline process for opening a bank account.	✓			
iii. Complete bank statement transactions.	✓			
<b>Part C: Pay Portfolio</b>				
i. Calculate apprenticeship pay rates.	✓			
ii. Calculate traineeship pay rates.	✓			
iii. Compare apprenticeship and traineeship pay rates.	✓			
iv. Complete timesheet using appropriate pay rates.	✓			
<b>Report</b>				
⇒ Prepare a draft of your portfolio.	✓			
⇒ Use appropriate numerical language.	✓			
⇒ Prepare your final portfolio.	✓			
⇒ Present your portfolio (if required). 				
<b>Additional information:</b>				
Signed: _____ Date: _____				

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9.23 Self-Reflection

Self-Reflection Pro-Forma

Which numeracy skills did I develop during this unit?

→

→

→

How have the skills of numeracy helped improve my personal life?

→

→

How have the skills of numeracy helped my development of work-related skills?

→

→

How would I rate my performance using a circle in developing my numeracy skills this unit?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

# Applied Work Numeracy 10

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Activities - 10. Applied Work Numeracy		p. Due date/Done?	Comment
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10.04B Numerical work-related skills	225	<input type="checkbox"/>	
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AT10 Numeracy at Work	252-255	<input type="checkbox"/>	
10.35 Self-Reflection	256	<input type="checkbox"/>	

Comments:

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## 10.01 Numeracy at Work

### Numerical information

When you are in work-related situations you will be expected to both demonstrate and develop numerical skills and competencies. This relies on you being able to deal with varied types of numeracy information using appropriate numerical techniques.

**Numerical information** might be communicated in different ways such as **written**, **verbal** or in business **documents** and **forms**.

Numerical information might also be presented in different ways such as in **tables**, in **graphs** or even as **digital readouts** on **measuring devices**.

As you start to build your workplace experience you will need to get better at applying the numerical skills you have developed in school to work tasks. This will assist you to build a suite a **transferable skills**.

You'll notice that this section does not include examples of calculations. This is because you are likely to have already learned how to do these calculations throughout the year. This section is about **applied numeracy**. Therefore, you have to decide which types of calculations to apply to your work-related situations. Your teacher will also guide you if there are any tricky situations that might be specific to your own work-related investigation.

The diagram below shows some of the main types of work-related numerical information that workers may have to deal with in a range of occupations and work settings. Which of these relate to your own work-related situations and experiences?



Numerical information A

1. What types of work-related information do you think might be used and communicated by the work team in this image?

Image: Rawpixel/Depositphotos.com




2. Identify a work-related situation you have been in, or one that you would like to work in. What is the job? Identify and describe 4 different types of numerical information that you are likely to have to deal with.

e.g. *In my job as a cashier I have to communicate verbal information to let the customer know how much their total order comes to. I also...*

<b>Occupation:</b>	
i.	ii.
iii.	iv.





## 10.03 Numeracy At Work

### Numerical work-related skills

Workers need a range of **numerical skills** and **numerical techniques** so that they can deal with information effectively and efficiently.

Some of these skills will be **generic** and needed by all workers in all work settings. These include basic **arithmetic** skills, an understanding of different **time** notations (i.e. analogue and 24-hour) and the ability to read, interpret and/or fill in a **timesheet**.

Other skills might be **industry-specific** and apply to workers performing specific jobs and job tasks. For example, the **measuring** skills needed by an apprentice chef compared to those needed by a fitness instructor; or a waitperson taking **customer orders** compared to hardware sales assistant taking a customer order.

This diagram shows some of the main types of work-related numerical skills and techniques that workers will need to develop and apply as part of their day-to-day

 work tasks. Which of these do you have to do at work?





Numerical work-related skills **B**

1. What types of work-related skills and techniques would be needed by the workers shown in these images? Add 1 more image of your own.
2. For each of these images describe how workers doing these jobs would be expected to demonstrate these skills as part of their regular job tasks.

i.



Image: kalinovsky/  
Depositphotos.com

ii.



Image: nejr/  
Depositphotos.com

iii.

**Preview  
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**Applied**

- a. Choose 5 of the examples of Work Numeracy in Action from p.224. For a workplace with which you are familiar describe an example of how you (or another worker) would be expected to demonstrate these numeracy skills in work-related situations.
- b. Add 3 more numeracy skills specific to this workplace and relevant work-related tasks and also describe the applied work-related use of these.
- c. How could you, or did you, develop these numeracy skills?

## 10.05 Numerical Language

### Numerical language

As you have experienced over this year during your studies of Numeracy Foundation the key success factor in developing numerical skills is being able to understand, interpret and apply numerical language effectively.

Numerical information involves language that is expressed and communicated in numbers, words, symbols, images, tables, charts, graphs, diagrams, images, forms and other ways using verbal, written, graphical and other communication methods.

Some of this numerical language is applied **generically**. This means that all employees in all industries should understand this language and terminology.

Terms such as price, cost, balance, debit, credit, stock, SKU, ETA, payslip, gross pay, net pay, timesheets, rosters, overtime, discounts, GST and many others should be understood by everyone. Some of this numerical language relates to work situations, i.e. cost price vs sales price. Other terms relate to a person's employment, i.e. gross pay and net pay.

However, a lot of numerical language is **industry-specific**, and even **job-specific**. This means that employees need to build their understanding of how this language relates to their job roles and tasks.

This can involve developing and applying a **professional** and/or **technical vocabulary** so as to communicate effectively with workers and other industry stakeholders.

**What type of numerical language and communication methods do you think waitstaff in the hospitality industry need to use as part of their day-to-day job tasks?**

Preview  
Sample:  
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Image: minervastock/Depositphotos.com



### Numerical language

- ⇒ Numbers expressed as words: Write these down, especially big numbers. Use commas to separate. e.g. "Four hundred thousand and seventy-six" is 400,076.
- ⇒ Numbers as measurement: Include units using abbreviations in standard form. e.g. 4 kg of sugar (and not 4000g). 40 metres (and not 0.04km).
- ⇒ Instructions involving numbers: Write a note or a list emphasising how many (or how much) of 'what'. e.g. 50 cooked chickens and 5 kg roast potatoes.
- ⇒ Multi-instructions: Write these down to make a summary list, underline or highlight key information. e.g. "We need 4 Ramblers by 3pm, 2 Jonkers by 4.30 and 7 Thumpers by 5."
- ⇒ Giving messages and instructions with numbers: 'Block large numbers into smaller chunks, say slowly and repeat. e.g. "My phone is 99-19-20-452; That's "99-12-20-452."

NUM  
SUPER  
SKILLS

**Part A**

In your workbooks complete these tasks related to work-related numerical language.

Use numerical examples from a workplace (or workplaces) to explain the difference between the following terms.

- a. cost and price
- b. gross pay and net pay
- c. roster and timesheet
- d. discount and GST
- e. quote and invoice.

**Part B**

1. Form into pairs. You are going to make effective verbal communication of numerical language and instructions. Each person should make up their own message.

- a. Create a work-related message that includes at least 3 pieces of numerical information. Each person should make up their own message.

*The message might be a simulated order from a customer, instructions from a boss of how to do a task or some other relevant applied work-related example.*

- b. Communicate the message to each other face-to-face.
    - c. The receiver needs to write down the message as they 'hear' it.
    - d. Compare the received message with the original.
    - e. Comment on how well the message was communicated by focusing on the accuracy of the original spoken message, as well as the accuracy of the 'received' message.
    - f. Outline strategies to improve both communicating and receiving the message.
2. Repeat the steps above using a new message. But this time the message will be communicated on the phone.
3. Again repeat the steps above using a new message. This time the message will be communicated on the phone by leaving a voicemail message. Don't forget to clearly leave a return phone number by blocking the number into chunks.

**Preview  
Sample:  
Do Not  
Copy**



10.07 Numerical Language

B Numerical language in action

Complete these tasks for an occupation (or job role) in a workplace with which you are familiar.



You might first do a draft in class; and then find out real applied examples from your workplace. You might have to talk with people in the workplace to assist you with some information.

Make an image, create a graphic or collect a piece of evidence to illustrate an example of work-related numerical language.

Workplace:

Occupation/job role:

Examples of verbal numerical language regularly used in this occupation/job role.

**Preview**

**Sample:**

**Do Not**

**Copy**

Verbal  
Numerical Language  
**1**

**2**

Written  
Numerical Language

Examples of written numerical language regularly used in this occupation/workplace.

Examples of situations when verbal numerical language is used; and by whom?

**3**  
**Verbal**  
**Numerical Situations**

**4**

**Written**  
**Numerical Situations**

Examples of situations when written numerical language is used; and by whom?

**Preview  
Sample:**

Examples of situations where both written and verbal numerical language are used together

**Do Not  
Copy**

**5**  
**Verbal & Written**  
**Numerical Situations**

**6**

**Clarifying**  
**Numerical Language**

What are the ways that you can ensure that you understand (or can clarify) this numerical language?

## 10.09 Numerical Information and Communication

### Workplace numerical communication

As you already know, work-related numerical information can be communicated **verbally**, in **writing** (including digitally), using **images** and using other methods of communication such as **physical gestures**. Some numerical information might even use all of these communication methods at the same time!

Workplace numerical communication can be between:

- ⇒ **managers** or **supervisors**
- ⇒ **workmates** and **colleagues**
- ⇒ **customers** and **clients**
- ⇒ **suppliers, contractors** and other stakeholders.

So it is important that you are able to understand, interpret and act upon this communication in work-related situations.

*For example, you might experience verbal numerical information such as your boss giving you instructions for a deadline*

*in a meeting, workmates asking you face-to-face to record measurements, or a customer ordering quantities of different items over the phone.*

*You might need to deal with written communication so that you can read order forms, record and interpret written measurements, create invoices, calculate sales totals, make change, update customer records or complete workplace forms.*

### Internal and external communication

One way to understand this workplace numerical communication is to consider whether it is primarily used for **internal communication** or for **external communication**. The methods and the language that you, your workmates and other employees communicate with each other might be very different from how you are expected to communicate with external stakeholders such as customers.

So we can see that at times there might be a different 'language' used by people within a workplace. And you need to be on top of this numerical communication.

*For example, a pair of workers having a discussion to work out how much timber they will likely need to erect a fence is internal communication. When they are satisfied with their discussion and their estimates they will then use this information to prepare a quote for their client - which is external information.*

*A cafe worker taking an order from a diner for scrambled eggs on toast is external communication. When the chef gets that order and then tells the kitchenhand to have 2 toasts ready in 10 minutes - this is internal communication.*

*Finally your boss might tell you to mark-up the new clothing range that's just come in by 50% of the cost price - this is of course internal communication. When you have to input the stock and prices into the Instagram sales account - then this is external communication.*

Image: leolintang/  
Depositphotos.com



Sometimes it might seem that your boss is talking a lot of numbers. What would you do if you didn't follow?



Preview  
Sample:  
Do Not  
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## Workplace numerical communication A

In your workbooks complete the following tasks for these situations of workplace numerical communication. It might be a good idea to work in pairs and speak these examples aloud.

1. Is this primarily an example of internal or external workplace communication? Why so?
2. 'Do the numbers' for the situations that require numerical calculations.
3. Answer the questions given for the relevant situations.
4. Explain whether these examples are effective at communicating numerical information.
5. Why is it important to sometimes use different language and information when communicating internally and externally?

Nancy has to put the new stock out. The items cost \$20, \$30 and \$40. The email from her boss says to mark up price by 100% for the two cheaper items, and 75% for the most expensive item. Also there are 40 units of each and Nancy has to record each item's cost and the total cost on the stock-in database.  
Help Nancy do the numbers.

Nadot gets a phone call from his boss who says, "Make sure you have ten dozen scones ready by half-eleven and then pack them in catering trays of forty. You'll need four litres of cream and about half that amount in jam. Don't forget the right amount of serve bowls for the cream and jam."  
What does Nadot need to prepare?

Freid is at the hardware shop and her workmate texts:  
24m pine 4 x 2s cut to 10  
46 pine 2b1s 800mm each  
What does she need to get?  
Freid thinks there might be an error in the text. What should she do?

Lily gets this large pizza phone order for a party left as a message.  
"Six Capricosa two Hawaiians two Margaritas two Vegetarian three MegaMeats family one must be gluten-free two Aussie double-egg but no pineapple we'll pick up at one. Johnno's Panels and 6 large Cokes.  
How should she record this order for the cook?

Tess is at the morning briefing and her manager says,  
"We have just got a new spring floral range in for our ladies of extra large size 20 and up, so we want you to push these as they have lovely prints and fabrics and are flattering for the fuller figure."  
Later when talking to a customer Tess says, "For a lady like you of extra large size we have a lovely print and fabric that will flatter you."  
The customer walks out in a huff.  
What did Tess do wrong?

Rubi is being shown around the supermarket at the start of her first shift by her supervisor Jacko who says.  
"Greenie food aisle two, Mutt grub aisle three, poo catchers aisle seven, crap wrap aisle eight and cow's juice back fridge."  
What is Jacko talking about? Should Rubi use these terms when talking with customers? What could Rubi use to help learn where different items are located in the store?

Preview  
Sample:  
Do Not  
Copy

10.11 Numerical Information and Communication

B Internal information and communication in action

Complete these tasks for an occupation (or job role) in a workplace with which you are familiar.



You might first do a draft in class; and then find out real applied examples from your workplace. You might have to talk with people in the workplace to assist you with some information.

Make an image, create a graphic or collect a piece of evidence to illustrate an example of internal workplace information and communication.

Workplace:

Occupation/job role:

Examples of internal numerical information that are important for this occupation/job role are.

Preview

Sample:

Do Not

Copy

1  
Internal  
Numerical Information

2  
Using Internal  
Numerical Information

Examples of situations when this internal numerical information is regularly used for this occupation/workplace.

**3**  
**Methods of Internal  
Numerical Communication**

Examples of the methods and ways that this internal numerical information is communicated.

**4**  
**Developing Internal  
Numerical Communication**

How could you develop your understanding of this internal numerical information for this occupation/workplace?

**Preview  
Sample:  
Do Not  
Copy**

**5**  
**Clarifying Internal  
Numerical Communication**

What are the ways that you can ensure that you understand (or can clarify) internal numerical information ?

10.13 Numerical Information and Communication

C External information and communication in action

Complete these tasks for an occupation (or job role) in a workplace with which you are familiar.



You might first do a draft in class; and then find out real applied examples from your workplace. You might have to talk with people in the workplace to assist you with some information.

Make an image, create a graphic or collect a piece of evidence to illustrate an example of external workplace information and communication.

Workplace:

Occupation/job role:

Examples of external numerical information that are important for this occupation/workplace.

**Preview**

**Sample:**

**Do Not**

**Copy**

1  
External  
Numerical Information

2  
Using External  
Numerical Information

Examples of situations when this external numerical information is regularly used for this occupation/workplace.

**3**  
**Methods of External  
Numerical Communication**

Examples of the methods and ways that this external numerical information is communicated.

**4**  
**Developing External  
Numerical Communication**

How could you develop your understanding of this external numerical information and communication for this occupation/ workplace?

**Preview  
Sample:  
Do Not  
Copy**

**5**  
**Clarifying External  
Numerical Communication**

What are the ways that you can ensure that you understand (or can clarify) external numerical information?

## 10.15 Estimating and Measuring

### Estimating and measuring

All types of workers have to estimate and measure different amounts, quantities and materials on a day-to-day basis. Of course the types of estimating and measuring will vary from job-to-job. This will mean that different workers, in different industries and in different jobs will have to perform the types of estimates and measurements needed for their job. Therefore, they apply numeracy skills to their work situations.

You will be expected to apply **generic** estimating, measuring and calculating skills such as getting yourself to work on time and also back after breaks.

You will also have to apply **specific** estimating, measuring and calculating such as when serving customers in a deli; or if working with materials to build a timber deck; or even if working to assist immobile patients in an aged-care residential facility.

Estimating, measuring and calculating commonly involves working with these work-related measures (as well as others that might be specific to your job).

1. **Materials**
2. **Ingredients**
3. **Time**
4. **Distance**
5. **Stock levels**
6. **Cost and Price**

# Preview Sample:

## 1. Materials

The term 'materials' refers to all the physical inputs that are used to make other goods, such as wheat into flour into bread or the materials used to provide a service, such as timber to make a house, or cotton to make a shirt.

Producers use materials to make other products. They sell these products to other businesses or to consumers. So producers must be able to estimate the amount of materials, as well as needing to manage the cost of these materials.

They also have to plan when they need the materials for different jobs which requires planning and organising time schedules.

Producers also need to minimise waste so as to try to protect the environment.

Here are some common examples of applied numeracy situations and skills. Which of these might apply to you? Can you think of others?

- ⇒ Types and costs of materials in a product.
- ⇒ Amounts (measurements) of materials in a product.
- ⇒ Types, amounts, quantities and/or costs of materials for a job quote.
- ⇒ Measures relating to perimeter, area and volume.
- ⇒ Weights and other measures, including safe handling guidelines.

**Practical, manual, trades and technical jobs that deal with materials require estimating, calculating and communicating numerical information all the time!**

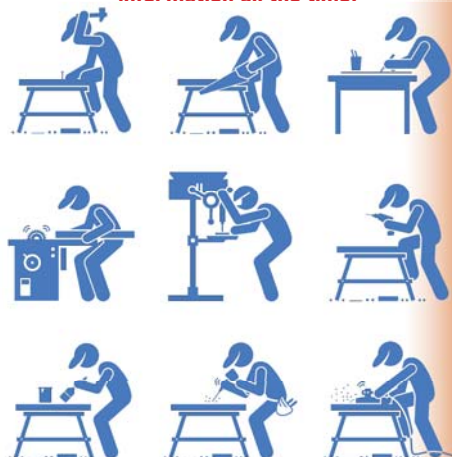


Image: Adapted from: jeremy/  
Depositphotos.com



## 2. Ingredients

The term 'ingredients' refers to the materials that are used in food, drink and even pharmaceutical production.

Many producers use ingredients to make another product. e.g. A food manufacturer will use bulk potatoes, oil and salt to make chips; or a cafe might use potatoes to make a potato salad.

Here are some common examples of applied numeracy situations and skills. Which of these might apply to you? Can you think of others?

- ⇒ Amounts, measures and weights of ingredients.
- ⇒ Cost of a major ingredient.
- ⇒ Costs of all ingredients.
- ⇒ Recipe measurement ratios and costs.
- ⇒ Prep and cooking time of ingredients.
- ⇒ Waste amounts, spoilage and waste costs of ingredients.

**Food and hospitality jobs that deal with ingredients require estimating, calculating and communicating numerical information for most day-to-day tasks!**

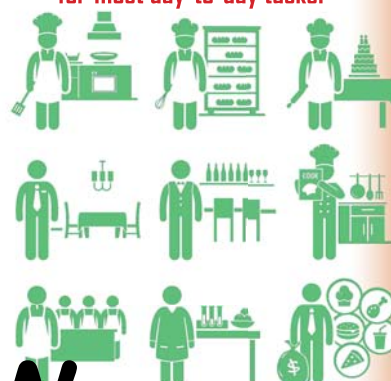


Image: Adapted from: leremy/Depositphotos.com

**Preview**  
**Sample:**  
**Do Not**  
**Copy**

## 3. Time

Time is an important measure in all workplaces. Input time, such as labour is important so that a business can work out how much labour cost to include in an item, in addition to materials and other costs.

*For example, if it takes a worker 90 minutes to sew a shirt then at least 90 minutes of labour time must go in to the price of the shirt. Alternatively if a restaurant requires 4 casual staff in the evening for shifts of 4 hours each then this is 16 hours of labour time that needs to be paid for by the owner.*

You also need to manage your time including getting to and from work and also estimating how long it might take you to do different job tasks. As you get more experienced you not only will you get faster at doing work tasks, you will also get better at estimating your own time more accurately.

Here are some common examples of applied numeracy situations and skills. Which of these might apply to you? Can you think of others?

- ⇒ Estimated time and actual time to do specific work tasks.
- ⇒ Total time needed by all staff for specific work tasks, or to fill a shift; as well as rosters and timesheets.
- ⇒ Cost of time, i.e. the amount of labour cost required for particular tasks.
- ⇒ Travel, courier and postage times.
- ⇒ Waiting times for customers to receive their items, e.g. cooking a meal.
- ⇒ Service times for a client, e.g. a hairdressing or medical appointment.
- ⇒ Time taken to finish a job for a client such as a renovation, new fence or a car repair.

**Estimating and calculating time and communicating and working within timelines and deadlines is an important applied numerical skill for all jobs.**



Image: Adapted from: leremy/Depositphotos.com



## 6. Cost and Price

Cost refers to the price of item from the businesses point of view. e.g. How much did the restaurant pay for the fish it will serve on the menu?

Cost relates to materials, ingredients, stock, labour cost and time, travel and other business expense inputs. All of these costs need to be taken into account (and many more as well)!

Businesses have to ensure that they can cover all of their costs and then still be able to sell goods and services at a price that enables them to make a profit.

Price refers to how much a business sells a good for, or how much it charges for a service. Price needs to take into account all the other inputs you have learned about as costs. When setting price, businesses must cover all their costs and leave a little room (margin) for profit.

Here are some common examples of applied numeracy situations and skills.

Which of these might apply to you. Can you think of others?

- ⇒ Cost of materials.
- ⇒ Cost of ingredients.
- ⇒ Cost of labour (time).
- ⇒ Cost of travel (distance).
- ⇒ Cost of stock.
- ⇒ Cost of any other items.
- ⇒ Trade discounts.
- ⇒ Price of goods and services.
- ⇒ Mark-up from cost to price.
- ⇒ Price needed to cover all costs.
- ⇒ Cost of a customer order.
- ⇒ Sales discounts.
- ⇒ Profit margin.
- ⇒ Processing a transaction.

Preview  
Sample:

Do Not  
Copy

Estimating and measuring A

Describe examples of how workers in a workplace you are familiar with have to estimate and/or measure amounts related to *materials, ingredients, time, distance, stock levels, cost and price*. Choose 3 of these categories.

i.	
ii.	
iii.	

## 10.19 Estimating and Measuring

### B Estimating and measuring in action

Complete these tasks for an occupation (or job role) in a workplace with which you are familiar.



You might first do a draft in class; and then find out real applied examples from your workplace. You might have to talk with people in the workplace to assist you with some information.

Make an image, create a graphic or collect a piece of evidence to illustrate an example of workplace estimating and measuring.

Workplace:

Occupation/job role:

Identify materials, stock and other items used in this occupation/  
workplace.

**Preview  
Sample:  
Do Not  
Copy**

Materials, etc.

1

2

Estimating

Explain examples of when it is OK to make estimates.

Describe skills and techniques you would use to make estimates.

Estimating skills

3

Explain examples of when you would need to make accurate measurements and calculations.

Measuring & Calculating  
4

5

Calculating skills

Describe skills, techniques and measuring devices you would use to make accurate measurements and calculations.

Preview  
Sample:  
Do Not  
Copy

How would you check that estimates or measurements are correct?

Checking  
6

7

Time

When would you need to make estimates or calculations of time?

How would you communicate these estimates, measurements or calculations?

Communicating  
8



## 10.21 Data, Information and Forms

### Data and information

All workers have to deal with **numerical data and information** as part of their day-to-day work tasks. Over the course of this year you have dealt with numerical data and information in many different situations.

In the workplace you might deal with **internal numeracy data and information** which can be used to organise times and rosters, create pay slips and records, manage work schedules, prepare orders, measure quantities, organise and record materials and stock, communicate instructions, process purchase orders, manage money, record customer information, show and communicate sales data, report on employee performance, monitor output, display and communicate technical and operational information, and many more examples.

You might also work with **external numerical data and information** which can be used to record and display prices, make change, process transactions, prepare quotes, issue invoices, create sales receipts, develop marketing information, communicate product specifications, show safety procedures and much more, depending on the type of occupation and the work tasks you are expected to perform.

Numerical data and information might also be created and communicated as invoices, customer orders, digital orders, purchase orders, order forms, bank account statements, customer account statements, payslips, timetables, bills, product specifications, rosters and time sheets, graphs and charts, tables, infographics, diagrams, maps, spreadsheets, databases, apps, budgets, employee performance reports and more.

Numerical data and information might be **communicated** face-to-face, over the phone, in both informal and formal writing, via digital devices and apps, through physical gestures, through account statements, using visual graphs, charts and diagrams, and many other methods.

Preview  
Sample:  
Do Not  
Copy

Some data might be technical in nature, such as readouts from industrial or production machinery. Whereas other data might be financial in nature, such as budgets, graphs and sales charts.



Images: t: monkeybusinessimages/  
r: seb\_ra  
iStock/Thinkstock



### Tables and spreadsheets

Tables are used to collate and organise data and information. This table records key information about 4 different chocolate products for a lolly shop. The table clearly gives information about product cost, quantities, total cost, different % mark-ups, retail price and total retail value of stock.

Item	SKU	Cost price	Quantity	Total Cost	Mark-Up	Selling Price	Total Value
Buntos	BUN	\$1	1,000	\$1,000	200%	\$3	\$3,000
Choclics	CHO	\$2	500	\$1,000	100%	\$4	\$2,000
Boxsters	BOX	\$20	50	\$1,000	50%	\$30	\$1,500
SpezSelec	SPZ	\$50	40	\$2,000	40%	\$70	\$2,800
Totals				\$5,000			\$9,300

	A	B	C	D	E	F	G	H
1								
2					=C2*D2		=C2+(C2*F2)	=D2*G2
3					=C3*D3		=C3+(C3*F3)	=D3*G3
4					=C4*D4		=C4+(C4*F4)	=D4*G4
5					=C5*D5		=C5+(C5*F5)	=D5*G5
6					=SUM(E2:E5)			=SUM(H2:H5)
7								
8								

This table is also shown as a spreadsheet (before data entry). A spreadsheet uses formulae to do calculations.

So if the lolly shop had a thousand different stock items, the spreadsheet would handle all this information as soon as it was entered.



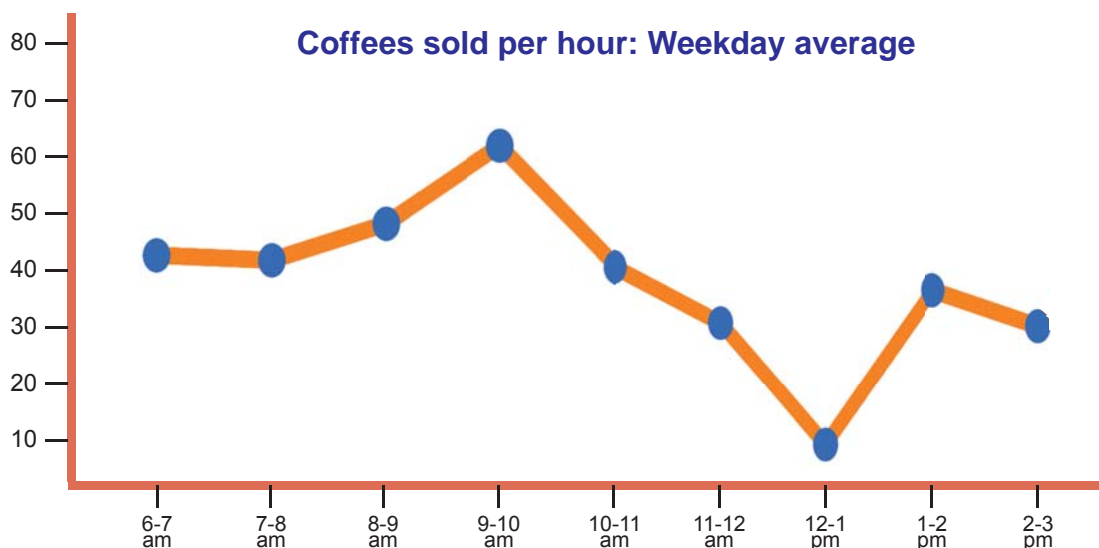
# Preview

# Sample:

# Do Not

### Graphs and charts

These can be used to communicate numerical data and information visually. This graph shows the number of coffees sold each hour by a busy coffee kiosk. The graph indicates a drop-off around lunchtime. Perhaps the kiosk needs to add a few snacks to the menu to attract more lunchtime customers.



## 10.23 Data, Information and Forms

**Grub Bros**  
**18 Main Road Brunsvale 3056**  
**03 9919 213256**  
**www.grubbros.com.au**

Table	Diners	Server	Time in	Time out
16	2	Jini	6:20pm	7:50pm
Menu Item	Qty	Price	Total	
Parma deluxe	1	\$17.50	\$17.50	
Vego supreme	1	\$19.50	\$19.50	
Garlic bread	2	\$4.00	\$8.00	
Beverage soft	2	\$4.50	\$9.00	
Coffee - Macchiato	1	\$5.00	\$5.00	
Coffee - Espresso	1	\$6.00	\$6.00	
Corkage	0			
<b>Total w/GST</b>			\$65.00	
<b>GST</b>			\$5.91	
<b>Paid by:</b>		Visa * 3412	\$65.00	
		13/09/2019		

Note: All price are GST Inclusive.  
This receipt acts as a tax invoice.

### Sales receipts

Sales receipts are used to collate and record customer transactions and to process payment. By law they must include certain information.

This sales receipt is used by a restaurant to keep track of customer ordering and dining experiences.

When the wait staff take the order it is entered on the point-of-sale system either manually, or digitally through an app (i.e. the server might use a phone or tablet to take the order). The POS system will use a database that stores menu items and prices.

This receipt makes it easy for staff to take payment. The customer also gets a receipt which meets the legal requirements as a tax invoice.

Preview  
Sample:  
Do Not  
Copy

### Digital measuring devices

Workers are increasingly using digital laser devices to make measurements.

Room		Length mm	Width mm	Floor Area m <sup>2</sup>	Height mm
Lounge		4752	4010	19.06	2200
Kitchen		3600	2500	9.00	2200
Living		5125	4010	20.55	2200
Bed	1	5000	3010	15.05	2200
Bed	2	3800	2500	9.50	2200
Bed	3	3600	2500	9.00	2200
Bath	1	1950	1950	3.80	2200
Bath	2	1750	1750	3.06	2200
Halls	1	900	600	0.54	2200
	2	900	600	0.78	2200
	3	1200	650	2.32	2200
Other	Laundry	1600	1450	93.20	2198

Many devices will then 'feed' this information directly into a table or a spreadsheet via an app. Calculations are then done automatically within the software program.

This example shows a builder taking internal house measurements. Measuring is faster and more accurate; and all the key data is stored and calculated immediately.

### Quotes

Many businesses have to prepare quotes, especially those that do practical tasks; i.e. tradies, car repairers, builders, gardeners and other similar services.

Quotes are used to estimate what a job might cost, the materials needed and the time it might take to complete the job (labour time). This gives the potential customer a guide to the estimated, or even actual price.

Becoming good at quoting takes experience.

If a person over-quotes they might not get the 'job'.

And if they under-quote they may not be able to do the job for the amount they promised!

Sometimes quotes might include a % allowance for variation from the original price; due to price changes or other problems occurring.

<b>Hammer Smiths Cabinets</b> <b>We nail it - first time!</b> <b>24a Enterprise Street Road Upper Yirra 3195</b> <b>0412 0413 04145</b>	
<b>Request for Quotation:</b>	<b>172</b>
Date:	Sep 18 2019
By:	Johnny Smith
For:	Julie Hoemyowna
Address:	16 Pinkshears Place , Lower Yirra
Remove old kitchen cabinetry	\$200
Make 8 new cabinets	\$1400
Supply cabinet furniture	\$200
Fit new cabinets	
Labour, callout and	
make over vast - 1800mm	\$480
Note: This quote is valid for 30 days. Price is correct subject to no unreasonable occurrences. 10% discount for pensioner discount. A 15% deposit is required on acceptance of this quotation and to be paid by direct debit.	
Total	\$2280
Note: All quoted prices include GST. <a href="http://www.hammersmithscabinets.com">www.hammersmithscabinets.com</a>	

Digital measuring devices can be quick and very accurate. This can help when preparing quotes and estimates.



Image: AndreyPopov/  
Depositphotos.com

## 10.25 Data, Information and Forms

### Purchase orders and invoices

A purchase order is a request to buy. These are used a lot for B2B transactions. Many businesses cannot process orders unless an official purchase order is generated. This authorises someone to order or buy goods or services.

A purchase order will include information such as name, address, products, quantities, expected prices, GST, etc. from the buyer's (purchaser) point-of-view. The seller will generate an invoice to go 'out' with the order. The invoice includes purchaser account details, product information, price, GST, etc. and payment terms from the seller's (supplier) point-of-view.

Here is a purchase order from a bakery and the corresponding invoice from the wholesale supplier.

<b>Finnegan's Bakery</b> <b>For your daily bread - and more</b> <b>24a Station Avenue Yirra Junction 3194</b> <b>M: 0411 0912 89256 ABN: 21 2121 21 236</b>		<b>Supply to:</b> Finnegan's Bakery 24a Station Avenue Yirra Junction 3194 ABN: 21 2121 21 236 per: Sam Finnegan		<b>Tax Invoice</b> del: Shainia Joyce	
Purchase order: <b>PO705</b> Date: 12 Oct 2019		Invoice: 201486 Date: 13 Oct 2019			
<u>Qty</u>	<u>Item</u>	<u>Qty</u>	<u>Product</u>	<u>Tax</u>	<u>Price</u> <u>Total</u>
3	x 20 kg flour - White	1	FL B20K	GST-Free	60 180
1	x 20 kg flour - Wholemeal	10	EG F12	GST-Free	80 80
10	x 1 doz free range eggs	10	ML 2L	GST-Free	4 40
10	x 2 litre milk	5	STG 1Lxk	GST-Free	2 20
5	x 10 kg Sugar - white	5	BUT 52K	GST-Free	10 50
5	x 2 kg butter - salted	1	Free delivery	na	2 10
Total				Total \$ 380	
Includes GST of: \$ 0				Includes GST of: \$ 0	
Ordered by : Sam Finnegan (Manager)		From:		Ulysses Wholesale	
Delivery instructions:				1/17 Kent Way Dovetown 3172	
To: Shainia Joyce (Kitchen manager)				www.ulysseswholesale.com.au	
After 5am. Call kitchen using buzzer at back.				orders@ulysseswholesale.com.au	
www.finnegansbakery.com.au				p: 03 9523 25416 f: 03 9523 25417	
		Salesperson: Ronnie Marker		Terms: 30 days	
		ABN: 41 4141 41 436			



**Invoices need to clearly communicate appropriate and accurate numerical information. A Tax Invoice is required - by law - to include specific information. What do you think that might be?**

Image: nongpimmy/  
Depositphotos.com

COMPANY		RECEIPT / TAX INVOICE	
CUSTOMER NAME			
ADDRESS			
QTY.	DESCRIPTION	UNIT PRICE	AMOUNT
TOTAL AMOUNT DUE			
AUTHORIZED SIGNATURES			
THANK YOU FOR YOUR BUSINESS			

Data, information and forms **A**

Complete the table by using examples of data, information and forms from work-related situations you are familiar with. Add one more example.

Data, Forms & Information	What do these communicate?	Why are they important/useful?
Table		
Spreadsheet		
Graphs and charts		
Sales receipt		
Digital measuring devices		
Quote		
Purchase order		
Invoice		

**Preview  
Sample:  
Do Not  
Copy**

*Applied:*

1. In your workbooks list all the main examples of numerical data, information and forms that are used in your workplace.
2. Classify these examples according to whether they are only used internally; or whether some are used for external communication.

10.27 Data, Information and Forms

B Data and information in action

Complete these tasks for an occupation (or job role) in a workplace with which you are familiar.



You might first do a draft in class; and then find out real applied examples from your workplace. You might have to talk with people in the workplace to assist you with some information.

Make an image, create a graphic or collect a piece of evidence to illustrate an example of workplace data and information.

Workplace:

Occupation/job role:

List the types of data, tables and/or graphs that are used in this occupation/workplace.

**Preview  
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Do Not**

**1**  
Data, tables  
& graphs

**2**  
Using data, tables & graphs

Describe examples of when data, tables and/or graphs are used in this occupation/workplace.

**Copy**



Describe skills and techniques that you would use to collect and interpret data, tables and/or graphs for this occupation/workplace.

**3**  
**Data, tables  
& graphs skills**

**4**

**Developing skills**

How could you develop or improve your skills to collect and interpret data, tables and/or graphs for this occupation/workplace?

**Preview  
Sample:**

Describe how software tools and devices are used to collect and interpret data, tables and/or graphs for this occupation/workplace.

**5**  
**Software & devices**

**Do Not  
Copy**

**6**

**Checking**

How would you check or clarify that you are collecting and interpreting data, tables and/or graphs properly?

10.29 Data, Information and Forms

C Workplace forms in action

Complete these tasks for an occupation (or job role) in a workplace with which you are familiar.



You might first do a draft in class; and then find out real applied examples from your workplace. You might have to talk with people in the workplace to assist you with some information.

Make an image, create a graphic or collect a piece of evidence to illustrate an example of workplace forms.

Workplace:

Occupation/job role:

List examples of workplace forms that are required in this occupation/job role.

**Preview  
Sample:  
Do Not**

Forms

1

2

Using forms

Describe examples of how workplace forms are used in this occupation, workplace.

**Copy**

Describe skills and techniques that you would use to interpret, create and complete forms for this occupation/workplace.

Form skills

3

4

Developing skills

How could you develop or improve your skills to interpret and complete forms for this occupation/workplace?

Preview  
Sample:

Describe how software tools and devices are used to interpret, create or complete forms for this occupation/workplace.

Software & devices

5

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6

Checking

How would you check or clarify that you have interpreted, created or completed forms properly?

## 10.31 Assessment Task

### AT10 Numeracy at Work

#### Overview



This assessment task requires you to undertake a detailed, step-by-step investigation of applied workplace numeracy.

You should base your investigation on a workplace with which you are familiar, such as one in which you have undertaken a work placement. This means you will actually investigate how you used numerical information when you were working.

You will need to negotiate this with your teacher before you start.

You will also have to communicate with workplace stakeholders to gather some of this information.

There are a number of parts to this investigation. The work you have done as part of Sections 10 (and Sections 1-9) will assist you.

Your teacher will advise you of timelines, due dates and other task requirements.

#### This task focuses on:

- ⇒ **estimating and calculating for work-related tasks**
- ⇒ **using numerical skills, techniques, devices or software to make work-related estimates and calculations**
- ⇒ **identifying and interpreting written and oral work-related numerical language and communication**
- ⇒ **collecting, collating, calculating and comparing work-related data and information**
- ⇒ **using multimedia to communicate work-related data**
- ⇒ **sourcing, interpreting and using data with numerical information.**

Preview  
Sample:  
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#### Part A: Estimating and calculating in the workplace

- i. Outline **3 examples** of **work-related tasks** or processes that require workers (i.e. you!) to make **estimates** of numerical information such as amounts, quantities, materials, ingredients, time, price, costs, stock and so on. (You choose what is appropriate for your workplace.)
- ii. Describe the **numerical skills and techniques** required to make each of these estimates.
- iii. Describe how **devices, software or apps** are used to **make or record** these estimates; and/or how these devices, software or apps are used to **organise** and **communicate** this numerical information.
- iv. Explain how a worker (i.e you!) would **check** their **estimates** to make sure these are **accurate**.

**Part B: Numerical information in the workplace**

- i. Identify the **main methods** used by workers within this workplace to **communicate internal numerical information**.
- ii. Identify the **main methods** used by workers from this workplace to **communicate external numerical information**.
- iii. Choose **4 examples** of numerical information. You must select examples from **both internal** and **external** types of numerical information.
- iv. Describe the **numerical skills and techniques** required to create and **interpret this numerical information**. (Refer to pp.224-225 for possible examples).
- v. Use **your applied numerical skills** to **interpret** and **explain** what each example of numerical information is communicating.

# Preview

**Part C: Data, tables, graphs and software**

- i. Collect **relevant data** from the workplace that shows a **comparison**.  
For example, different wages, varied work duties, time spent on different work tasks, measurements of materials or ingredients, sales of different products, costs of different inputs, sales figures over time (such as different days of the week), number of customers, or some other suitable information.
- ii. Use a **table** to **collate** **or** organise this data. (You could set up a basic spreadsheet.)
- iii. Calculate any **relevant** totals, averages, percentages, proportions or other **summary information**.
- iv. Use a **multimedia** program to construct a **chart** or a **graph** to communicate this information.
- v. Prepare a concise **summary of the data** as shown by the chart or graph.

**Part D: Forms**

- i. Find **2 examples of workplace forms** that involve numerical information.
- ii. Complete each of these forms using **simulated** or **actual information** related to your workplace.
- iii. Complete any **calculations**.
- iv. Review and **check** your information for **accuracy**.

## 10.33 Assessment Task

<b>Name:</b>		<b>Key dates:</b>			
<b>Workplace:</b>		<b>Occupation:</b>			
Tasks - AT10: Numeracy at Work		Re-quired	Due by	Done	Teacher initials
<b>Part A: Estimating and calculating in the workplace</b>					
⇒ Negotiate the task details with your teacher.	✓				
⇒ Organise your investigation of information.	✓				
i. Outline 3 examples of work-related estimates.	✓				
ii. Describe numerical skills & techniques for estimates.	✓				
iii. Describe use of devices/software/apps.	✓				
iv. Explain how to check estimates for accuracy.	✓				
<b>Part B: Numerical information in the workplace</b>					
i. Methods to communicate internal numerical information.	✓				
ii. Methods to communicate external numerical information.	✓				
iii. 4 examples of numerical information.	✓				
iv. Numerical skills to interpret numerical information.	✓				
v. Interpretation/explanation of numerical information.					

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<b>Name:</b>	<b>Key dates:</b>			
<b>Workplace:</b>	<b>Occupation:</b>			
<b>Tasks - AT10: Numeracy at Work</b>	<b>Re- quired</b>	<b>Due by</b>	<b>Done</b>	<b>Teacher initials</b>
<b>Part C: Estimating and calculating in the workplace</b>				
i. Collect comparison data.	✓			
ii. Use a table to collate and organise the data.	✓			
iii. Calculate summary information.	✓			
iv. Use multimedia to construct a chart or a graph.	✓			
v. Prepare a concise summary of the data.	✓			
<b>Part D: Forms</b>				
i. Examples of numerical workplace forms.	✓			
ii. Complete forms using simulated or actual information.	✓			
iii. Complete any calculations.	✓			
iv. Review and check your information for accuracy.	✓			
<b>Report</b>				
⇒ Prepare a draft of your investigation.	✓			
⇒ Use appropriate numerical language.	✓			
⇒ Prepare your final investigation.	✓			
⇒ Present your investigation (if required).				
Additional information:				
Signed: _____		Date: _____		

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10.35 Self-Reflection

Self-Reflection Pro-Forma

Which numeracy skills did I best develop during this year?

→

→

→

How have the skills of numeracy helped improve my personal life this year?

→

→

How have the skills of numeracy helped my development of work-related skills this year?

→

→

How would I rate my performance using a circle in developing my numeracy skills this year?

0 not shown	1 low	2 reasonable	3 good	4 very good	5 excellent
----------------	----------	-----------------	-----------	----------------	----------------

What were my strongest areas of performance and what should I work on improving?

My strongest topics/skills were:	But I need to improve my skills in:

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Teacher initials: \_\_\_\_\_ Date: \_\_\_\_\_

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**Preview  
Sample:  
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Name:		Teacher:		Final Date:	
<b>NUMERACY FOUNDATION - UNIT RECORD</b>					
List appropriate tasks that you are required to successfully complete in order to demonstrate achievement of the learning outcomes. Include due date and tick when done.					
<b>LO1: Skills and Processes (1)</b>		<b>LO2: Financial Numeracy (3)</b>		<b>LO3: Planning &amp; Organising (5)</b>	
Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date	
<b>LO1: Skills and Processes (2)</b>		<b>LO2: Financial Numeracy (4)</b>		<b>LO3: Planning &amp; Organising (6)</b>	
Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date	

Preview  
Sample:  
Do Not  
Copy

Name:		Teacher:		Final Date:	
<b>NUMERACY FOUNDATION - UNIT RECORD</b>					
List appropriate tasks that you are required to successfully complete in order to demonstrate achievement of the learning outcomes. Include due date and tick when done.					
<b>LO4: Measurement, Representation &amp; Design (7)</b>		<b>LO5: Preparing for Work (9)</b>		<b>LO1: Skills and Processes (Applied)</b>	
Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date	
<b>LO4: Measurement, Representation &amp; Design (8)</b>		<b>LO5: Preparing for Work (10)</b>		<b>LO1: Skills and Processes (Applied)</b>	
Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date		Are all tasks completed for this outcome? /Date	

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**Preview  
Sample:  
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