### Activities 9: Applied Numeracy Project

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Applied Numeracy Project 9

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


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.

Note: If you receive this flyer without receiving an email then you are not on the email list.
Send a brief email to michael@delivereducation.com.au to join the email list and to add relevant staff.

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

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
- Career and Enterprise: ATAR 12

Current resource list: 2020 (* = new)

VCAL and Applied Learning (Master sets also available)
- *Personal Development - Senior 4ed Workbook/text & Activities booklet (2020)
- *Work Related Skills - Senior 3ed Workbook/text & Activities booklet (2020)
- Literacy - Senior Workbook/text 2ed & Activities skills booklet *Light-Senior also available as an e-version (2019)
- Numeracy - Intermediate Workbook/text 2ed (for units 1&2) & Activities booklet (2019)
- Numeracy - Senior Workbook/text 2ed (for units 1&2)
- Industry and Enterprise
  > 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
  > Community Services Intermediate
  > Retail Foundation
  > Retail Intermediate
- WACE Career and Enterprise (PDF e-versions also available)
  > Career and Enterprise General 11
  > Career and Enterprise General 12/ATAR11
  > Career and Enterprise ATAR 12
  > Career and Enterprise Foundation 12
  > Career and Enterprise Foundation 11

View PDF samples on the website. Any questions please feel free to contact me.

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## Order form: Prices for Semester 1, 2020 (Note: All prices are GST inc.)

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Unit 2: Introduction

Welcome to your studies of Unit 2: Numeracy Intermediate. Throughout Unit 1 you built up a considerable suite of numerical skills over the course of the unit. Those skills were related to these four broad areas of numeracy.

⇒ Numeracy skills and processes
⇒ Financial literacy
⇒ Planning and organising
⇒ Measurement, representation and design

You also demonstrated the ability to apply these skills to relevant practical personal and work-related contexts.

For Unit 2 you are required to apply your numeracy skills to undertake an investigation of a familiar industry area related to your VET studies, and/or to your employment. This is called your Numeracy-based Project Plan.

Numeracy-based Project Plan: Requirements

In order to satisfactorily complete your Numeracy-based Project Plan you have to select, investigate and report on 6 enquiry-based tasks related to your chosen industry. So the ‘big picture’ steps that you are required to follow are as follows:

- Select an industry-area related to your VET program or employment.
- Develop one (or more) investigative Numeracy-based Project Plan(s) related to this industry area.
- Select 6 enquiry-based tasks to investigate for your Numeracy-based Project Plan(s). We are going to refer to these investigations as your Applied Numeracy Projects (ANP).

Enquiry-based tasks

For your Numeracy-based Project Plan you are required to choose and investigate 6 enquiry-based tasks (EBTs). You must then report on your findings from your investigations into each of those. There are a range of suggested EBTs listed in the Numeracy Intermediate Curriculum Planning guide. Your teacher may have structured your learning program using these pre-determined EBTs for your investigation.

You must ensure that you choose at least one enquiry-based task that is related to each of these 4 numeracy focus areas of:


Alternatively, you might be able to develop one or more of your own EBTs (from each of these 4 focus areas) that are more suitable or relevant for your particular industry. You will need to negotiate this with your teacher to ensure that you choose a task (or tasks) that provide enough scope for you to satisfy the elements associated with the learning outcomes for Unit 2.

You must also ensure that you choose at least one enquiry-based task that is related to each of the 3 industry stages of: a. inputs, b. processing, c. outputs.
Develop your:
Numeracy-based Project Plan

This will be based on:
An industry related to your...
- VET studies and/or
- employment.

Your Numeracy-based Project Plan must include:
- your aims
- your timelines
- numeracy skills and processes you will use
- software tools and devices you will utilise
- communication methods to report your findings
- obstacle or barriers you might have to deal with
- outcomes to measure your success
- the need to collaborate with others.

Investigate 6 Enquiry-based tasks.
(We call these your Applied Numeracy Projects, or ANPs.)
These must focus on the:
- Inputs stage
- Processing stage
- Outputs stage

Investigate, collect and report on numerical data and information related to each focus area of:
- Number
- Measurement
- Probability and Statistics
- Financial Numeracy

So across your entire Numeracy-based Project Plan you need to do 6 enquiry-based tasks ensuring that:
- at least one must be related to each of the 3 industry stages
- at least one must be related to each of the 4 focus areas.
9.03 Numeracy-Based Project Plan

For example, Jude is doing a VET course linked to the Retail Trade industry. Jude is planning to investigate Measurement and Financial Numeracy for the inputs stage; Number and Measurement for the processing stage; and Financial Numeracy and Probability and Statistics for the outputs stage.

Jude has covered all 4 focus areas and each of the 3 industry stages.

Roderik is doing a VET course linked to the Construction industry. Roderik is planning to investigate Measurement for the inputs stage; Number, Measurement, and Financial Numeracy for the processing stage; and Number, and Probability and Statistics for the outputs stage.

Roderick has covered all 4 focus areas and each of the 3 industry stages - but in a different configuration from Jude.

A Numeracy-based Project Plan

So let’s clarify your unit requirements right from the beginning. Answer the questions in the boxes and this will provide a step-by-step guide to the unit requirements.

a. What is the correct full title of what you have to complete for Unit 2?

b. The industry you select to investigate for your project must be linked to which 2 applied situations?

c. How many enquiry-based tasks do you need to select?

d. You must select at least 1 enquiry-based task from each of these 4 focus areas.

e. You must ensure that at least 1 enquiry-based task comes from each of these 3 industry stages.

f. So the name that we use for the 6 investigations you undertake is...

The four focus areas are:
1. _____________________________
2. _____________________________
3. _____________________________
4. _____________________________

The three industry stages are:
a. _____________________________
b. _____________________________
c. _____________________________

We call your 6 investigations:
_________ _________ _________ or _______
1. List the industry that is most closely related to your VET studies, or to your employment. Briefly outline key activities of the industry.

2. Identify some of the main work tasks that occur within workplaces from that industry for each of the 4 numeracy focus areas.

3. Briefly describe some key numerical skills, processes, techniques and calculations that would usually be important for that focus area.

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<td>(e.g. Chefs need to measure different ingredients and ratios for recipes.)</td>
<td>(e.g. Waitstaff need to take orders, add charges and then process diners' bills.)</td>
<td>(e.g. The restaurant manager needs to estimate the likely number of diners to plan staff for different nights of the week.)</td>
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9.05 Industry Stages

Transformation process
All enterprises produce goods, services or a combination of goods and services. The production of goods and services involves the transformation process.
The transformation processes that turn inputs into outputs can better be described as the enterprise’s production process. Enterprises must ensure that they manage their resources efficiently so as to generate the highest return on each of their materials, human (labour), financial (capital) and technological investments.
Production processes vary significantly from industry to industry. But in essence all enterprises are involved in production. They all ‘make’ something using various processes, whether this be a good, or a service.

Industry stages
The Numeracy-based Project Plan uses the term Industry Stages to describe Inputs, Processing and Outputs.

a. Inputs
The first stage involves sourcing and using inputs such as raw materials, consumables, labour and other resources.
For example, a chef can use meat and vegetables to make meals, a carpenter will use timber to build a house frame, and a barista will use coffee beans and milk to make a coffee. These materials and consumables, as well as labour, are inputs.
Industry Stages 9.06

b. Processing
The processing stage combines labour, skills and expertise; as well as the use of tools, equipment, machinery and technology; to turn inputs into a usable good or service. For example, the chef will use their skills and expertise (using various processes and equipment) to turn the ingredients (goods inputs) into a restaurant meal (a service). The carpenter will use their skills and expertise (using various processes and equipment) to turn the materials (goods inputs) into a house frame (also a service). And the barista will use their skills and expertise (using various processes and equipment) to turn the materials (goods inputs) into a quality coffee (once again, also a service).

c. Outputs
Outputs are the final stage which sees the production of a good, or the provision of a service. Outputs are then sold to other producers and/or consumers as goods or services.
For example, the chef uses industry-specific practical and manual processes and varied inputs to prepare a meal (the output) for sale to a diner in a restaurant. The carpenter uses industry-specific practical, manual and technical processes and relevant inputs to complete the house frame (the output). This frame might be for a consumer who is having their house renovated; or for another producer, such as a building firm, that is making dozens of houses on a new housing estate. And the barista uses industry-specific practical and manual processes and relevant inputs to make a coffee (the output) for a waiting customer.

For each of these 3 industry stages, outline the types of work tasks and activities that workers in your industry would regularly do as part of the transformation process.

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9.07 Industry Stages

Industry

An industry is a group of work settings, businesses, enterprises or organisations that are involved in the production of the same or a similar product. Industries may be classified in different ways; there isn’t one correct method that applies.

For your Numeracy-based Project Plan(s) you are required to investigate the industry that is most closely related to your VET studies, or to your employment. So it is important that you understand the industries that exist within the Australian commercial world, and how different industries are classified.

5-stage industry classification

The 3-stage production classification is the traditional method of industry classification that you might already be aware of. Formerly, only primary, secondary and tertiary industry sector classifications were used. In simple terms:

- **primary industry** is involved in raw materials such as farming, mining, fishing, logging and so on
- **secondary industry** is involved in physical processing such as manufacturing, milling, smelting and so on
- **tertiary industry** is involved in providing services.

However, as the commercial world has become more sophisticated, the amount of enterprises in the tertiary sector now dominates Australian industry. A more useful approach involves classifying the general tertiary sector down into 3 further sectors:

- **tertiary industry** provides services such as retail, wholesale and transport
- **quaternary industry** provides information services such as finance, media, education and so on
- **quinary industry** provides services that replace domestic duties such as personal services; or community and cultural services, such as health, emergency services, and arts and recreation.

It is important to know that enterprises from these five industry stages all deal with inputs, processing and outputs. So at what stage of production is your industry?

### A Industry classification

Classify each of these industries according to the 5-stage method and also according to ANZSIC. Do this also for “your” industry.

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Which industry?

In order to determine the industry that you will investigate for your Numeracy-based Project, you might have to use the official industry ANZSIC classification system. The ANZSIC classification system uses 19 different general industry titles and letters to classify all enterprises in Australia such as G: Retail Trade. These 19 industries are then further classified into industry sub-sectors that more closely relate to the types of goods or services that enterprises within this classification actually make or provide.

e.g. G: Retail Trade - includes sub-sectors such as:
  ➞ G39: Motor Vehicle & Motor Vehicle Parts Retailing
  ➞ G40: Fuel Retailing
  ➞ G41: Food Retailing
  ➞ G42: Other Store- Based Retailing and Non-Store Retailing
  ➞ G43: Retail Commission- Based Buying &/or Selling.

Some of these sub-sectors are then further broken down.

e.g. G41: Food Retailing gets further broken down into:
  ➞ G411: Supermarket & Grocery Stores
  ➞ G412: Specialised Food Retailing
  ➞ G413: Liquor Retailing

Many VET training packages are closely aligned with these industry classifications and may help you correctly 'name' your industry.

Industry names

Sometimes when we read about the commercial world or hear business owners on the radio, TV or online talking about their enterprise, they might say they are in the fast-food industry, the frozen seafood industry, the sports marketing industry, the comic book industry or even the sock industry!

These people are describing the industry they belong to by using a term that relates directly to the nature of the goods and service they produce or provide.

So if you have been working, or undertaking work placement as part of your VET course, your boss might use a more 'informal' name to classify their industry.

Perhaps it might be better to name your selected industry this way - especially if you are going to obtain a lot of research material from people in work settings who use these industry names. Ask your teacher for advice.

So now that you know these different methods, what is the name of your industry?
9.09 Transformation Process

Introduction
Over the next 3 sections you will investigate the transformation process in much more detail. As you already know, the transformation process involves turning various inputs into outputs (goods and services) by using a range of production or service-provision processes. This, of course, makes up the processing stage.

For your Applied Numeracy Projects you are required to investigate and report on how numeracy skills are applied in the inputs, processing and outputs stages for an industry that matches your VET studies or work situation.

Inputs
Inputs are the resources that are used by enterprises as part of their production process, or as part of their service-provision process. Inputs include materials and stock, as well as labour, tools, equipment and machinery, technology, capital investment, time and information.

For example, a carpenter in the Construction industry will use timber and other materials including stocks of small consumables such as fixings. They will use hand and power tools and they might also use digital, technological devices, all paid for by capital investment. Of course they will use their time and expertise, as well as other information needed to perform their work.

<table>
<thead>
<tr>
<th>INPUTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>materials</td>
<td>manual labour</td>
</tr>
<tr>
<td>ingredients</td>
<td>service labour</td>
</tr>
<tr>
<td>consumables</td>
<td>technological labour</td>
</tr>
<tr>
<td>inventory (stock)</td>
<td>information labour</td>
</tr>
<tr>
<td>capital investment</td>
<td></td>
</tr>
</tbody>
</table>

A Inputs
1. List the key inputs usually required by a tradie (your choice).
2. List the key inputs usually required by a fitness instructor.
3. List the key inputs usually required for an occupation of your choice.
4. Share and discuss with your class.
Processing

Processing involves combining varied resources so as to produce a good, or to provide a service. Processing can involve manufacturing, refining, cooking and combining raw materials to make other goods (finished products). For example, a miller processing wheat into flour; and then an industrial baker baking flour into bread; followed by a café using bread to make sandwiches.

Processing also occurs in thousands of different services that are provided throughout the commercial world including transport, retail, ICT, business services, media, personal services, education, health and medical, community services, as well as many, many more.

The processing stage uses various processes (naturally), systems, work practices and other methods to create and produce goods or services.

Most enterprises invest heavily in processing, as this is the stage where varied inputs are combined to create a product (an output), as efficiently and safely as possible.

1. List the different processes involved in turning beef cattle into sausages!
2. List the processes involved in a courier firm organising and delivering parcels.
3. List the key processes regularly undertaken for a work setting of your choice.
4. Share and discuss with your class.
9.11 Transformation Process

Outputs
Outputs are generated at the final stage of the transformation process after all the varied inputs have been turned into goods or services. Outputs can take the form of consumer goods and consumer services which are sold to consumers.

Examples of consumer goods include thousands of grocery items, clothing, cars, books, computers - the list is virtually endless. Consumer services include a café that produces a coffee for customers, a hairdresser that provides a cut and style for clients, and a school that provides educational services for students. This list also is almost endless!

However, many enterprises produce goods and services that are sold to other enterprises that form part of a new production process. These producer goods and producer services happen as B2B transactions and may take the form of processed materials, stock (or inventory), direct services and indirect (or support) services.

For example, an industrial baker might sell stocks of bread rolls to cafés who make lunches. A carpenter might work as a service contractor on a housing estate building house frames for a property developer and builder. A ICT firm might be hired to assist a school to develop a new student database. And a car parts manufacturer might make headlights and other parts that are exported to overseas car makers.

Outputs

List the outputs usually produced by a café.
List the outputs usually produced by a frozen food manufacturer.
List the outputs usually produced by an enterprise of your choice.
Share and discuss with your class.

Industrial bakeries can produce tens of thousands of units of output each day (and night).
1. What is the transformation process? Give an example.

2. What role do inputs have in the transformation process? Explain using 2 different examples.

3. What role does processing have in the transformation process? Explain using 2 different examples.

4. What role do outputs have in the transformation process? Explain using 2 different examples.

5. Use examples to explain the difference between a consumer good or service, and a producer good or service.

6. Draw a diagram to illustrate the transformation process for a workplace in an industry in which you are interested. This might be a mind map, a chart, a series of graphics - you choose the design to best represent the ideas you want to communicate.
9.13 Efficiency and Productivity

Efficiency
One of the key goals of enterprises and workers involved in the transformation process is to achieve efficiency. The relationship between time and money is a relationship based on efficiency. Efficiency refers to how quickly, or how cost-effectively tasks are completed.

Some people are more efficient than others. This means that they get things done faster. This might also mean that they complete tasks more cost-effectively. This can make them more productive workers.

However, being efficient doesn’t always result in a high level of quality. Sometimes greater efficiency means a drop in quality, more rejects and waste, and bad service.

So how well do you use your time? Are you using it efficiently? And perhaps more importantly, how efficiently are you using other peoples’ time, especially your boss’s?

Productivity
We measure efficiency by calculating productivity. Productivity simply measures the ratio of outputs, compared to the ratio of inputs. Now don’t be fooled into thinking that this sounds a little bit complicated. Productivity is a very easy concept. Out versus in.

For example, if it takes one person one hour to prepare 30 pizzas, then this chef has a productivity rating of 30 pre-prepared pizzas per hour. The chef achieves an output of one pizza every two minutes.

Another example might show that it takes a team of two carpenters, five days each to put up the complete timber framing on a 30 square house. So the framing of this 30 square house will be completed in 10 working days. That is a productivity rating of two workers achieving six squares, per day. Or, as an average, each worker completing three squares per day.

One final example might see a car wash attendant clean six standard-sized vehicles per hour by hand; or 18 per hour using a high-pressure hose. This means that the use of the hose increases productivity by 200%; i.e. 18 cars per hour versus six cars per hour. Technology has made this employee much more (three times more) productive.

Calculating productivity
Productivity is a measure of the ratio of outputs, compared to the ratio of inputs. Common work-related output/input measures are per/worker, per/$ or per/hour.

\[
\text{Productivity} = \frac{\text{25 (collars)}}{\text{1 hour}} = \text{25 units (collars) per hour (25 collars/hr)}
\]

\[
\text{Productivity} = \frac{\text{25 (collars)}}{\text{$20}} = \text{1.25 units (collars) per dollar. (1.25 collars/$)}
\]

(And 1 whole collar ‘costs’ 80c, or $0.80/collar.)
1. In one sentence describe the meaning of productivity. In another sentence give a numerical example to support your explanation.

2. Calculate the productivity of each worker per week, per day and per hour. They each work a 38 hour week (with 8 hour days and 1 day RDO every 4 weeks).

<table>
<thead>
<tr>
<th>Dragha can make 60 pairs shoes in a day.</th>
<th>Kai can make 8 pairs of shoes per hour.</th>
<th>Leni is able to serve 92 customers each 4 hour shift.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abel is able to serve 22 customers per hour.</td>
<td>Sal can lay 15 metres of pipe per half hour.</td>
<td>Tini can roll 90 mini spring rolls every 2 hours.</td>
</tr>
</tbody>
</table>

3. Describe what might either speed up or slow down a worker’s productivity.

4. List some productivity measures that might be relevant for your industry.
9.15 Efficiency and Productivity

Fixed and variable costs

It is important to understand the relationship between fixed and variable costs as part of the transformation process.

A fixed cost is the cost incurred in production, regardless of how many products (or outputs) are produced. For example:

_factory: Rental/lease, establishment costs, research and development, legals, insurance, wages and salaries for minimum staff, tools, equipment, machinery for fit-out, etc.

_milk bar: Rent/lease, cash register, fittings, insurance, legals, wages for minimum staff, etc..

A variable cost is a cost incurred per unit of production. For example:

_factory: Cost of materials, supplies and stock, wages and salaries for production staff, electricity and other utilities, freight, storage and warehousing, etc.

_milk bar: Purchase of stock, wages for extra staff at busy times, electricity for longer working hours, freight for extra stock.

Essentially a fixed cost won't alter regardless of how many outputs you make or sell. Variable costs change depending on the volume of production and sales. Variable costs usually go down per unit as volume is increased. This happens due to cost savings and other efficiencies achieved through economies of scale.

You have to be aware that an enterprise must cover all of its fixed costs. Regardless of how many products it sells, it always has to make these fixed costs. These fixed costs might include initial establishment costs, rent, basic payments such as overheads just to stay open including wages and utilities, and many other expenses. Then the enterprise has to cover its variable costs, hopefully by having an appropriate margin on its sales and services. Finally, if there is anything left after taxes, the owner might record a profit based on its sales or service income.

B Fixed and variable costs

What is the difference between fixed costs and variable costs? Use examples from an enterprise within your industry to illustrate your answer.
## Numeracy-Based Project Plan

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### Activities 10. Numeracy-Based Project Plan

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<th>p.</th>
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<td>205</td>
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<tr>
<td>AT1a</td>
<td>Numeracy-based Project - Planning</td>
<td>206-207</td>
</tr>
<tr>
<td>AT1b</td>
<td>Numeracy-based Project - Organising</td>
<td>208-209</td>
</tr>
<tr>
<td>AT1c</td>
<td>Numeracy-based Project - Doing</td>
<td>210-211</td>
</tr>
<tr>
<td>AT1d</td>
<td>Numeracy-based Project - Software Tools &amp; Devices</td>
<td>212</td>
</tr>
<tr>
<td>AT1e</td>
<td>Numeracy-based Project - Reporting</td>
<td></td>
</tr>
<tr>
<td>AT1</td>
<td>Assessment Task Planner</td>
<td>214</td>
</tr>
</tbody>
</table>

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10.01 PODR Planning

Achieving goals
As you now know, for this unit you are required to complete a large, ongoing project over an extended number of weeks. This means that you have to achieve a long-term goal; your Numeracy-based Project Plan.

At first glance, it may seem difficult to achieve long-term objectives or goals. Some people find it daunting to have to plan and organise themselves to achieve a long-term goal. They struggle to plan and organise to do the right things, at the right times. But you’re not like that!

As a VCAL, applied learning or vocational student you have experienced, through your other studies (e.g. Personal Development Skills and Work Related Skills) that the best way to deal with a significant or long-term goal, is to break it down into a series of smaller, achievable, bite-sized objectives.

The Plan-Organise-Do-Review process can help you tackle any task or activity. The Plan-Do-Review Process is a natural process that comes easily. This is why it’s such a simple and useful tool to use when planning and making decisions.

These are the four PODR steps.

1. Work out and **plan** just what it is you are trying to do (your goal) and also how to best get it done.
2. Then **organise** yourself and any resources you need to successfully complete the task.
3. Complete and **do** the task.
4. Monitor and **review** your work output and make any changes and adjustments if necessary.

The PODR Process is a continuous process. Planning leads to organising, which leads to doing, which leads to reviewing which leads back to planning, and so on. Also, each of the 4 stages of the Plan-Organise-Do-Review process are not discrete. As part of planning you might be organising - which naturally leads to doing, and also involves checking things which is part of reviewing; and so on.

What you need to remember is that for everything you need to do for your Numeracy-based Project Plan, just think: Plan-Organise-Do-Review.

“We’ve used PODR before to help us tackle big project goals. Doesn’t mean we’re experts. But it does mean we have experience and know how to get started; and also how to break goals down into objectives that we can tick off.”

Image: Highwaystarz-Photography/iStock/Thinkstock
PODR Planning Process

1. Plan

▶ Work out just what it is you are trying to do.
▶ Write down your overall goal, and also how you might be able to achieve this goal.
▶ It is good to be able to write this in one or two short sentences.

*example* Develop your overall Numeracy-based Project Plan to achieve your project goal in consultation with your teacher.

2. Organise

▶ Break your overall goal into a series of smaller, achievable, bite-sized objectives.
▶ Develop an action plan, including a timeline, to achieve each of these smaller objectives on a task-by-task basis.
▶ Organise yourself, any resources you need, and any other people required, to successfully complete each task.

*example* Work out all the required tasks, resources, people and timelines needed to achieve the ongoing objectives of your project.

3. Do

▶ Undertake the ongoing weekly or day-to-day activities needed to actually perform each task.
▶ This is where everything comes together.
▶ The doing phase could be quite short; especially if you have planned and organised yourself effectively beforehand.

*example* Undertake your investigation of 6 enquiry-based tasks in the workplace on an ongoing basis. In class organise and analyse your findings; and later draft and prepare your final report(s).

4. Review

▶ Monitor what you’ve achieved, evaluate your outcomes for quality, and make any changes and adjustments if necessary.

*note* The 4 stages of Plan-Organise-Do-Review are interdependent. So you should be reviewing throughout the whole project process, and not just at the end.

*example* Review that you have chosen the most suitable methods to collect information during your investigations; you might have to make some changes.

You will investigate your industry by applying the numeracy skills and techniques you have learned through Unit 1.

Your teacher will also develop examples to show how different numeracy skills and techniques apply generally in different industries, and specifically to your industry.

As a class discuss examples where you have previously developed and used skills related to planning, organising, doing and reviewing.

Your teacher will help the class come up with a list of the most important PODR skills that you should focus on using for your Numeracy-based Project Plan.
10.03 My Project Plan - Planning

Numeracy-based Project Plan

The next few pages feature a series of planning pro-formas that will assist you to manage your Numeracy-based Project through the planning, organising, doing and reviewing stages. It is important to note that you are not likely to complete all 5 stages of your plan in one go, straight away. Rather, you are likely to come back to certain stages further on in the unit, as you carry out the various tasks associated with that stage.

1A: Planning - Develop your project plan

- In consultation with your teacher.
- Select your industry.
- Choose your 6 enquiry-based tasks to investigate.
- Develop your overall plan.

1B: Organising - Design your project plan

- Develop your ongoing timeline.
- Explain: How you will use:
  - numerical skills
  - software tools and devices
  - other skills.
- Describe your methods to record and communicate the data.
- Discuss potential issues and problems.

1C: Doing - Apply a range of numerical skills to investigate your industry

- Research 6 enquiry-based tasks.
- Choose numerical processes to find and collect data.
- Collect relevant data.
- Apply problem-solving strategies.
- Estimate, calculate and analyse the data.
- Analyse the data.

1D: Planning, organising, doing and reviewing - Represent your data using software tools and devices

- Use software tools & devices.
- Describe those you could use and their advantages and disadvantages.
- Explain which might best represent the data.
- Use these to represent and communicate your data.
- Evaluate these for showing and reporting your findings.

1E: Doing and reviewing - Communicate your findings from your investigation

- Communicate your results effectively.
- Using mathematical language.
- Using mathematical symbols and conventions.
- Using suitable software and tools.
- Communicate to a relevant audience.
- Evaluate your performance.

AT1a Numeracy-based Project - Planning

This is the first stage of developing your Numeracy-based Project. Here you will start to plan your overall project.

Complete this planning pro-forma. Your teacher will help and guide you in developing your plan. But you could also try to independently complete as many sections as you can. List due dates and tick off tasks when done and checked.

Once you have consulted with your teacher about the suitability of your choices, then redraft your Numeracy-based Project Plan.
### 1a: Planning - Develop your Numeracy-based Project Plan (LO1 a-d)

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Information/Explanation</th>
<th>Due dates/Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is my overall goal?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### a. Select your industry area.

**Inputs:** Enquiry-based tasks I will investigate are:

**Outputs:** Enquiry-based tasks I will investigate are:

Consult with your teacher to choose 6 enquiry-based tasks to investigate.

#### b. & c.

Have you chosen at least:

- 1 for each of the 3 *industry stages*, and
- 1 from each of the 4 *Numeracy focus areas*?

Tick these off.

<table>
<thead>
<tr>
<th>Number</th>
<th>Measurement</th>
<th>Financial Numeracy</th>
<th>Probability &amp; Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs:</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

#### d.

Develop a plan with:

- your aims
- required numeracy skills
- your overall timeline
- measurement outcomes
## 10.05 My Project Plan - Organising

### AT1b Numeracy-based Project - Organising

This is the **second stage** of developing your Numeracy-based Project. It focuses mainly on the ‘organising’ phase (which flows on from planning). This is the stage when you start to **organise yourself** and any **resources** so that you can undertake your **specific investigations (ANPs)** for your overall project.

Your teacher will guide you in developing your plan, but first try to complete this independently. List due dates and tick off when done and checked. Consult your teacher about the suitability of your choices, then redraft this stage of the Numeracy-based Project Plan.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Information/Explanation</th>
<th>Due dates/Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>e. Develop your <strong>timeline</strong> for completion, including ongoing drafting and reporting stages.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Identify:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- numerical skills and processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- software tools &amp; devices</td>
<td></td>
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</tr>
<tr>
<td>- other skills you will use. Explain why you have chosen to use these.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Describe how you will use <strong>software tools and devices</strong> to present your data.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Describe the <strong>communication media and techniques</strong> that you will use to present your data.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Identify and discuss <strong>issues and problems</strong> that might prevent you from doing your investigations effectively.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. <strong>Work with others</strong>, when and where required, to develop your plan.</td>
<td></td>
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</table>

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This is the third stage of developing your Numeracy-based Project. It focuses mainly on the ‘doing’ phase (which of course flows from planning and organising).

This is the stage when you will do your investigative Applied Numeracy Projects as part of your overall Numeracy-based Project.

Your teacher will help and guide you in developing your plan, but try to complete as many section as you can independently. List due dates and tick off when done and checked. Once again consult your teacher about the suitability of your choices, then redraft this stage of the Numeracy-based Project Plan.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Information/Explanation</th>
<th>Due dates/Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Research your 6 enquiry-based tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. What numerical processes will you use to collect data for each of these 6 enquiry-based tasks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Collect relevant data related to these 6 enquiry-based tasks. Apply techniques such as estimation, computation and use of technology.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. What numerical problem-solving strategies will you use for your investigations. How will you use these; and why?</td>
<td></td>
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<tr>
<td>e. Use the data to make estimates and calculations. Describe what your estimates and calculations suggest.</td>
<td></td>
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<tr>
<td>f. Use 1 or more methods to analyse the data related to each of the 6 enquiry-based tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enquiry-based task 1</td>
<td>Enquiry-based task 2</td>
<td></td>
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<td>---------------------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>Description:</td>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Numerical processes:</td>
<td>Numerical processes:</td>
<td></td>
</tr>
<tr>
<td>Key data:</td>
<td>Key data:</td>
<td></td>
</tr>
<tr>
<td>Problem-solving strategies:</td>
<td>Problem-solving strategies:</td>
<td></td>
</tr>
<tr>
<td>Data estimates &amp; calculations:</td>
<td>Data estimates &amp; calculations:</td>
<td></td>
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<tr>
<td>Analysis of data:</td>
<td>Analysis of data:</td>
<td></td>
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<td>Key data:</td>
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<td>Problem-solving strategies:</td>
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<table>
<thead>
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<th>Enquiry-based task 5</th>
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<tr>
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<td>Problem-solving strategies:</td>
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<td>Data estimates &amp; calculations:</td>
<td>Data estimates &amp; calculations:</td>
</tr>
<tr>
<td>Analysis of data:</td>
<td>Analysis of data:</td>
</tr>
</tbody>
</table>
This is the **fourth stage** of planning your Numeracy-based Project. It focuses on ‘planning’, ‘organising’, ‘doing’ and ‘reviewing’ related to **software tools** and **devices** you plan to use, and will use, for collecting, organising and analysing your data and information during your **Applied Numeracy Projects**.

- **Complete this planning pro-forma.** Your teacher will help and guide you in developing your plan, but try to complete as many sections as you can independently. List due dates and tick off when done and checked.

Once you have consulted with your teacher about the suitability of your choices, then redraft this stage of your Numeracy-based Project Plan.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Information/Explanation</th>
<th>Due dates/Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Describe the <strong>software tools</strong> and <strong>devices</strong> that you could use to show the data from your investigation of the 6 enquiry-based tasks.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td>Discuss <strong>advantages</strong> and <strong>disadvantages</strong> of these <strong>software tools and devices</strong> in representing your collected data.</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td>Explain which <strong>software tools and devices</strong> are most likely to best represent the data you have collected; and say why.</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td><strong>Use the software tools and devices to represent and communicate the data</strong> you have collected for your investigation into the 6 enquiry-based tasks.</td>
<td></td>
</tr>
<tr>
<td>e.</td>
<td><strong>Evaluate the effectiveness</strong> of your chosen <strong>software tools and devices</strong> in showing and representing your findings.</td>
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**Preview Draft Sample:**

Do Not Copy
This is the final stage of planning your Numeracy-based Project. It focuses on ‘doing’ and ‘reviewing’ related to your reporting of the results based on the data and information you collected during your Applied Numeracy Projects.

Complete this planning pro-forma. Your teacher will help and guide you in developing your plan, but try to complete as many sections as you can independently. List due dates and tick off when done and checked.

Once you have consulted with your teacher about the suitability of your choices, then redraft this final stage of your Numeracy-based Project Plan.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Information/Explanation</th>
<th>Due dates/Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Communicate your results effectively using appropriate mathematical language.</td>
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<td>b.</td>
<td>Communicate your results effectively using appropriate mathematical symbols and conventions.</td>
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<tr>
<td>c.</td>
<td>Communicate your results effectively using suitable software and tools.</td>
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<td>d.</td>
<td>Communicate your results to a relevant audience (as negotiated with your teacher).</td>
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<td>e.</td>
<td>Evaluate your performance in this investigation including: - planning and organising - skills, techniques, software tools and devices to collect and analyse information - overcoming barriers and obstacles - dealing with other people - communicating and reporting results.</td>
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</tbody>
</table>

My Project Plan - Reporting 10.10

1e: Doing and reviewing - Communicate your findings from your investigation (LO4 a-e)
10.11 Assessment Task Planner

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dates:</th>
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<tbody>
<tr>
<td>Industry:</td>
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**Tasks - AT1: Design your Numeracy-based Project Plan**

<table>
<thead>
<tr>
<th>Stage 1a:</th>
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</table>

**Reporting**

- Prepare and submit your final report. ✔
- Prepare a report to the class (if required). ✔
- Present your final report to the class (if required). 🗣️ ✔

**Additional information:**

Signed: ___________________________    Date: _____________
<table>
<thead>
<tr>
<th>Activities 11: Industry Stages - Inputs</th>
<th>p.</th>
<th>Due date/Done?</th>
<th>Comment</th>
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<tr>
<td>11.02A Resources</td>
<td>217</td>
<td></td>
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<tr>
<td>11.04A Inputs - Materials</td>
<td>219</td>
<td></td>
<td></td>
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<tr>
<td>11.06B Inputs - Materials in action</td>
<td>221</td>
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<tr>
<td>11.07 ANP: Inputs - Materials Investigation</td>
<td>223</td>
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<tr>
<td>11.10A Inputs - Labour</td>
<td>224</td>
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<tr>
<td>11.12B Inputs - Labour in action</td>
<td>227</td>
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</tr>
<tr>
<td>11.13 ANP: Inputs - Labour Investigation</td>
<td>228-229</td>
<td></td>
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<tr>
<td>11.18A Inputs - Equipment</td>
<td>230</td>
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<td>11.19 ANP: Inputs - Equipment Investigation</td>
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<td>11.21 ANP: Inputs - Overall Investigation</td>
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<tr>
<td>AT2 Applied Numeracy Project - EBT: Inputs</td>
<td>238-240</td>
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</tbody>
</table>

Comments:
Inputs

Inputs refer to the varied resources used by enterprises as part of their production processes or service-provision processes. The main categories of resources that you should investigate for your Applied Numeracy Projects are:

- **materials**: both raw and processed
- **labour**: worker skills, expertise and time
- **equipment**: tools, equipment, machinery and technology
- **capital**: money invested by the enterprise
- **information**: knowledge, experience, expertise and analysis.

Efficiency

One of the issues surrounding inputs is the achievement of efficiency in the use of resources. This means that enterprises use various numerical techniques to measure productivity. These measures or key performance indicators may focus on materials productivity, labour productivity and other industry-specific measures.

So when you are investigating work settings within your chosen industry you should be aiming to collect numerical data and information that will enable you to measure productivity. For example:

- measure physical materials, or count stock and other inputs
- estimate and calculate labour time, and find out and calculate labour costs
- calculate and show different proportions of materials, labour and other inputs
- estimate and calculate total materials, labour and other input amounts, and total $ cost
- calculate average materials, labour and other input amounts, and $ costs
- compare and analyse materials, labour and other input usage and productivity ratios.

Applied Numeracy Projects

In relation to inputs you might investigate one or more of the following.

- **Amounts** of inputs used in goods production or service provision. (N)
- **Ratios** of inputs used for goods production or service provision. (M)
- **Cost** of inputs used in goods production or service provision. (FN)
- **Comparison of trends** in inputs for goods production or service provision. (P&S)
- **Amounts and/or ratios** of **different categories** of inputs used.
- **Changing ratios** of inputs used for specific goods or services.
- **Comparison of different types** of inputs used for varied goods or services.
- **Ratios of waste** in inputs generated in goods production or service provision.

You might also investigate industry-specific, inputs-related issues in negotiation with your teacher.
Consider a hamburger, favourite fast food of many people and staple product of the big chains, McDonald’s and Hungry Jacks. Work in pairs to identify all of the resource inputs that go into the production of a hamburger for sale in a fast food outlet. Group these according to the 5 resource categories.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Labour</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Equipment</th>
<th>Capital</th>
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</table>

<table>
<thead>
<tr>
<th>Information</th>
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</table>
11.03 Inputs - Materials

Materials

Materials as part of the transformation process can include raw materials, processed materials, stock (inventory) and other consumables. As you investigate your industry, you need to apply the numeracy skills and techniques you learned in Unit 1 by identifying and describing industry examples of applied numeracy in action related to inputs.

Raw materials

Raw materials are resources that are still close to their original state as when they were farmed, grown, harvested or extracted. Key examples include:

- fresh fruit and vegetables
- grains and other food crops
- livestock and herds
- fish and seafood
- fibre crops
- wood and forestry resources
- mineral resources
- coal, crude oil, natural gas and other fossil fuels.

Key industries include agriculture, forestry, fishing and mining.

Processed materials

Processed materials are resources that have been turned into a more usable form as part of a transformation process. Some examples include:

- canned fruit, chopped vegetables
- flour and processed grains
- food products
- meat and meat products
- fish and seafood products
- cotton and wool
- timber
- steel, aluminium and concrete
- refined oil, petrol, gas and electricity.

Key industries include:

- milling such as food processing, fibre processing or timber processing
- refining and smelting such as coal, crude oil, natural gas and fossil fuel (oil) refining
- manufacturing including food, petrochemical, fabric, clothing, timber, electronics, vehicles and many other examples.

Stock

Stock (or inventory) refers to both raw and processed items that are supplied and sold at wholesale and retail. This is commonly called trading stock.

Stock also refers to materials that are used by enterprises to make their goods, or to provide their services (known as production stock), e.g.

- Flour for bakers, timber for cabinet makers, hair care products for hairdressers, food ingredients for a café and computer parts for computer suppliers.

Examples include:

- fresh food and vegetables supplied by wholesalers, markets and retailers
- manufactured items supplied by wholesalers, markets and retailers
- products for sale in shops, e.g. groceries, clothing, household items.

Key industries include:

- retail trade, wholesale trade, and personal services that also sell stock
- all industries for the use of ‘production stock’.
Consumables are all the other material inputs that any enterprise naturally uses up as part of the production of goods, or the provision of services. Enterprises don’t sell these consumables in their current form, otherwise they would be treated as stock. Instead they use consumables as a part of the transformation process. Consumables could include office supplies, petrol, electricity, screws and nails, cleaning products, packing boxes, and other incidental, but important, items, where these are not the key items of stock for sale.

E.g. Petrol is a consumable for a delivery service, but naturally is stock for a petrol station. Office supplies are consumables for almost every enterprise, but are stock for a newsagent. Screws, nuts, bolts and other small fixings would be consumables for a carpenter, but stock for a hardware store.

Consider the industry area for your Numeracy-based Project Plan. Outline the types of inputs of materials that are commonly used by enterprises in that industry. Consider production stock and trading stock.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Enterprise(s):</th>
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</table>

What do they buy, sell, or else provide?

Materials: Classify these as raw materials (RM) or processed materials (PM).

Stock: What stock items do they use up or sell? Consider production stock and trading stock.

Consumables: What other items do they use up as part of their operations?
11.05 Inputs - Materials

Numeracy in action

One of the most relevant areas for you to investigate for the inputs stage of your Applied Numeracy Projects is the amounts, and the costs, of materials inputs. All enterprises use materials as inputs to one extent or another, including raw materials, processed materials, trading stock, production stock and other consumables. Enterprises need to be able to track the amounts and costs of the inputs they use.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your Applied Numeracy Projects. Also keep in mind that the numerical data and information from your investigations might naturally be related to one or more of the other focus areas (e.g. Number and Measurement or Number and Financial Numeracy); and/or related to another industry stage.

**Number**

**Inputs - Materials**
- How much (amount of) materials inputs? (or)
- How many materials inputs?
- Different types of materials inputs.
- Different stock inputs.

**Measurement**

**Inputs - Materials**
- Sizes of materials inputs.
- Weight of materials inputs.
- Length of materials inputs.
- Volume of materials inputs.
- Ratios of materials inputs.
- Ratios of different types of stock.

**Financial Numeracy**

**Inputs - Materials**
- $ costs of materials inputs.
- $ costs of different materials inputs.
- $ costs of stock inputs.
- $ costs of consumables.

**Probability & Statistics**

**Inputs - Materials**
- Changes in amounts, measures and costs over time.
- Comparison of amounts, measures and costs for different workers.
- Comparison of amounts, measures and costs for different goods, services, tasks or projects.
- Comparison of amounts, measures and costs with other firms.
- Possible/likely changes in the future.
ANP Example: Chicken checken’

Pol is doing a VET course in hospitality and works at Chico’s Chicken Barn in the Accommodation and Food Services industry. He works mainly in the kitchen but sometimes on registers. Pol sees lots of boxes of fresh and frozen food come in to the place each day, but he would like to know just how much these amounts really are. He thinks that knowing this will help him if he ever has to handle ordering food in his future career.

Pol is going to estimate how much food that Chicos’ normally uses per week. Pol is going to organise his information according to different types of food inputs including chickens, patties, buns, nuggets, chips and salad items.

Pol will do some research and then compare actual amounts to his estimates.

Pol is thinking that he might calculate the total weight of each of these food input categories and create daily, weekly and annual averages. These could be shown on a pie chart or on bar graphs.

Pol thinks he might choose 3 enquiry-based tasks for inputs, but needs to check first with his teacher, as some information might better match the processing stage.

- **Inputs - Materials: Number**
  - Estimating and counting different food ingredient amounts and totals.

- **Inputs - Materials: Measurement**
  - Estimating, calculating, totalling and comparing the total weight of inputs of different types of food ingredients daily and weekly.

- **Inputs - Materials: Financial Numeracy**
  - Estimating and calculating the $ costs of stock inputs, and the costs for different food ingredient categories daily and weekly.

Consider the example of Pol at Chico’s Chicken Barn. What types of numerical techniques, information and skills do you think he is going to use for his ANP?

<table>
<thead>
<tr>
<th>Estimating and counting different food ingredient amounts and totals.</th>
<th>Estimating, calculating, totalling and comparing the total weight of inputs of types of food ingredients daily and weekly.</th>
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</thead>
<tbody>
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<td><strong>Numerical techniques:</strong></td>
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<td><strong>Numerical skills:</strong></td>
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</table>
11.07 Inputs - Materials

**ANP: Inputs - Materials Investigation**

If you are investigating an industry area that uses materials extensively as part of its production or service-provision process, then you should complete this **ANP: Inputs - Materials Investigation** pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for a materials inputs focus for your ANP are as follows.

- Primary industries such as agriculture, forestry or fishing, e.g. a farm; or mining.
- Secondary industries such as manufacturing, milling, smelting or refining. e.g. A factory producing either intermediate goods (such as timber) or finished goods such as (furniture).
- Construction industry firms such as carpentry, plumbing, plastering, bricklaying, concreting, cabinet-making, electrical, engineering, etc..
- Retail trade and wholesale trade firms dealing in different stocks of goods.
- (Accommodation and) Food services using materials as ingredients.
- Personal services firms that use consumable, e.g., hairdressing & beauty therapy.

### Inputs - Materials:

- Identify numerical processes to collect data and information.
- Use numerical techniques and technologies to organise and use the data.
- Estimate, calculate, summarise, analyse and communicate using the data.

<table>
<thead>
<tr>
<th>Classifying different types of materials.</th>
<th>Counting amounts of different types of materials.</th>
<th>Working out costs of materials in total.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classifying different types of consumables.</td>
<td>Counting amounts of different types of consumables.</td>
<td>Working out costs of ingredients in total.</td>
</tr>
<tr>
<td>Classifying different types of stock.</td>
<td>Counting amounts of different types of stock.</td>
<td>Working out costs of stock in total.</td>
</tr>
<tr>
<td>Describing different ingredients ratios, proportions or costs.</td>
<td>Describing different materials ratios, proportions or costs.</td>
<td>Examining waste amounts, ratios and costs.</td>
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<td>Comparing material costs from different suppliers.</td>
<td>Predicting patterns in materials usage and costs.</td>
<td>Comparing materials costs over time.</td>
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<td>ANP: Inputs - Materials Investigation</td>
<td>ANP Inputs Materials</td>
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<td>Inputs: EBT Focus area: ANP 2</td>
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<tr>
<td>Numerical techniques and technologies I will use to organise and use the data.</td>
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<tr>
<td>Estimates related to the data and information.</td>
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<tr>
<td>Calculations using the data and information.</td>
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<tr>
<td>Summary information about the data and information.</td>
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11.09 Inputs - Labour

Labour

Labour refers to the human effort that goes into the transformation process. Labour includes the skills of workers, the level of worker expertise, and of course the time and its associated labour cost that a worker puts into a task. The cost of labour is a key input into the transformation process. For many enterprises, especially services involving significant human effort, labour is the biggest input cost!

As you investigate your industry, you need to apply the numeracy skills and techniques you learned in Unit 1 by describing industry examples of applied numeracy in action.

Labour: Time and cost

Time is a key measure of labour as an input. One way to measure time as a labour input is by calculating the amount of labour hours or people-hours required for different job tasks.

e.g. A supermarket might need 800 people-hours per week for checkouts, 120 hrs/week for the deli, and another 400 hrs/week for other job roles.

Time can then be conveniently measured in $, especially when dealing with wage-earning workers. You can simply multiply the number of hours worked, by the wage rate for different workers.

e.g. It takes 2 warehouse workers, 4 hours each to process and pack a large order. If each worker earns a wage of $20/hour then the total wage cost for this job = $160.

But keep in mind that some workers cost more than others. Or perhaps it might be better to say that some workers cost less (are cheaper) than others!

Labour as an input is also more efficient if workers are busier.

e.g. If a chef only makes 20 meals on a slow night they'll still be paid the same as if they were making 100 meals on a very busy night. So if the chef is paid $200 for their night’s work, this means that the slow night costs:

$10/meal ($200/20 meals) in chef labour time, versus
$2/meal ($200/100 meals) on the busier night.

Labour time and/or cost can be calculated to find:
- how many workers are needed
- how many labour hours are required
- which types (skill levels) of workers are needed
- $ cost of labour hours for a job
- $ cost of different levels of workers required for a job
- average $ cost of workers for a job
- average hourly, weekly or task cost of labour for a salary worker
- various productivity ratios related to any, or all, of the above.

So which of these measures do you think would suit your industry investigation?
**Labour: Skills and expertise**

Workers are required to perform various tasks as part of the transformation process. This means that workers need to be skilled so that they can properly and safely carry out their duties as efficiently as possible.

Formal and informal training, including both on and off-the job training is a key factor in developing a skilled workforce. Investment in training develops workers who are better skilled and more capable of performing their work tasks. This creates a better ‘return’ on labour costs as part of the transformation process through improved quality and efficiency.

Different tasks may require various levels of expertise, including highly skilled workers, supervision and management, professional support, and even outsourced expertise. These all come at a higher labour cost.

Input issues to consider related to this include:
- cost of training
- paying more for better skills
- some job tasks have higher labour costs due to expertise needed
- cheaper labour vs more expensive and experienced expertise
- paying salaries vs paying wages.

Choose 2 enterprises from your industry area. Outline the different types of labour inputs that these enterprises might normally use as part of their operations.

<table>
<thead>
<tr>
<th>Enterprises:</th>
<th>What do they do: i.e. sell, produce or provide?</th>
<th>Common job tasks required: e.g. Pre-cutting all salad items.</th>
<th>Labour inputs needed: e.g. At least one worker to do this before opening, for 3 hours.</th>
<th>Other skills/expertise needed: e.g. Might need a supervisor.</th>
</tr>
</thead>
</table>
11.11 Inputs - Labour

Numeracy in action

Another important area for you to investigate for your Applied Numeracy Projects is the amount and cost of labour inputs. All enterprises rely on the labour of workers to produce goods or to provide services. This labour can include work needed for the usual day-to-day job tasks, as well as higher level skills and expertise for more complex tasks. Enterprises need to be able to track the amount, cost and types of the labour inputs they use.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your ANP. And again, the numerical data and information from your investigations might naturally be related to one or more of the other focus areas (e.g. Number and Measurement or Number and Financial Numeracy); and/or related to another industry stage.

**Number**

Inputs - Labour
- Total number of workers.
- Total number of work hours.
- Amounts of different types of labour inputs.
- Amounts of different types of work hours.

**Measurement**

Inputs - Labour
- Time as an input.
- Labour cost as an input.
- Labour hours in total; and/or per worker.
- Labour hours at different times and for different days.
- Labour hours for different jobs tasks and job classifications.
- Productivity ratios of labour hours per job task, per worker, per day, etc..
- Productivity ratios of labour cost/job task, /worker, /day, etc..

**Financial Numeracy**

Inputs - Labour
- $ costs of labour inputs.
- $ costs of different labour inputs.
- $ costs of outsourced labour inputs.
- Productivity ratios.

**Probability & Statistics**

Inputs - Labour
- Changes in labour amounts and costs over time.
- Comparison of labour amounts and labour costs for different workers.
- Comparison of labour amounts and labour costs for different tasks or projects.
- Comparison of labour amounts and labour costs with other firms.
- Possible/likely future changes in labour amounts and labour costs.
ANP Example: Counting me in

La is working at Nugget’s News and Lotto as part of the Retail Trade industry. She hopes to one day run her own retail shop so she wants to know more about the business side of retail operations.

First off La is going to estimate the total number of workers, the number of hours each worker usually works a week, and then the total number of work hours. Then she will use the weekly roster to calculate a more accurate count.

La is then going to look at the different labour costs for workers in the Retail Trade industry. She is going to estimate hourly wages for trainees, part-time staff, full-time staff, the manager and casual rates.

La will then research the actual wage rates using the Retail Industry award, and compare these to her own workplace.

La is going to classify different workers according to the cost of their labour, i.e. the casual sales assistant compared to the manager. She is then going to show the comparisons on a bar graph.

La has decided to choose 2 EBTs for inputs related to labour.

✓ Inputs - Labour: Number
  Total number of workers and total number of work hours.

✓ Inputs - Labour: Financial Numeracy
  Estimating and calculating $ costs of labour inputs.

Consider the example of La at Nugget’s News and Lotto. What types of numerical techniques, information and skills do you think La is going to use for her ANP?

<table>
<thead>
<tr>
<th>Total number of workers and total number of work hours.</th>
<th>Estimating and calculating $ costs of labour inputs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical techniques:</td>
<td>Numerical techniques:</td>
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<tr>
<td>Numerical information:</td>
<td>Numerical information:</td>
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<tr>
<td>Numerical skills:</td>
<td>Numerical skills:</td>
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</tbody>
</table>
# 11.13 Inputs - Labour

## ANP: Inputs - Labour Investigation

All enterprises rely on **labour** as part of their goods production or service-provision processes. So you should complete this **ANP: Inputs - Labour Investigation** pro-forma.

Some possible numerical processes and techniques are listed below, but note: All industry areas and their related workplace settings are suitable for a **labour inputs focus** for your ANP.

- All labour-intensive people and community services such health, caring, education, community services, emergency services, and many others.
- Information and professional services such as media, ICT, accounting, finance, legal, marketing, engineering, and many others.
- Manufacturing of all types.
- Construction industry firms that rely on labour time, skills and expertise.
- Retail trade and wholesale trade (retail is the biggest employing industry).
- Accommodation and food services of all types.
- Personal services, arts and recreation, and all other industry areas.

### Inputs - Labour

- Identify numerical processes to collect data (and information).
- Use numerical techniques and technologies to organise and use the data.
- Estimate, calculate, summarise, analyse and communicate using the data.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classifying different types of workers.</td>
<td>Measure the amount of time spent.</td>
</tr>
<tr>
<td>Classifying different levels of workers.</td>
<td>Working out costs of different labour.</td>
</tr>
<tr>
<td>Counting numbers of workers, worker hours in total and equivalent full-time workers.</td>
<td>Counting numbers of workers overall.</td>
</tr>
<tr>
<td>Counting amounts of workers and worker hours for specific types of workers.</td>
<td>Counting amounts of workers and worker hours for specific types of jobs.</td>
</tr>
<tr>
<td>Working out cost of labour in total.</td>
<td>Working out cost of management labour.</td>
</tr>
<tr>
<td>Working out cost of outsourced labour.</td>
<td>Comparing costs of apprenticeship labour.</td>
</tr>
<tr>
<td>Comparing labour costs from different sources.</td>
<td>Comparing costs of traineeship labour.</td>
</tr>
<tr>
<td>Comparing full-time, part-time and casual labour costs.</td>
<td>Comparing costs of junior labour.</td>
</tr>
<tr>
<td>Predicting patterns in labour hours and costs.</td>
<td>Calculating different labour productivity ratio and measures.</td>
</tr>
<tr>
<td>Comparing internal labour costs with outsourced labour costs.</td>
<td>Comparing labour costs over time.</td>
</tr>
</tbody>
</table>
### ANP: Inputs - Labour Investigation

<table>
<thead>
<tr>
<th>Inputs: EBT Focus area: ANP 1</th>
<th>Inputs: EBT Focus area: ANP 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical processes I will use to collect data and information.</td>
<td>Numerical processes I will use to collect data and information.</td>
</tr>
<tr>
<td>Numerical techniques and technologies I will use to organise and use the data.</td>
<td>Numerical techniques and technologies I will use to organise and use the data.</td>
</tr>
<tr>
<td>Estimates related to the data and information.</td>
<td>Estimates related to the data and information.</td>
</tr>
<tr>
<td>Calculations using the data and information.</td>
<td>Calculations using the data and information.</td>
</tr>
<tr>
<td>Summary information about the data and information.</td>
<td>Summary information about the data and information.</td>
</tr>
</tbody>
</table>
11.15 Inputs - Other

Other inputs

There are a range of other inputs (besides materials and labour) that are part of the transformation process. These include categories such as equipment inputs, capital inputs and information inputs. All enterprises use these other inputs in various amounts, in combination with materials and labour.

For many of you it might be better to focus on these other inputs as part of the processing stage (which is the next stage) of your Applied Numeracy Projects. However, some of you might be investigating an industry that relies heavily on one or more of these other categories of inputs. For example:

- a service industry such as telecommunications relies heavily on the use of equipment inputs (e.g. technological equipment) rather than inputs of materials
- a service industry such as finance and insurance relies heavily on the use of capital inputs (e.g. financial investment) rather than inputs of materials
- a service industry such as media relies heavily on the use of information inputs (e.g. publications and digital entertainment) rather than inputs of materials.

It is important that you realise that all industries rely heavily on the use of equipment as an input and this is a good focus throughout your investigation. Enterprises in all industries also use capital inputs to set up and fund their operations. But it is critically important that you don’t make capital inputs the focus of your investigation. Rather, you can focus on what enterprises use the capital for, such as buying tools, equipment, machinery and technology.

Equipment inputs

Equipment inputs usually include all of the various tools, equipment, machinery, vehicles and technological devices and systems use to produce and provide goods and services. Enterprises across all industries invest in practical, useful and often state-of-the-art equipment so as to produce their goods or provide their services. Equipment varies greatly: compare coal mining with a beauty salon, an airline operator with a mobile auto-electrician, and even a fish farmer with a child-care centre.

Equipment is usually industry-specific and enables workers to efficiently perform work tasks required by enterprises in a specific industry. e.g.

- A nailgun is an essential tool for construction industry workers who deal with timber.
- A commercial oven is an essential item of equipment for a chef in the restaurant industry.
- A delivery van is a vital item of machinery for parcel couriers in the transport industry.
- An EFTPOS and digital sales terminal is vital technology for sales assistants in the Retail Trade industry to process transactions.

So for your ANP, you might choose to investigate the cost of the various types of equipment required for particular enterprises in your industry.
Some types of equipment might be used in almost any industry. But this equipment may require modifications, or the use of specialised software and apps, so that it can be used effectively for tasks required in that industry. E.g. Computers, mobile devices, motor vehicles and other ‘universal’ equipment. Enterprises purchase equipment by using capital funds (i.e. money invested in the business). This is especially relevant when new enterprises start up, as they will have to spend a lot of money on equipment at this formative stage.

This might make for an interesting enquiry-based task for your ANP; i.e. investigating start-up equipment costs as an input for a new enterprise in a particular industry. Enterprises also upgrade equipment as they grow. Enterprises might have to upgrade to keep up with competitors and industry trends. In order to fund (or finance) this upgrade they might invest more capital in the enterprise, or borrow money, or use retained earnings, i.e. use part of their profit to buy new equipment. This could also make for a potential enquiry-based task for your ANP.

Enterprises also upgrade equipment as they grow. Enterprises might have to upgrade to keep up with competitors and industry trends. In order to fund (or finance) this upgrade they might invest more capital in the enterprise, or borrow money, or use retained earnings, i.e. use part of their profit to buy new equipment. This could also make for a potential enquiry-based task for your ANP.

**Capital inputs**

Capital represents all the money that an enterprise invests to start-up and/or to purchase tools, machinery, plant and equipment, technology, etc.; on an ongoing basis. Capital can also be represented by owner’s equity which is accumulated by keeping profits in the enterprise (retained earnings). It is better that you deal with capital as an input in terms of the equipment that an enterprise invests in. However, if you are dealing with a start-up enterprise within your industry for your ANP, then you might consider investigating capital as an input. Alternatively, if your VET course or work placement is related to the Finance and Insurance industry then capital would be a key input to investigate. And finally, if you are investigating not-for-profit community services, or arts and creative industries, then capital is also a potential input to investigate as it might be sourced through grants, government funding and even crowdfunding.

**Information inputs**

In the digital age an increasing range of enterprises in different industries have begun to ‘purchase’ information as an input. Of course the Information Media and Telecommunications industry is a key example. Broadcasters have to ‘purchase’ their content - just like purchasing meat for a hamburger! Many specialist ICT developers sell their services (e.g. consultancy and advice, or perhaps software and apps) as products that could be classified as information inputs. Many enterprises operating in the Professional, Scientific and Technical Services industry have to buy information, such as pre-prepared research, data analysis and specialist information services from industry professionals (i.e. outsourcing). So if your VET studies or work is related to these industries then you might investigate information as an input - just like a restaurant would use food ingredients, or a manufacturer would use raw and processed materials.
11.17 Inputs - Equipment

Numeracy in action - Equipment

An area that you might investigate for the inputs stage of your Applied Numeracy Projects is the types and cost of equipment inputs.

All enterprises rely on various equipment, tools, machinery, technology, devices and vehicles in order to produce goods or provide services. Enterprises invest significant funds (capital) into purchasing equipment for use by workers. Enterprises in all industries also have to update equipment to keep up with industry changes, ongoing innovation and the emergence of new technologies, including digital technologies.

Also keep in mind that the numerical data and information from your investigations might naturally be related to one or more of the other focus areas; and even related to another industry stage. So, perhaps it might be better for you to investigate equipment as part of the processing stage (the next stage) of your Applied Numeracy Projects.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your ANPs.

Number

Inputs - Equipment
- Types of equipment; and overall costs (audit).
- Counts of tools (audit).
- Counts of other types of equipment.
- Classification of different types of equipment.
- Comparison of equipment used by different types of workers.

Measurement

Inputs - Equipment
- Size of equipment.
- Weight of equipment.
- Lifespan of equipment (time).
- Measuring devices: Tools and equipment used for measuring.

Financial Numeracy

Inputs - Equipment
- $ costs of equipment in total.
- $ costs of specific types of equipment, e.g. tools.
- $ costs of replacing equipment.
- $ costs of new equipment.

Probability & Statistics

Inputs - Equipment
- Comparison of costs of different types of equipment.
- Comparison of costs of equipment with other firms.
- Comparison of past costs with current costs of equipment.
- Investigation of potential future equipment costs.
Choose an enterprise from your industry area. Outline the different types of equipment inputs that it might normally use as part of its operations.

<table>
<thead>
<tr>
<th>Enterprise:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment: Tools &amp; implements</td>
</tr>
<tr>
<td>Equipment: Machinery</td>
</tr>
<tr>
<td>Equipment: Technology</td>
</tr>
</tbody>
</table>
11.19 Inputs - Equipment

**ANP: Inputs - Equipment Investigation**

If you are investigating an industry area that uses equipment as a key input in its production or service-provision process, then you should complete this **ANP: Inputs - Equipment Investigation** pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for an **equipment inputs focus** for your ANP are as follows.

- Primary industries such as agriculture, forestry or fishing, e.g. a farm; or mining.
- Secondary industries that are capital-intensive such as manufacturing, milling, smelting or refining.
- Construction industry firms such as carpentry, plumbing, plastering, bricklaying, concreting, cabinet-making, electrical, engineering and so on.
- Retail and wholesale trade, transport, and accommodation and food services.
- Information and professional services, such as media, communications, ICT firms accounting, finance, legal, marketing, engineering, and many others.
- Human services such as education, nursing, sporting, emergency services.
- Personal services e.g. hair and beauty, and other services e.g. automotive.

<table>
<thead>
<tr>
<th>Numerical Processes to Collect Data (and Information)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classifying different types of equipment.</td>
</tr>
<tr>
<td>Measuring different types of equipment.</td>
</tr>
<tr>
<td>Working out costs of different equipment.</td>
</tr>
<tr>
<td>Counting amounts of different types of tools.</td>
</tr>
<tr>
<td>Counting amounts of different types of equipment.</td>
</tr>
<tr>
<td>Counting amounts of different types of machinery.</td>
</tr>
<tr>
<td>Working out costs of specific tools.</td>
</tr>
<tr>
<td>Working out costs of specific machinery.</td>
</tr>
<tr>
<td>Working out costs of specific vehicles.</td>
</tr>
<tr>
<td>Working out total costs of tools.</td>
</tr>
<tr>
<td>Working out total costs of machinery.</td>
</tr>
<tr>
<td>Working out total costs of vehicles.</td>
</tr>
<tr>
<td>Working out cost of equipment in total.</td>
</tr>
<tr>
<td>Calculating the cost of replacing equipment.</td>
</tr>
<tr>
<td>Comparing labour and equipment costs.</td>
</tr>
<tr>
<td>Comparing equipment costs from different suppliers.</td>
</tr>
<tr>
<td>Comparing the costs of second-hand with new equipment.</td>
</tr>
<tr>
<td>Comparing equipment costs over time.</td>
</tr>
</tbody>
</table>
### ANP: Inputs - Equipment Investigation

<table>
<thead>
<tr>
<th>Inputs: EBT Focus area: ANP 1</th>
<th>Inputs: EBT Focus area: ANP 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerical processes</strong> I will use to collect data and information.</td>
<td><strong>Numerical processes</strong> I will use to collect data and information.</td>
</tr>
<tr>
<td><strong>Numerical techniques and technologies</strong> I will use to organise and use the data.</td>
<td><strong>Numerical techniques and technologies</strong> I will use to organise and use the data.</td>
</tr>
<tr>
<td><strong>Estimates related to data and information.</strong></td>
<td><strong>Estimates related to data and information.</strong></td>
</tr>
<tr>
<td><strong>Calculations using the data and information.</strong></td>
<td><strong>Calculations using the data and information.</strong></td>
</tr>
<tr>
<td><strong>Summary information about the data and information.</strong></td>
<td><strong>Summary information about the data and information.</strong></td>
</tr>
</tbody>
</table>
### ANP Inputs (Overall) Investigation

Use the *Inputs (Overall) Investigation* to guide your Applied Numeracy Project investigation into work settings or workplaces within your industry.

- Identify the key types of inputs in this *industry context*, and how these are used.
- Identify the numerical processes to collect relevant data and information.
- Identify the numerical techniques to use the collected data and information.
- Use the collected data and information to make estimates.
- Use the collected data and information to make calculations.
- Develop summary statements to describe the key data and information.
- Analyse the key data and information - make inferences and conclusions.
- Other: i.e. the most suitable way to communicate the data and information.

<table>
<thead>
<tr>
<th>ANP Inputs</th>
<th>ANP: Inputs (Overall) - Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name(s):</td>
<td>Date:</td>
</tr>
<tr>
<td>Industry:</td>
<td>Volume:</td>
</tr>
</tbody>
</table>

Inputs: (Consider materials, labour, equipment and/or other inputs)

- Key examples and types involved and how these are used.

Inputs: (Materials, labour, equipment, other)

- Numerical processes I can/will use to collect estimates of data & information.

Inputs: (Materials, labour, equipment, other)

- Numerical techniques I can/will use to make estimates using data & information.

Inputs: (Materials, labour, equipment, other)

- Applied examples of estimates using these numerical processes and techniques.
### ANP: Inputs (Overall) Investigation (cont.)

<table>
<thead>
<tr>
<th>Inputs: (Materials, labour, equipment, other)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical processes I can/will use to do calculations using the data &amp; information.</td>
<td>Numerical techniques I can/will use to do calculations using the data &amp; information.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inputs: (Materials, labour, equipment, other)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied examples of calculations using these numerical processes and techniques.</td>
<td></td>
</tr>
</tbody>
</table>

### Preview Draft Sample:

Do Not Copy

Use the estimates and/or calculations to develop descriptive summary statements.

Analysis based on the estimates and/or calculations:
What are some key conclusions/inferences I can make from the data?

Other:
How the data and information might best be communicated. (e.g. Numbers, words, visual, etc..)
### 11.23 Assessment Task

**AT2  Applied Numeracy Project - EBT: Inputs**

**Overview**

For your whole-of-unit *Numeracy-based Project* you have to select 6 *Enquiry-based Tasks* (EBTs) to investigate across the three industry stages of:

- **inputs**,  
- **processing**, and  
- **outputs**.

You must select at least 1 EBT for each of these stages.

Your EBTs must also cover all four focus areas:

- **Number**  
- **Measurement**  
- **Financial Numeracy**, and  
- **Probability and Statistics**.

**Consider**

- It is best to select **2 EBTs related to inputs** for your *Numeracy-based Project*; (or perhaps 3 if you are investigating an industry that uses lots of inputs).
- It is best to select no more than **2 EBTs for inputs** to match any single focus area of **Number, Measurement, Financial Numeracy** or **Probability and Statistics**.
- Some EBT focus areas for inputs will naturally complement one another, e.g. **Number and Measurement** or **Number and Financial Numeracy**.

Complete the summary table below to indicate the EBTs you will be investigating for your *Numeracy-based Project*.

We will use the term *Applied Numeracy Project (ANP)* to refer to you undertaking and completing each of your 6 EBTs. So 6 ANPs = 1 whole-of-unit *Numeracy-based Project*.

<table>
<thead>
<tr>
<th>Numeracy-based Project</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Industry:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Workplace(s):</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Inputs</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Processing</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Outputs</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Focus area:</strong></td>
<td><strong>Number (N)</strong></td>
</tr>
<tr>
<td><strong>Industry Stages:</strong></td>
<td></td>
</tr>
</tbody>
</table>
PODR: Applied Numeracy Project - Inputs

In order to successfully complete this Applied Numeracy Project (ANP) for the inputs industry stage you should make use of the PODR: Process to successfully manage these tasks.

- **Planning** and **organising** yourself, timelines, industry contacts, devices and software, and any other resources you need to undertake your investigation.

- **Doing** the investigation including making estimates, performing calculations, using technology and software to access, record, collate and organise data and information; and dealing with problems that may arise in collecting or analysing the data and information.

- **Reviewing** your progress in each EBT as part of your ANP on an ongoing basis, making adjustments (problem-solving); and then reviewing your overall performance across the entire whole-of-unit Numeracy-based Project.

**ANP Inputs: Step 1**
- Choose your focus area(s).
- Negotiate the suitability of these with your teacher.

**ANP Inputs: Step 2**
- Use PODR to plan and organise your investigation.
- Anticipate the type of estimates and calculations you would need to use.
- Select the most suitable numerical processes and techniques to use to gather and collect your data and numerical information.

**ANP Inputs: Step 3**
- Apply numerical processes and problem-solving techniques to gather your data and numerical information.
- Evaluate and use suitable devices and software to gather your data and numerical information.

**ANP Inputs: Step 4**
- Choose and apply appropriate estimates, calculations and numerical techniques to interpret, analyse and communicate your data and numerical information.
- Organise and collate your data and numerical information.
- Produce descriptive statements about your data and numerical information.
- Analyse your data and information.
- Draw conclusions (inferences) from your data and numerical information.

**ANP Inputs: Step 5**
- Undertake a review of your performance on the ANP(s).
- Self-assess and review how well you did at collecting, organising, analysing and communicating the data and numerical information.
- Suggest and make improvements for your next ANP(s).
### 11.25 Assessment Task

<table>
<thead>
<tr>
<th>Name:</th>
<th>Dates:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry:</td>
<td>Focus areas:</td>
</tr>
<tr>
<td>Workplace(s):</td>
<td></td>
</tr>
</tbody>
</table>

#### Tasks - AT2: Applied Numeracy Project - Enquiry-based Task

<table>
<thead>
<tr>
<th>Required</th>
<th>Due by</th>
<th>Done</th>
<th>Teacher initials</th>
</tr>
</thead>
</table>

#### Stage 1: Design your Numeracy-based Project

1. Negotiate appropriate industry and workplace(s) with teacher. ✔
2. Select EBTs from each industry stage, and each focus area. ✔
3. Develop draft of Numeracy-based Project Plan. ✔

#### Stage 2: Undertake research for your ANP by applying numeracy skills

1. Undertake your research for this EBT into inputs. ✔
2. Outline the processes you will use to collect data and information. ✔
3. Estimate, calculate and use technology to collect data and inputs. ✔
4. Apply numerical problem-solving tools and techniques as needed. ✔
5. Use data and information to make inferences and conclusions. ✔
6. Use data and information to perform estimations and calculations. ✔
7. Analyse the data and information. ✔

#### Stage 3: Use appropriate software tools and devices

1. Describe software tools and devices that might be appropriate to represent the data and information. ✔
2. Describe advantages & disadvantages of using these software tools and devices. ✔
3. Explain why you have chosen to use these software tools and devices; and use evidence to justify your choices. ✔
4. Use appropriate software tools and devices to show the data and information you have collected. ✔
5. Evaluate the software tools and devices you used; and their effectiveness for collecting, collating and communicating. ✔

#### Stage 4: Reporting

- Prepare a draft for your final report (Refer pp.298-299) ✔

**Additional information:**

Signed: _____________________________ Date: _____________

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**Preview Draft Sample:**

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*NUMERACY INTERMEDIATE 2ed. - FOR VCAL AND APPLIED LEARNING*

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## Industry Stages - Processing 12

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### Activities 12: Industry Stages - Processing

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<th>Page(s)</th>
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</thead>
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<tr>
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<td>12.12A</td>
<td>Processing - Services</td>
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<tr>
<td>12.14A</td>
<td>Processing - Practical services in action</td>
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<tr>
<td>12.15</td>
<td>ANP: Processing - Practical Services Investigation</td>
<td>256-257</td>
</tr>
<tr>
<td>12.18A</td>
<td>Processing - Other services in action</td>
<td>259</td>
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<tr>
<td>12.19</td>
<td>ANP: Processing - Other Services Investigation</td>
<td>260-261</td>
</tr>
<tr>
<td>12.21</td>
<td>ANP: Processing - Overall Investigation</td>
<td>262-263</td>
</tr>
<tr>
<td>AT3</td>
<td>Applied Numeracy Projects - EBT: Processing</td>
<td>264-266</td>
</tr>
</tbody>
</table>

### Comments:

**Preview Draft Sample:**

*Do Not Copy*
12.01 Processing

Processing

Processing refers to all of the actions and activities that are used by enterprises to produce goods and services as part of their production processes or service-provision processes. Processing involves combining productive resources to produce an output, i.e. a good or service. All production processes combine materials, labour and capital inputs that are managed and coordinated through enterprise to create outputs.

Some transformation processes are inherently labour-intensive and rely on significant human effort and expertise to produce a product, e.g. teaching and education.

Other production processes are very capital-intensive and make use of significant investment in technological processes in order to produce products, e.g. mining.

One of the key issues related to processing is the achievement of efficiency in the use of resources. This means that enterprises use various numerical techniques to estimate and measure efficiency and productivity. So when you are investigating work settings within your chosen industry, you should aim to collect numerical data and information that will enable you to measure processing efficiency.

Applied Numeracy Project

In relation to processing you might investigate one or more of the following.

- **Amounts** and **ratios** of varied resources used in goods production or service provision processes. (N)
- **Measurement** devices, techniques and units used in goods production or service provision processes. (M)
- **Cost** of wages and salaries as part of goods production or service provision processes. (FN)
- **Comparison of trends** related to goods production or service provision. (P&S)
- **Costs** of different processing types, methods and systems.
- **Changing ratios** of labour vs capital investment used in processing.
- **Measurements** of processing time, productivity, efficiency and waste.

You might also investigate industry-specific, processing-related issues in negotiation with your teacher.
Let’s revisit the hamburger, one of Australia’s biggest selling fast foods (estimates average consumption at about 1 per day for all Australians; 750+ million p.a!). Work in pairs to identify the main processing activities (for these 4 categories) that go into producing and selling a hamburger in a fast food outlet.

<table>
<thead>
<tr>
<th>Labour processes (including the processing of materials inputs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment and machinery processes (including the processing of materials inputs)</th>
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<table>
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<tr>
<th>ICT and data processes (including the processing of materials inputs)</th>
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<table>
<thead>
<tr>
<th>Safety processes (including the processing of materials inputs)</th>
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</tbody>
</table>
12.03 Processing - Goods

Processing - Primary and secondary industries
Goods production industries involve primary production, goods manufacturing, industrial manufacturing (such as steel), and construction (which is also a service industry).

As you investigate your industry, you need to apply the numeracy skills and techniques you learned in Unit 1 by identifying and describing industry examples of applied numeracy in action that relate to the processing stage.

**Primary production**

Primary processes are normally capital-intensive using a lot of equipment and technology, supported by labour expertise.

Some farming processes can need a lot of labour at certain times of the year, e.g. harvesting and picking; whereas others require day-to-day farm labourers, e.g. dairy.

Primary producers and miners make use of many diverse practical, manual and technical processes needed for their day-to-day, and longer-term operations.

Manufacturing processes are normally capital-intensive supported by labour expertise.

Manufacturers might make commercial products (e.g. bread, shoes or furniture) or industrial products (flour, leather or steel).

Manufacturing combines many diverse practical, manual and technical processes, along with information processes and safety processes.

Productivity targets are a key consideration in manufacturing, including keeping unit costs as low as possible.

**Goods manufacturing involves varied processes such as:**

- making
- manufacturing
- milling
- refining
- tanning
- smelting
- moulding
- slaughtering
- butchering
- crafting
- building
- assembling
- brewing
- printing
- cooking (industrial)
- weaving
- knitting
- sewing
The construction industry makes goods and also provides services. Technically many large structures that are made are goods; such as houses, buildings and civil projects (e.g. bridges, roads, etc.). However, many of the workers involved in construction provide services to build a smaller component, or section, of a larger structure.

E.g. A house frame might be built offsite, and technically this is manufacturing; but it is fine to include this as an example of a construction good if this is your industry area.

Construction combines diverse practical, manual and technical processes, along with information processes and safety process. Some key construction ‘goods’ processes are:

- making
- assembling
- building.

Construction combines diverse practical, manual and technical processes, along with information processes and safety process. Some key construction ‘goods’ processes are:

- making
- assembling
- building.

Consider the industry area for your Numeracy-based Project Plan. Outline how goods are processed by enterprises in that industry.

<table>
<thead>
<tr>
<th>Industry:</th>
<th></th>
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<tbody>
<tr>
<td>Use of materials in goods processing.</td>
<td></td>
</tr>
<tr>
<td>Use of labour in goods processing.</td>
<td></td>
</tr>
<tr>
<td>Use of equipment and machinery in goods processing.</td>
<td></td>
</tr>
<tr>
<td>Use of other goods processing methods.</td>
<td></td>
</tr>
</tbody>
</table>
12.05 Processing - Goods

**Numeracy in action**

For your Applied Numeracy Projects it is likely that you will investigate more than one enquiry-based task for the **processing stage**.

All enterprises combine a range of process to produce their products. **Goods processing** focus on the measurement, development, use and application of processes involving materials (raw or processed), ingredients, stock and other consumables. Enterprises set and monitor targets related to **cost ratios**, **materials** and **labour productivity**, **waste reduction**, **safety** and other measures.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your ANPs.

<table>
<thead>
<tr>
<th>Number</th>
<th>Processing - Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Amounts and totals of materials involved in processing overall.</td>
<td></td>
</tr>
<tr>
<td>□ Amounts and totals of materials involved in processing for different items or processes.</td>
<td></td>
</tr>
<tr>
<td>□ Amounts and totals of different resources needed for overall processing; and for varied processes.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Processing - Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Description of the different measuring units, tools and devices required.</td>
<td></td>
</tr>
<tr>
<td>□ Explanation of measurement techniques for common work tasks.</td>
<td></td>
</tr>
<tr>
<td>□ Calculations that are required for different processes.</td>
<td></td>
</tr>
<tr>
<td>□ Time-based measures and requirements in the production process.</td>
<td></td>
</tr>
<tr>
<td>□ Measurements of productivity and efficiency rates.</td>
<td></td>
</tr>
<tr>
<td>□ Amount of waste generated by amount, weight or time.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial Numeracy</th>
<th>Processing - Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Calculation of total processing $ costs.</td>
<td></td>
</tr>
<tr>
<td>□ Calculation of processing $ costs per item for different products.</td>
<td></td>
</tr>
<tr>
<td>□ Calculations of productivity and efficiency rates in dollars.</td>
<td></td>
</tr>
<tr>
<td>□ Estimates and calculations of cost of waste generated.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Probability &amp; Statistics</th>
<th>Processing - Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Comparison with past amounts, percentages and statistics.</td>
<td></td>
</tr>
<tr>
<td>□ Comparison with industry benchmarks and guidelines.</td>
<td></td>
</tr>
<tr>
<td>□ Estimation/projection of future amounts, percentages and statistics.</td>
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</tbody>
</table>
Applied Numeracy Project: Egg-Zactly

Zak is studying VET agriculture and is interested in sustainable small-scale farming. Zak is going to investigate some of the processes involved in operating a small-scale, free range, egg farming enterprise.

Zak is going to research and investigate appropriate measurements required for the structures to house the hens, and also the area that each hen needs to have in order to achieve classification as ‘free range’.

Zak is going to create a diagram to show how a farm might be set-up based on the minimum number of hens needed to make a small-scale farm viable.

Zak is then going to investigate the time it would take to do the different farm tasks each day based on this number of hens.

Again using research, and advice from other farmers, Zak will list the different daily job tasks, and estimate the times associated with the processes required for daily farm work. Zak will then calculate relevant time proportions and develop a pie chart, in the shape of an egg, to communicate this information.

Zak has decided to choose 2 EBTs for processing.

- **Processing - Goods: Measurement**
  Explanation of measurement techniques for common work tasks (and description of the different measuring tools and devices required.)

- **Processing - Goods: Measurement**
  Time-based measures and requirements in the production process.

Consider the example of Zak and Egg-Zactly. What types of numerical techniques, information and skills do you think Zak is going to use for the ANP?

<table>
<thead>
<tr>
<th>Explanation of measurement techniques for common work tasks (and description).</th>
<th>Time-based measures and requirements in the production process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical techniques:</td>
<td>Numerical techniques:</td>
</tr>
<tr>
<td>Numerical information:</td>
<td>Numerical information:</td>
</tr>
<tr>
<td>Numerical skills:</td>
<td>Numerical skills:</td>
</tr>
</tbody>
</table>
If you are investigating an industry area that mainly makes physical products or goods as part of its production processes, such as manufacturing and goods construction; or one that deals with raw materials and natural resources, such as agriculture, forestry, fishing, or mining; then you should complete this ANP: Goods Investigation pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for a goods processing focus for your ANP are as follows.

- Manufacturing firms of all types that turn raw materials, production stock and other physical inputs into other products, including factories, mills, refineries, smelters and commercial food and beverage production.
- Construction industry firms that build and construct dwellings, commercial buildings, industrial buildings or civil construction.
- Firms involved in growing, harvesting, collecting or extracting natural resources and commodities using agriculture, forestry, fishing, and mining processes.

### Processing - Goods Investigation

<table>
<thead>
<tr>
<th>ANP</th>
<th>Processing - Goods Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Identify numerical processes to collect data (and information).</td>
</tr>
<tr>
<td></td>
<td>Use numerical techniques and technologies to organise and use the data.</td>
</tr>
<tr>
<td></td>
<td>Estimate, calculate, analyse, interpret and communicate the data.</td>
</tr>
</tbody>
</table>

- Classifying different types of materials used for processing.
- Measuring different types of consumables used for processing.
- Describing techniques for measurement as part of processing.
- Estimating processing costs of equipment and machinery.
- Working out total cost of materials used in processing.
- Describing ingredient processing ratios, proportions or costs.
- Comparing processing material costs from different suppliers.
- Measuring different types of consumables used for processing.
- Measuring, describing and calculating processing times.
- Working out cost of different stock used for processing.
- Counting different types of consumables used in processing.
- Working out total cost of ingredients used in processing.
- Describing different materials ratios, proportions or costs.
- Predicting changes in processing costs for varied materials.
- Counting different types of stock used in processing.
- Working out total costs of stock used in processing.
- Examining processing waste amounts, ratios and costs.
- Comparing different types of potential material costs.
### ANP: Processing - Goods Investigation

<table>
<thead>
<tr>
<th>Processing: EBT Focus area: ANP 1</th>
<th>Processing: EBT Focus area: ANP 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numerical processes I will use to collect data and information.</strong></td>
<td><strong>Numerical techniques and technologies I will use to organise and use the data.</strong></td>
</tr>
<tr>
<td><strong>Estimates related to the data and information.</strong></td>
<td><strong>Calculations using the data and information.</strong></td>
</tr>
<tr>
<td><strong>Summary information about the data and information.</strong></td>
<td><strong>Summary information about the data and information.</strong></td>
</tr>
</tbody>
</table>
12.09 Processing - Services

Processing - Services

The majority of economic activity and employment in Australia is within service industries. Service processes can vary widely depending on the nature of the service that occurs. For example, consider the difference between aged-care services, education and training services, and computer network development services. And what about the different service processes offered by a chef, a hairdresser, a police officer and a media producer?

We can classify services according to these 5 categories. However, some services may cross over into more than one category, especially with people and community services.

- Practical services
- Goods-trading services
- Information services
- People services
- Community services

So what type of service does your industry provide?

As you investigate your industry, you need to apply the numeracy skills and techniques you learned in Unit 1 by identifying and describing industry examples of applied numeracy in action that relate to the processing stage.

Practical services involve processes such as:
- making
- serving
- cooking
- repairing
- building
- supplying
- delivering
- transporting
- installing
- crafting.

Practical services provide a tertiary service such as food and hospitality, public and private transport, couriers and construction.

Many service providers tend to use capital-intensive processes combined with varying amounts of labour inputs.

Many practical service-providers step in and take over the tasks that people can’t, don’t or won’t do themselves; such as car repairs, household maintenance and even home-delivery of meals!

Many of these services involve the use of materials inputs, combined with technical labour expertise, such as in food services and construction.

More than 40% of all young employees aged 15-24 work in accommodation and food services enterprises that undertake food and/or hospitality processes.

Some key examples of product-based services include:
- food services
- arts and crafts
- water, gas and electricity supply
- hotels and accommodation
- home maintenance
- transport
- couriers
- construction
- automotive repairs.
Information services are a growing area of service provision due to economic growth and continued digital innovation.

Information services can involve capital-intensive technological systems. High level ICT design and development expertise can be used to create and deliver information and data services. (e.g. Media streaming and communications products).

Professional information services provide high quality expert knowledge and data. (e.g. ICT, business, finance, marketing and legal advice).

Consumers are switching to digital services to access media products as data, rather than buying physical products. (e.g. streaming music and films rather than buying CDs and DVDs.)

Enterprises often buy-in information services and data that are developed and delivered by outsourced specialists or contractors. (e.g. ICT, finance, business advice and analytics.)

Some key examples of information services include:
- media
- digital entertainment
- ICT services
- internet and online services
- multimedia and app-based services
- data analytics
- professional and business advice
- banking and finance
- legal advice
- marketing advice
- engineering advice
- scientific advice
- health and medical advice
- research and development
- design services
- education and training services.
People services

People services are usually labour-intensive and focus on the provision of a service directly to a person, e.g. hair and beauty, fitness training and even life coaching; or to a group of people e.g. education and training.

Many community services are also people-focused, including education, care providers, medical and many government services.

People services will usually make use of equipment and technologies to assist and support workers to provide their services to other people.

For example:
- a hairdresser or barber will regularly use specialised tools and equipment
- teaching will use ICT devices and classroom equipment
- practical education and TAFE training might take place in workshops, studios or kitchens

- health and medical facilities will use diagnostic, and treatment equipment
- childcare, aged-care and disability services will all make use of extensive facilities equipment.

Community services

Community services are often (but not exclusively) supplied by not-for-profit enterprises in areas such as:
- health and medical services
- aged-care
- child-care
- disability services
- emergency services
- government services
- charities and welfare groups
- religious organisations
- arts and recreation services.

Many community services are provided to people on an individual basis.

However, some broaden to whole-of-society services, such as police, firefighting, defence and government services.

Some community services are environmentally-focused, or involve outdoor participation and recreation.

As always, tools, equipment and other work-related technologies are used training degrees by workers who perform community services.

Consider the reliance on equipment by emergency paramedics, by doctors and nurses in a hospital, by search and rescue workers, and by the Airforce.

This varies in comparison with the equipment used by charities, religious bodies and a local arts program.

But of course, it’s the quality of the people that deliver these services that is most important.
### Processing - Services 12.12

Investigate the **service processing activities** for your chosen industry. Complete this table. You could investigate a range of enterprises or work settings.

<table>
<thead>
<tr>
<th>Industry:</th>
<th>Enterprises/work settings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do they do: i.e. sell, produce or provide?</td>
<td></td>
</tr>
<tr>
<td>How materials are used in service processes.</td>
<td></td>
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<tr>
<td>Use of labour in service processes.</td>
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<tr>
<td>Use of equipment and machinery in service processes.</td>
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<tr>
<td>Use of information in service processes.</td>
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<tr>
<td>Other information</td>
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</tbody>
</table>
12.13 Processing - Practical Services

Numeracy in action

For your Applied Numeracy Projects it is likely that you will investigate at least two enquiry-based tasks for the processing stage.

All enterprises combine a range of processes to produce their products. Enterprises in industries that provide practical services focus on the measurement, development and application of processes involving materials (raw or processed), ingredients, stock and other consumables. Enterprises set and monitor targets related to cost ratios, materials and labour productivity, waste reduction, safety targets and other measures.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your ANPs.

Number

- Amounts and totals of materials/ingredients involved in processing overall.
- Amounts and totals of materials/ingredients involved in processing for different items or processes.
- Amounts and totals of different resources needed for overall processing; and for varied processes.

Financial Numeracy

- Calculation of total processing $ costs.
- Calculation of processing $ costs per item for different products.
- Calculations of productivity and efficiency rates in dollars.
- Estimates and calculations of cost of waste generated.

Measurement

- Description of the different measuring units, tools and devices required.
- Explanation of measurement techniques for common work tasks.
- Calculations that are required for different processes.
- Time-based measures and requirements for the production process.
- Measurements of productivity and efficiency rates.
- Amounts of waste generated by amount, weight or time.

Probability & Statistics

- Comparison with past amounts, percentages and statistics.
- Comparison with industry benchmarks and guidelines.
- Estimation/projection of future amounts, percentages and statistics.
Applied Numeracy Project: Example - Chicken checken’

Pol, working at Chico’s Chicken Barn in the Accommodation and Food Services industry, wants to analyse the processing stage in more detail. This will help him develop higher level industry-specific skills for later in his career.

Pol is going to measure and record the time taken to produce different menu items. So he will estimate and then measure prep times.

He will then investigate and record the correct cooking temperatures and times, as well as the safety guidelines related to cooking chicken.

He will also investigate regulations about how long cooked foods can sit before being discarded. He thinks he might show this information in an infographic.

Pol is then going to investigate the costs involved in preparing and making foods. First he will estimate ingredient costs per menu item (e.g. for a chicken burger). Then he will try to find out more exact information to do accurate calculations.

To work out labour costs involved in processing the food, he will calculate food prep costs, and cooking labour costs, paid for the total day. He will then allocate these as a proportion over the number of items sold. e.g. If they sell 50 chickens per day and total ‘kitchen’ labour cost is $100, then that’s a labour cost of $2 per chicken. He can add this to the material costs.

But Pol knows that he is going to have to split the labour costs over many different items, because as a cook he might have chickens in the oven, patties on the grill, and chips and nuggets in the fryer, all at the same time.

Pol has decided to choose 2 EBTs for processing.

✓ Processing - Practical Services: Measurement
  Time-based measures and requirements in the production process.

✓ Processing - Practical Services: Financial Numeracy
  Processing costs (materials and labour $) per item for different products.

Consider the example of Pol at Chico’s Chicken Barn. What types of numerical techniques, information and skills do you think he is going to use for his ANP?

<table>
<thead>
<tr>
<th>Time-based measures and requirements in the production process.</th>
<th>Processing costs (materials and labour $) per item for different products.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical techniques:</td>
<td>Numerical techniques:</td>
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<tr>
<td>Numerical information:</td>
<td>Numerical information:</td>
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<tr>
<td>Numerical skills:</td>
<td>Numerical skills:</td>
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</tbody>
</table>
If you are investigating an industry area that uses or makes physical products extensively as part of its service process then you should complete this ANP: Practical Services Investigation pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for a practical service processing focus for your ANP are as follows.

- Construction industry firms such as carpentry, plumbing, plastering, bricklaying, concreting, cabinet-making, electrical, engineering, etc.
- (Accommodation and) food services and hospitality.
- Personal services firms, e.g. hairdressing & beauty therapy.

### Processing - Practical Services

- Identify numerical processes to collect data (and information).
- Use numerical techniques and technologies to organise and use the data.
- Estimate, calculate, summarise, analyse and communicate using the data.

#### Measuring different types of materials used in processing.
- Working out costs of different materials used in processing.
- Measuring different types of consumables used in processing.

#### Describing techniques for measurement as part of processing.
- Calculating service processing productivity rates.
- Measuring, describing and calculating service processing times.

#### Working out total cost of materials used in processing.
- Working out total cost of ingredients used in processing.
- Examining processing waste amounts, ratios and costs.

#### Describing ingredient processing ratios, proportions or costs.
- Comparing different materials ratios, proportions or costs.
- Comparing processing material costs from different suppliers.

#### Measuring and calculating labour time for different tasks.
- Measuring and calculating labour cost for different tasks.
- Comparing processing labour costs with different firms.

#### Estimating and calculating machinery processing task times.
- Estimating and calculating costs of operating machinery.
- Comparing overall processing times/costs with different firms.

#### Comparing processing machinery costs from different suppliers.
- Comparing processing labour costs with different firms.
- Estimating and calculating time and costs of travel.

#### Measuring and calculating total labour costs and time.
- Estimating and calculating total labour costs and time.
<table>
<thead>
<tr>
<th>ANP: Processing - Practical Services Investigation</th>
<th>ANP Processing Practical Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing: EBT Focus area: ANP 1</td>
<td>Processing: EBT Focus area: ANP 2</td>
</tr>
</tbody>
</table>

Numerical processes I will use to collect data and information.

Numerical techniques and technologies I will use to organise and use the data.

Estimates related to the data and information.

Calculations using the data and information.

Summary information about the data and information.
12.17 Processing - Other Services

Numeracy in action

For your Applied Numeracy Projects it is likely that you will investigate at least two enquiry-based tasks for the processing stage. Enterprises that provide people services, community services, information services and goods-trading services often use labour-intensive processes supported by equipment, machinery and technology. People services, community services and person-to-person services (such as professional advice and support) are naturally very labour-intensive; whereas wholesale trade and information services often make use of sophisticated technological processes. These types of service enterprises set and monitor targets related to labour cost, labour productivity, efficiency in the use of time, service quality, safety targets, stock levels and other measures. Work through these checklists and see which might apply to your industry.

Number

Processing - Other Services
- Types and counts of services provided.
- Types, levels and totals of workers involved for different types of services; and overall.
- Counts and amounts of trading stock for retail and wholesale services.
- Amounts and totals of support resources, such as consumables and equipment needed to provide the services.

Measurement

Processing - Other Services
- Explanation of measurement techniques for common work tasks.
- Calculations that need to be done to provide service processes.
- Time-based measures and requirements for service delivery.
- Measurements of labour hours, consultation times and travel times.
- Measurements of productivity and efficiency rates of workers.
- Measurement of stock sizes and weights for retail and wholesale services.

Financial Numeracy

Processing - Other Services
- Estimates/calculations of total service provision $ costs.
- Estimates/calculations of labour/processing $ costs for different services.
- Calculations of productivity and efficiency rates in dollars.
- Estimates/calculations of $ costs of stock for retail and wholesale services.
- Estimates and calculations of cost of waste generated.

Probability & Statistics

Processing - Other Services
- Comparison with past amounts, percentages and statistics.
- Comparison with industry benchmarks and guidelines.
- Estimation/projection of future amounts, percentages and statistics.
- Comparison of use of labour versus use of technology.
La, working at Nugget’s News and Lotto as part of the Retail Trade industry, wants to look at retail labour processes in more detail. She is wondering just how much of her work time is actually spent serving customers in ‘retailing’ and how much is spent on other tasks.

La is going to record all the tasks she does for a normal day’s work and the time she spends on each task. This will include cleaning, vacuuming, processing stock, arranging stock, removing old stock and other shop tasks. She will also record the time she spends helping customers, answering the phone and other tasks that she can’t quite remember, but that seem to always crop up during the day.

La will then focus on her actual ‘retail’ tasks such as serving customers, working on the lotto station and getting customer orders ready.

She is then going to compare her time use to the time use of the full-time staff member. Then she is going to do the same for the boss. She will interview them to get their estimates and use this information to make comparisons which she will show in pie charts.

La is then going to calculate the cost of different tasks using time taken and her base wage to calculate rates e.g. Vacuuming $5 per day or $25 per week. She will also do this for some of the job tasks for the full-time staff member, and for her boss.

So after talking with her teacher La has decided to choose 2 EBTs for processing.

- **Processing - Other Services: Measurement**
  - Measurements of labour hours (for different job tasks).

- **Processing - Other Services: Financial Numeracy**
  - Estimates/calculations of labour $ costs (for different job tasks).

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### Consider the example of La at Nugget’s News and Lotto. What types of numerical techniques, information and skills do you think she is going to use for her ANP?

<table>
<thead>
<tr>
<th>Measurements of labour hours (for different job tasks)</th>
<th>Estimates/calculations of labour $ costs (for different job tasks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical techniques:</td>
<td>Numerical techniques:</td>
</tr>
<tr>
<td>Numerical information:</td>
<td>Numerical information:</td>
</tr>
<tr>
<td>Numerical skills:</td>
<td>Numerical skills:</td>
</tr>
</tbody>
</table>
12.19 Processing - Other Services

If you are investigating an industry area that uses processes to buy and sell goods, or that provides services for people and/or the community, or that deals mainly with information processes, then you should complete this ANP: Other Services Investigation pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for a service processing focus for your ANP are as follows.

- Retail and wholesale trade (i.e. goods trading services).
- Business and professional services (i.e. finance, legal, marketing, admin., etc.).
- People and community services (i.e. health, medical, caring, community, etc.).
- Public services (i.e. education, emergency, government, defence, welfare, etc.).
- Personal services (i.e. hairdressing, beauty therapy, health and fitness, etc.).
- Information and ICT services (i.e. computing, communications, design, media, etc.).
- Arts and recreation services (i.e. sport, arts, dance, recreation, etc.).
- Accommodation and food services (i.e. hospitality, bars, clubs, hotels, etc.).

- Calculating amounts of consumables used in service provision.
- Calculating equipment time and $ needed for different services.
- Measuring and calculating labour time for different job tasks.
- Describing different labour skills needed for varied tasks.
- Estimating and calculating equipment processing task times.
- Comparing service costs from different providers.
- Calculating equipment time and $ needed for varied services.
- Estimating and calculating costs of operating equipment.
- Measuring servicing client needs through quality KPIs.
- Comparing cost of outsourced labour from different firms.
- Calculating overall service provision productivity rates.
- Estimating and calculating travel time/costs for varied services.
- Comparing overall service times/costs with different firms.

Processing - Other Services

✓ Identify numerical processes to collect data (and information).
✓ Use numerical techniques and technologies to analyse and use the data.
✓ Estimate, calculate, summarise, analyse and communicate using the data.
### ANP: Processing - Other Services Investigation

<table>
<thead>
<tr>
<th>Processing: EBT Focus area: ANP 1</th>
<th>Processing: EBT Focus area: ANP 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical processes I will use to collect data and information.</td>
<td>Numerical techniques and technologies I will use to organise and use the data.</td>
</tr>
<tr>
<td>Estimates related to the data and information.</td>
<td></td>
</tr>
<tr>
<td>Calculations using the data and information.</td>
<td></td>
</tr>
<tr>
<td>Summary information about the data and information.</td>
<td></td>
</tr>
</tbody>
</table>
12.21 ANP: Processing Investigation

**ANP: Processing (Overall) Investigation**

Use the Processing (Overall) Investigation to guide your Applied Numeracy Project investigation into work settings or workplaces within your industry.

- Identify **key types of processes** in this **industry context**, and how these are used.
- Identify the **numerical processes** to **collect** relevant **data** and information.
- Identify the **numerical techniques** to **use** the collected **data** and information.
- Use the collected data and information to **make estimates**.
- Use the collected data and information to **make calculations**.
- Develop **summary** statements to **describe** the key **data** and information.
- Analyse the key **data** and information - make **inferences** and **conclusions**.
- Other: i.e. the most suitable way to **communicate** the **data** and information.

---

**ANP: Processing (Overall) - Investigation**

<table>
<thead>
<tr>
<th>Name(s):</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry:</td>
<td>Workplace:</td>
</tr>
</tbody>
</table>

**Processing: (Consider materials, labour, equipment and other processes)**

- Key examples and types involved and how these are used.

**Processing: (Materials, labour, equipment & other)**

- Numerical processes I can/will use to collect **estimates** of data & information.
- Numerical techniques I can/will use to make **estimates** using data & information.

**Processing: (Materials, labour, equipment and other processes)**

- Applied examples of **estimates** using these numerical processes and techniques.
<table>
<thead>
<tr>
<th>ANP: Processing (Overall) Investigation (cont.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing: (Materials, labour, equipment &amp; other)</td>
</tr>
<tr>
<td>Numerical processes I can/will use to do calculations using the data &amp; information.</td>
</tr>
</tbody>
</table>

| Processing: (Materials, labour, equipment & other) |
| Numerical techniques I can/will use to do calculations using the data & information: |

Processing: (Materials, labour, equipment and other processes)

Applied examples of calculations using these numerical processes and techniques.

---

**Preview Draft Sample:**

Do Not Copy

Use the estimates and/or calculations to develop descriptive summary statements.

Analysis based on the estimates and/or calculations:

What are some key conclusions/inferences you can make from the data?

Other:

How the data and information might best be communicated. (e.g. Numbers, words, visual, etc..)
12.23 Assessment Task

AT3 Applied Numeracy Projects - EBT: Processing

Overview

For your whole-of-unit Numeracy-based Project you have to select 6 Enquiry-based Tasks (EBTs) to investigate across the three industry stages of:

- inputs,
- processing, and
- outputs.

You must select at least 1 EBT for each of these stages.

Your EBTs must also cover all four focus areas:

- Number
- Measurement
- Financial Numeracy, and
- Probability and Statistics.

Consider

- It is best to select 2, or preferably, 3 EBTs related to processing for your Numeracy-based Project, because processing is an integral part of all operations of an enterprise.
- It is best to select no more than 2 EBTs for processing to match any single focus area of Number, Measurement, Financial Numeracy, or Probability and Statistics.
- Some EBT focus areas of processing will naturally complement one another. e.g. Number and Measurement, or Measurement and Financial Numeracy.

Complete the summary table below to indicate the EBTs you will be investigating for your Numeracy-based Project.

We use the term Applied Numeracy Project (ANP) to refer to you undertaking and completing each of your 6 EBTs. So 6 ANPs = 1 whole-of-unit Numeracy-based Project.

<table>
<thead>
<tr>
<th>Industry Stages</th>
<th>Focus area: Number (N)</th>
<th>Focus area: Measurement (M)</th>
<th>Focus area: Financial Numeracy (FN)</th>
<th>Focus area: Probability and Statistics (PS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In order to successfully complete this Applied Numeracy Project (ANP) for the processing industry stage you should make use of the PODR: Process to successfully manage these tasks.

- **Planning and organising** yourself, timelines, industry contacts, devices and software, and any other resources you need to undertake your investigation.

- **Doing** the investigation including making estimates, performing calculations, using technology and software to access, record, collate and organise data and information; and dealing with problems that may arise in collecting or analysing the data and information.

- **Reviewing** your progress in each EBT as part of your ANP on an ongoing basis, making adjustments (problem-solving); and then reviewing your overall performance across the entire whole-of-unit Numeracy-based Project.

### ANP Processing: Step 1
- Choose your focus area(s).
- Negotiate the suitability of these with your teacher.

### ANP Processing: Step 2
- Use PODR to plan and organise your investigation.
- Anticipate the type of estimates and calculations you would need to use.
- Select the most suitable numerical processes and techniques to use to gather and collect your data and numerical information.

### ANP Processing: Step 3
- Apply numerical processes and problem-solving techniques to gather your data and numerical information.
- Evaluate and use suitable devices and software to gather your data and numerical information.

### ANP Processing: Step 4
- Choose and apply appropriate estimates, calculations and numerical techniques to interpret, analyse and communicate your data and numerical information.
- Organise and collate your data and numerical information.
- Produce descriptive statements about your data and numerical information.
- Analyse your data and information.
- Draw conclusions (inferences) from your data and numerical information.

### ANP Processing: Step 5
- Undertake a review of your performance on the ANP(s).
- Self-assess and review how well you did at collecting, organising, analysing and communicating the data and numerical information.
- Suggest and make improvements for your next ANP(s).
**12.25 Assessment Task**

**Tasks - AT3: Applied Numeracy Projects - Enquiry-based Task**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Stage: Processing</th>
<th>EBT#</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Re-</th>
<th>Due by</th>
<th>Done</th>
<th>Teacher initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dates:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Stage 1: Design Numeracy-based Project**

- i. Negotiate appropriate industry and workplace(s) with teacher.  
- ii. Select EBTs from each industry stage, and each focus area.  
- iii. Develop draft of Numeracy-based Project Plan.  

**Stage 2: Undertake research into processing for your ANP by applying numeracy skills**

- i. Undertake your research for this EBT into processing.  
- ii. Outline the processes you will use to collect data and information.  
- iii. Estimate, calculate and use technology to collect data and information.  
- iv. Apply numerical problem-solving tools and techniques as needed.  
- v. Use data and information to perform estimations and calculations.  
- vi. Use data and information and make inferences and conclusions.  
- vii. Analyse the data and information.

**Stage 3: Use appropriate software tools and devices**

- i. Describe software tools and devices that might be appropriate for the data and information.  
- ii. Describe advantages & disadvantages of using these software tools and devices.  
- iii. Explain why you have chosen to use these software tools and devices; and use evidence to justify your choices.  
- v. Use appropriate software tools and devices to show the data and information you have collected.  
- vi. Evaluate the software tools and devices you used and their effectiveness for collecting, collating and communicating.

**Stage 4: Reporting**

- i. Prepare a draft for your final report (Refer p.???)

**Additional information:**

Signed:_________________________________________  Date:____________________

---

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## Industry Stages - Outputs

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<td>13.03</td>
<td>Outputs - Goods</td>
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<td>13.09</td>
<td>Outputs - Services</td>
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<td>Assessment Task 4</td>
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</table>

### Activities 13: Industry Stages - Outputs

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<td>284-285</td>
</tr>
<tr>
<td>AT4</td>
<td>Applied Numeracy Project - EBT: Outputs</td>
<td>286-288</td>
</tr>
</tbody>
</table>

### Comments:

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13.01 Outputs

Outputs

Outputs refer to products made, or the services provided, by enterprises as a result of their production processes or service-provision processes. Outputs may be sold as either producer goods and services, or consumer goods or services.

Producer goods and services are products that are made for, and sold to, other enterprises for use in their production processes. We sometimes call these intermediate products. These examples of producer goods and services all demonstrate how producer products are integral parts of the supply-chain.

⇒ A farmer grows wheat to sell to a mill to turn into flour.
⇒ A miner extracts coal to sell to a power generation plant to burn to make electricity.
⇒ A wholesaler sells goods to retailers that retailers then on-sell to the public.
⇒ A commercial kitchen makes meals for a home-delivered, cook-at-home service.
⇒ A plumber installs drainage on houses in a housing estate, and a property developer sells those homes to the public.
⇒ An accountant prepares the financial records for a small business.
⇒ A workplace trainer provides onsite training to Australian Apprentices.
⇒ A trucking company delivers products made by manufacturers to wholesalers.

Consumer goods and services are products that are made for, and sold to, the public (consumers and clients) for their own direct use. We sometimes call these final products. These examples of consumer goods and services all demonstrate how the product is sold or provided to the final user at the end of the supply chain.

⇒ A bakery uses flour to make bread products to sell to customers.
⇒ An electricity supplier provides energy supply to households.
⇒ A clothing retailer sells their clothes in a shop in a shopping centre.
⇒ A home-delivery meals service provides healthy meals to clients each week.
⇒ A real estate agent sells homes to the public.
⇒ An accountant does a personal income tax return for a client.
⇒ A young worker (such as an Australian Apprentice) gives a haircut to a client.
⇒ A supermarket sells canned food to shoppers.

Applied Numeracy Projects

In relation to outputs, you might investigate one or more of the following.

- Amounts of outputs sold to the public. (N)
- Sizes of different outputs sold to the public. (M)
- Price of outputs offered for sale or sold. (FN)
- Comparison of trends in outputs for goods production or service provision, such as different time of day, days of the week, or seasonal trends. (P&S)
- Ratios of outputs sold to different customers; or of different types of outputs.
- Comparison of different types of outputs bought by customers and clients.
- Ratios of waste in outputs generated in goods production or service provision.

You might also investigate other industry-specific issues through negotiation with your teacher.
Margins
The concept of margins is very important in the commercial world. A margin is simply a measure of the difference between a ‘cost price’ and a ‘sale price’. An understanding of margins helps to tie together the relationships between inputs, processing and outputs as part of the transformation process.

Gross margin
Gross margin represents the gross return based on the purchase price of an item (its cost) compared to the price at which it is sold. In accounting this might be represented by the calculation for cost of goods sold. Consider these examples.

A milk bar buys a Mars bar for $1.25 and then sells that for $2.50. The gross margin is $1.25 or 100% (a 100% mark-up).

A supermarket buys a Mars bar for $1 and sells it for $1.75. The gross margin is 75c and or 75%.

So this means that the gross margin is higher for the small retailer than for the large retailer. Do you think this would be the case in the real world? Think carefully.

A restaurant spends $12 on the ingredients for a steak meal and then sells that for $20. The gross margin is $8 or 40%. The cost of goods ratio to price is 60%.

The restaurant spends $8 on the ingredients for a vegetarian meal and then sells that for $20. The gross margin is $12 or 60%. The cost of goods ratio to price is 40%.

So should the restaurant go vego due to the higher gross margin? Explain carefully.

Net margin
Although gross margin is a useful indicator to manage variable costs related to stock and materials, net margin gives a fuller picture about the overall return or margin from trading or operating.

Net margin takes into account all of the other business expenses that an enterprise has to cover, and not just the cost of stock or materials. Many of these other expenses are fixed costs such as rent, wages, insurance, taxation, interest on loans and many more. Each item sold has to cover a little bit of those fixed costs. The more sold, then the easier it is to meet those fixed costs, and hopefully make a profit.

Although the milk bar might have a gross margin of 100% on its Mars Bars, it also experiences another $200,000 in expenses per year. After taking all these expenses into account, the net margin on all sales might drop to about 20%.

The supermarket might have a gross margin of 75% on its Mars Bars, but it might experience another $2,000,000 in expenses per year. After taking all these expenses into account, the net margin on all sales might drop to under 10%.

You should consider calculating gross and net margins as part of your ANPs. These are important measures related to Financial Numeracy and Probability and Statistics.

You can also calculate gross and net service margins by taking into account the direct labour costs associated with providing a service, e.g. labour costs for a medical consultation, for a haircut, to install a windscreen, to teach a class, to mow a lawn, and so on; and then estimate and/or find out all other expenses, to come up with a net margin.
13.03 Outputs - Goods

Goods

Different types of goods outputs could include raw materials, processed materials, manufactured goods, stock and food and hospitality items.

As you investigate your industry, you need to apply the numeracy skills and techniques you learned in Unit 1 by identifying and describing industry examples of applied numeracy in action that relate to the outputs stage.

Materials outputs are created by natural resource enterprises such as farmers, fishers, miners and so on. They mainly deal in bulk quantities of materials outputs that get on-sold to other enterprises further down the supply-chain. These materials are usually still in a 'raw' or unprocessed state. Output measures might be expressed as:

- tonnes of produce from crops
- head of livestock
- mega litres of milk
- kg weight of a daily catch
- kg, tonnes and kilotonnes of minerals
- barrels of oil

Key industries include agriculture, forestry, fishing and mining.

Processed materials outputs are resources that have been transformed into a more usable form as part of a transformation process. Processing is usually done in bulk through large-scale manufacturing, milling, smelting, slaughtering and butchering, and other processing operations. Output is usually supplied wholesale to other users in the supply-chain. However, some smaller processors might sell direct to the public. Some examples include:

- flour and processed grains
- bulk food ingredients
- meat and meat products
- fish and seafood products
- cotton and wool
- timber
- steel, aluminium and concrete
- refined oil, petrol, gas and electricity
- petro-chemical items such as plastics and chemicals.

Manufactured outputs take varied inputs and transform these into outputs that are either:

- intermediate goods for other enterprises in the supply chain (e.g. aluminium cans that are sold to a beer brewer), or
- final goods that will be sold to consumers (e.g. leather shoes).

In Australia, manufacturing is still a fairly large industry; especially the food, chemical, and industrial/construction manufacturing sub-sectors. However, we do buy an increasing amount of goods from overseas.

Achieving efficiency in manufacturing is vital for competitive success and for the continued operation of local firms. Most manufacturing output is sold through wholesalers either B2B, or to the retail sector. Manufacturers often produce and deal in bulk quantity measures. Outputs are usually measured in units. i.e. 1m per day for aluminium cans vs 1 per day for a steel house frame!
### Outputs - Goods 13.04

#### Stock (Wholesale and retail)
Wholesalers and retailers deal in stocks of goods. Even though they provide a service, they will usually measure outputs in relation to sales quantities or $, sales prices (mark-ups), and profit margins associated with their stock. e.g.  
- 6 bikes per day for a bike shop
- $6,000/week for a milk bar
- 200% mark-up for a clothing store
- 15% average net margin for a wholesaler.

#### Food and hospitality outputs
Although food, beverage and hospitality enterprises provide a service, they usually measure outputs expressed as sales quantities, sales prices and profit margins based on the physical quantities of items they sell. Outputs might be measured as:  
- 60 covers per day for a restaurant
- 25kg coffee per week for a café
- 30 barrels per week for a pub
- 600 pies per month for a takeaway.

---

Consider the industry area for inclusion in your Numeracy-based Project Plan. Outline the types of **goods outputs** that are related to enterprises in that industry.

<table>
<thead>
<tr>
<th>Industry</th>
<th>Enterprise(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do they: sell, produce or provide?</td>
<td></td>
</tr>
<tr>
<td>Description of goods: Are these: raw materials, processed materials, manufactured goods, stock, or food and hospitality items?</td>
<td></td>
</tr>
<tr>
<td>Measures: How would they measure output amounts? (i.e. $, weight, volume, type, etc.)?</td>
<td></td>
</tr>
<tr>
<td>Time: What time scale would they use for measurement of outputs, and why? (i.e. per hour, per day, per week, etc.)</td>
<td></td>
</tr>
<tr>
<td>Margins: What might be some of the margins associated with these outputs?</td>
<td></td>
</tr>
</tbody>
</table>
13.05 Outputs - Goods

Numeracy in action

Some of the most relevant areas for you to investigate for the outputs stage of your Applied Numeracy Projects are the amounts, quantities, prices and margins associated with goods outputs. Goods producers sell their products to wholesalers or to the public and need to get a suitable return on the quantities they make. Enterprises need to measure and calculate their sales in different product categories, total sales quantities, revenue (total sales), stock turnover (how long it takes to sell items) and relevant profit margins.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your ANPs. Also keep in mind that the numerical data and information from your investigations might naturally be related to one or more of the other focus areas (e.g. Number and Probability and Statistics, or Financial Numeracy and Probability and Statistics); and/or be related to another industry stage.

Number

Outputs - Goods
- How much outputs? (i.e. how many outputs?)
- Different types of outputs (products).
- Different purchasers of outputs.

Financial Numeracy

Outputs - Goods
- $ price of different outputs, and in total.
- Daily, weekly and total (sales) revenue amounts.
- Daily, weekly and total (sales) profit amounts.
- $ margin of different outputs, and in total.
- % margin of different outputs, and in total.

Measurement

Outputs - Goods
- Time taken to produce outputs.
- Time taken to sell outputs.
- Weight of outputs per unit and per order.
- Length of outputs per unit and per order.
- Volume of outputs per unit and per order.
- Ratios of different types of outputs.

Probability & Statistics

Outputs - Goods
- Changes in amounts, measures and prices of outputs over time.
- Comparison of outputs sold by different workers/departments.
- Comparison of amounts, measures and costs for different types of outputs.
- Comparison of sales amounts, prices and margins with other firms.
- Possible/likely changes in the future.
- Analysis of trends and patterns in sales, profits, margins, etc.
### Applied Numeracy Project: Egg-Zactly

Zak who is doing VET Agriculture needs to investigate the likely outputs and margins associated with operating a small-scale, free range, egg farming enterprise.

Zak needs to know how many eggs the hens might regularly lay and the likely weights of these eggs. He needs to find out more about this, so he is going to ask his VET Agriculture teacher about where he could research his information, and also about some potential industry contacts to get in touch with. With this info Zak can estimate daily, weekly and monthly egg outputs amounts, calculated per dozen. He is going to have to come up with some probability calculations, and use averages to estimate reliable quantities and likely egg sizes.

From this Zak can then calculate to predict gross and net margins associated with running the free-range egg farm. He has already collected and analysed information relating to various input and processing amounts, measurements, and financial numeracy information in his previous ANPs, so these will help him to work the numbers for this outputs stage. Zak is also going to have to do some comparisons with other similar-sized, free-range farms to evaluate if his calculations are realistic and reliable.

Zak has decided to choose 2 EBTs for processing:

- Outputs - Goods: Probability and Statistics
  - Probabilities related to how many outputs, and for different sizes of outputs (eggs).
- Outputs - Goods: Probability and Statistics
  - Estimation, prediction and comparison of likely gross and net margins with other firms.

### Consider the example of Zak and Egg-Zactly. What types of numerical techniques, information and skills do you think he is going to use for his ANP?

<table>
<thead>
<tr>
<th>Probabilities related to how many outputs and different sizes of outputs (eggs).</th>
<th>Estimation, prediction and comparison of likely gross and net margins with other firms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical techniques:</td>
<td>Numerical techniques:</td>
</tr>
<tr>
<td>Numerical information:</td>
<td>Numerical information:</td>
</tr>
<tr>
<td>Numerical skills:</td>
<td>Numerical skills:</td>
</tr>
</tbody>
</table>
13.07 Outputs - Goods

ANP Outputs - Goods Investigation

If you are investigating an industry area that produces outputs in the form of goods then you should complete this **ANP: Outputs - Goods Investigation** pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for a goods outputs focus for your ANP are as follows.

- Primary industries such as agriculture, forestry or fishing, e.g. a farm; or mining.
- Secondary industries such as manufacturing, milling, smelting or refining, e.g. A factory producing either intermediate goods (such as timber) or final goods such as (furniture).
- Retail trade and wholesale trade firms that sell different stocks of goods.
- Food and hospitality enterprises, such as cafés and restaurants, that provide a service to make or produce 'physical' items such meals and beverages.
- Take-away food ‘retailers’ that sell food items to customers.
- Personal services firms that sell physical products in addition to the personal services they provide, e.g. hair and beauty products.

Estimating different types of outputs.

Estimating size of varied outputs.

Calculating hourly sales amounts & %'s.

Calculating different price ratios and profit margin ratios.

Comparing sales volumes over time; or with other firms.

Comparing profits levels over time; or with other firms.

Counting different types of outputs.

Measuring size of varied outputs.

Calculating order amounts and price.

Calculating daily sales amounts & %'s.

Examining unsold waste amounts, ratios and costs.

Identify numerical processes to collect data and information.

Use numerical techniques and technologies to organise and use the data.

Estimate, calculate, summarise, analyse and communicate using the data.

Calculating weekly sales amounts & %'s.

Calculating customer sales amounts & %’s.

Calculating employee sales amounts & %’s.

Calculating employee sales amounts & %’s.

Estimating and predicting sales amounts and trends.

Comparing revenue amounts over time; or with other firms.
<table>
<thead>
<tr>
<th>ANP: Outputs - Goods Investigation</th>
<th>ANP Outputs Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outputs: EBT Focus area: ANP 1</td>
<td>Outputs: EBT Focus area: ANP 2</td>
</tr>
<tr>
<td>Numerical processes I will use to collect data and information.</td>
<td></td>
</tr>
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<td>Numerical techniques and technologies I will use to organise and use the data.</td>
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<td>Calculations using the data and information.</td>
<td></td>
</tr>
<tr>
<td>Summary information about the data and information.</td>
<td></td>
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</tbody>
</table>
13.09 Outputs - Services

Services
In the commercial world, services outputs are provided by many enterprises to clients including:

- practical services
- information services
- people services
- community services.

It is important to recognise that some types of services cross over more than one of these categories. For example, some practical services are people services, most community services are also people services, and many information services might be delivered in support of practical services or people services.

As you investigate your industry, you need to apply the numeracy skills and techniques you learned in Unit 1 by identifying and describing industry examples of applied numeracy in action that relate to the outputs stage.

### Practical services

Practical service outputs include:

- serving diners
- cooking meals
- repairing cars and houses
- building constructions
- supplying power and gas
- delivering meals
- transporting people and stock
- installing equipment
- providing haircuts
- making items for people.

The provision of these services usually involves labour time, expertise and the use of specialised equipment and technologies.

Practical services outputs can involve

- short-term activities measured in minutes, (such as a quick haircut, an Uber ride or mowing a lawn)
- mid-term activities measured in hours, (such as servicing a car or installing a window)
- long-term activities measured in days, (such as painting a house, or installing an ICT network).

Practical services usually have a measurable output in price that is calculated based on the time, labour, expertise and equipment needed.

Some practical service-providers expect to service a specific number of clients per hour, per day, or per week, for a pre-arranged fee, e.g. at a car wash.

Other practical service-providers will estimate and quote based on the nature of the ‘job’ they are being asked to do. They have to build their variable costs (e.g. labour time and consumables) and their fixed costs (e.g. equipment, vehicle and rent) into the price of their quote. Otherwise they will be squeezed by a profit margin that is too narrow.

Key examples of practical services include food services, arts and crafts, water, gas and electricity supply, hotels and accommodation, home maintenance, transport, couriers, construction, automotive repairs and personal services.
The provision of information services usually involves labour time, significant expertise and the use of specialised equipment and technologies.

Information service outputs include:
- personal and health advice
- business and professional advice
- data analytics
- information services
- media production
- media provision
- internet and data services
- banking and financial services
- insurance products
- education and training
- design and engineering services
- technical support
- research and development
- and many other services.

Some of these outputs can be measured on a per unit basis, such as with digital media services; e.g.
- number of subscriptions
- number of downloads
- clicks-on-page, or even
- page views/impressions.

Others might be measured on a client-service basis which takes into account time factors measured per week, per day, or per hour, such as:
- number of customers served (banking)
- policies sold (insurance)
- courses/units delivered, total class hours, or number of students (education)
- number of client appointments for professional services or for personal/health advice.

Some information services, that extend over a period of time, might see outputs expressed on a ‘project’ or ‘contract’ basis. These can include services such as technical support, research and development, design and engineering, and other ongoing consultancies across a range of areas.

These types of services may use output concepts such as:
- service hours
- billable hours
- on-site hours
- technical support hours
- total clients serviced and/or service per client
- total clients serviced and/or support per client.

Information service-providers have to build in variable costs (e.g. labour time and consumables) as well as their fixed costs (e.g. equipment, vehicles and rent) into the price of their quote. Once these service-providers have to tender for a contract and then do their work (their processing) in such a way that ensures that they can deliver their outputs in a cost-effective manner.

This means that labour productivity, especially measured in terms of labour hours, becomes a key concern.

Some information service outputs can be measured through the achievement of key performance indicators such as:
- money saved (finance)
- reduction in downtime (technical support)
- clients ‘connected’.
13.11 Outputs - Services

People services

The outputs associated with people services are usually labour-intensive and focus on the provision of a service directly to a person. For example, health and medical service outputs might focus on the number of patients, patient hours, patient outcomes, types of medical care, quality of patient care, and so on. Personal service outputs such as hair and beauty might focus on the number of clients, client consultation time, types of service outcomes, quality of services provided, and so on. Education and training service outputs might focus on the number of students serviced, student hours, student results, student achievement levels, courses/units delivered, completion rates and other relevant measures of output. Caring and support service outputs might focus on number of clients, client hours, quality of client care and so on. So when investigating outputs for people services you will need to understand just what the intention or objective of the service was in the first place. The services provided to achieve those objectives are the outputs. e.g.

- the doctor saw 26 patients today
- the child-care worker supervised a room of 14 toddlers for a week
- the hairdresser completed 6 cuts and 4 colours for the day
- the teacher worked with 17 VCAL Numeracy Intermediate students, for 4 hours a week, over 34 weeks.

From these various labour productivity output measures can be developed.

Community services

The outputs of community services are also usually labour-intensive and not always easy to quantify. However, many community service enterprises have goals or objectives that they try to meet as part of their mission or charter. Some of these relate to measures that match funding related to meeting service targets:

- the number of long-term unemployed clients who gain jobs
- the number of aged residential clients serviced per staff member
- the response time for call-outs for paramedics.

Some community service outputs might be understood better by using quality and quantity terms that describe activities related to community engagement and support. e.g.

- a welfare group serving 1,000 meals a week to low-income families and helping to improve people’s lives
- an environmental group reducing local litter by 50% as part of the delivery of an education program
- a religious organisation developing 3 community engagement programs; that engaged local young people, isolated people and elderly people
- an arts organisation that mounted an exhibition of 30 local artists that attracted 1,500 visitors and raised awareness of local indigenous culture.

As with people services, when investigating outputs for community services you will need to understand just what the intention or objective of the service was in the first place. The provision of services to achieve that objective are the outputs.
Investigate the service outputs activities for your chosen industry. Complete this table. You could investigate a range of enterprises or work settings.

<table>
<thead>
<tr>
<th>Industry:</th>
<th>Enterprises/work settings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do they do: i.e. sell, produce or provide?</td>
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<tr>
<td>Description of services: What type of services do they provide, and to whom?</td>
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<td>Measures: How would they use measurements to assess the cost of providing these services, and what measures would they use?</td>
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<td>Time: What time scale would they use in measuring the service provision, and why? (i.e. per hour, per day, per week, etc.)</td>
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<td>Margins: What might be some of the margins associated with these outputs of services?</td>
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<td>Other information</td>
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</table>
13.13 Outputs - Services

Numeracy in action

Some of the relevant areas to investigate for this final stage of your Applied Numeracy Projects are the amounts, quantities, prices and margins associated with service outputs. Service enterprises need to; measure and calculate their service income (fees) for different service categories, number of customers/clients, trends in customers/clients, total revenues (total fees), as well as relevant profit margins. Investigations focusing on Probability and Statistics are highly recommended for the outputs stage.

As a class work through these checklists and see which might apply to the industry (and enterprises and work settings) you are investigating for your ANPs.

Also keep in mind that the numerical data and information from your investigations might naturally be related to one or more of the other focus areas (e.g. Number and Probability and Statistics or Financial Numeracy and Probability and Statistics); and/or related to another industry stage.

Number

Outputs - Services
- How much outputs? (or) how many outputs?
- Different types of outputs (services).
- Different purchasers of/clients for outputs (services).

Measurement

Outputs - Services
- Time taken to produce provide service outputs.
- Measurement of quality control related to outputs.
- Measurement of output for practical services.
- Measurement of client contact times for people services.
- Measurement of services and service work areas.

Financial Numeracy

Outputs - Services
- $ price/fee of different service outputs, and in total.
- Daily, weekly and total (service) revenue amounts.
- Daily, weekly and total (service) profit amounts.
- $ margin of different outputs of services, and in total.
- % margin of different outputs of services, and in total.

Probability & Statistics

Outputs - Services
- Changes in amounts, measures and prices of service outputs over time.
- Comparison of service outputs ‘sold’ by different workers/departments.
- Comparison of amounts, measures and costs for different types of outputs.
- Comparison of service amounts, prices and margins with other firms.
- Predictions of likely sales service trends; or anticipated changes.
- Analysis of trends and patterns in service revenues, profits, margins, etc.
ANP Example: Tool up to start up

During his Numeracy-based Project, Kev has found that he is getting quite good at collecting and organising information in spreadsheets. He now realises that once spreadsheets are set up they are a very quick and useful tool to show and analyse numerical information; and that this is very important if you are running your own business.

So Kev is going to create a spreadsheet to record all the jobs in the last month. He will record the type of job, prep time, travel time, time spent on-site, the cost of consumables used, and the amount charged for the job. He will use formulae to calculate an average gross profit for each job and an average hourly gross return.

He is then going to analyse the results and see if there are patterns; such as whether shorter jobs or longer jobs ‘earn’ more for his boss, and whether it might be better to do some job tasks at ‘apprentice’ wages to cut costs.

Kev is also getting good at estimating time needed to do basic jobs like fixing toilets and unblocking drains. Quite often it’s the same reasons causing these problems. On-site Kev starts by focusing on the most likely cause of the problem, thereby getting the job done faster and wasting less time. He also thinks that this is way to increase service outputs per day and earn more money. He reckons he can calculate some probabilities on this, especially if he asks around the industry to get more data to work with. So for outputs, Kev is going to investigate:

**Outputs - Service: Probability and Statistics**

Comparison of time, costs, revenue and gross profit for different types of service outputs.

**Outputs - Service: Probability and Statistics**

Analysis of reasons and patterns related to different service jobs (so as to measure probabilities).

Consider the example of Kev the apprentice plumber. What types of numerical techniques, information and skills do you think he is going to use for his ANP?

<table>
<thead>
<tr>
<th>Comparison of time, costs, revenue and gross profit for different types of service outputs.</th>
<th>Analysis of reasons and patterns related to different service jobs (to measure probabilities).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical techniques:</td>
<td>Numerical techniques:</td>
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<td>Numerical information:</td>
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<td>Numerical skills:</td>
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</table>
### Outputs - Services

**ANP Outputs - Services Investigation**

If you are investigating an industry area that produces outputs in the form of services then you should complete this **ANP: Outputs - Services Investigation** pro-forma.

Some possible numerical processes and techniques are listed below to guide you. Industry areas and related workplace settings that are more suitable for a service outputs focus for your ANP are as follows.

#### Practical services:
- Construction industry firms such as carpentry, plumbing, plastering, bricklaying, concreting, cabinet-making, electrical, engineering, etc.
- (Accommodation and) food services including home-delivery.
- Information, people, community and other services including these and more.
- Business and professional services (i.e. finance, legal, marketing, admin., etc.).
- People and community services (i.e. health, medical, caring, community, etc.).
- Public services (i.e. education, emergency, government, defence, welfare, etc.).
- Personal services (i.e. hairdressing, beauty therapy, health and fitness, etc.).
- Information and ICT services (i.e. computing, communications, design, media, etc.).
- Arts and recreation services (i.e. sport, arts, dance, recreation, etc.).
- Accommodation and food services (i.e. hospitality, pubs, clubs, hotels, etc.).

#### Numerical Processes

- Identify numerical processes to collect data (and information).
- Use numerical techniques and technologies to organise and use the data.
- Estimate, calculate, summarise, analyse and communicate using the data.

<table>
<thead>
<tr>
<th>Outputs - Services</th>
<th>Counting different types of service outputs.</th>
<th>Classifying different types of outputs.</th>
<th>Weighing and measuring practical service outputs.</th>
<th>Performing debit and credit financial transactions.</th>
<th>Calculating different service ratios and profit margin ratios.</th>
<th>Comparing service volumes over time; or with other firms.</th>
<th>Calculating total service profit margin ratios.</th>
<th>Estimating and predicting service amounts and trends.</th>
<th>Examine waste amounts, ratios and costs from services.</th>
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<td>Services: EBT Focus area: ANP 1</td>
<td>Services: EBT Focus area: ANP 2</td>
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<td>Numerical processes I will use to collect data and information.</td>
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<td>Numerical techniques and technologies I will use to organise and use the data.</td>
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<td>Estimates related to the data and information.</td>
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<td>Calculations using the data and information.</td>
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<td>Summary information about the data and information.</td>
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13.17 ANP: Services Investigation

**ANP Outputs (Overall) Investigation**

Use the Outputs (Overall) Investigation to guide your Applied Numeracy Project investigation into work settings or workplaces within your industry.

- Identify **key types of outputs** in this **industry context**, and the ‘form’ these take.
- Identify the **numerical processes** to **collect** relevant **data** and information.
- Identify the **numerical techniques** to **use** the collected **data** and information.
- Use the collected data and information to **make estimates**.
- Use the collected data and information to **make calculations**.
- Develop **summary** statements to **describe** the key **data** and information.
- Analyse the key **data** and information - make **inferences** and **conclusions**.
- Other: i.e. the most suitable way to **communicate** the **data** and information.

<table>
<thead>
<tr>
<th>ANP Outputs</th>
<th>ANP: Outputs (Overall) - Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name(s):</td>
<td>Date:</td>
</tr>
<tr>
<td>Industry:</td>
<td>Workplace:</td>
</tr>
</tbody>
</table>

**Outputs (goods and/or services)**

- Key examples and types involved and the form these take (i.e., goods or services).

**Outputs (goods and/or services)**

- Numerical processes I can/will use to collect **estimates** of data & information.
- Numerical techniques I can/will use to make **estimates** using data & information.

**Outputs (goods and/or services)**

- Applied examples of **estimates** using these numerical processes and techniques.
## ANP: Outputs (Overall) Investigation (cont.)

<table>
<thead>
<tr>
<th>Outputs: (goods and/or services)</th>
<th>Outputs: (goods and/or services)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical processes I can/will use to do calculations using the data &amp; information.</td>
<td>Numerical techniques I can/will use to do calculations using the data &amp; information:</td>
</tr>
</tbody>
</table>

### Outputs: (goods and/or services)

- Applied examples of calculations using these numerical processes and techniques.

---

### Preview

### Draft Sample:

**Do Not Copy**

<table>
<thead>
<tr>
<th>Use the estimates and/or calculations to develop descriptive summary statements.</th>
</tr>
</thead>
</table>

### Analysis based on the estimates and/or calculations:

- What are some key conclusions/inferences you can make from the data?

### Other:

- How the data and information might best be communicated. (e.g. Numbers, words, visual, etc.)
13.19 Assessment Task

**AT4  Applied Numeracy Projects - EBT: Outputs**

**Overview**

For your whole-of-unit Numeracy-based Project you have to select 6 Enquiry-based Tasks (EBTs) to investigate across the three industry stages of:

- **inputs**,  
- **processing**, and  
- **outputs**.

You must select at least 1 EBT for each of these stages.

Your EBTs must also cover all four focus areas:

- **Number**  
- **Measurement**  
- **Financial Numeracy**, and  
- **Probability and Statistics**.

Consider

- It is best to select 1, or 2, EBTs related to **outputs** for your Numeracy-based Project.
- It is best to choose no more than 1 EBT related to any single focus area of Number, Measurement, Financial Numeracy or Probability and Statistics, (although for goods outputs you might choose 2).
- Some EBT focus areas for processing will naturally complement one another, e.g. **Number** and **Probability and Statistics** or **Financial Numeracy** and **Probability and Statistics**.

Complete the summary table below to indicate the EBTs you will be investigating for your Numeracy-based Project.

We use the term **Applied Numeracy Project** (ANP) to refer to you undertaking and completing each of your 6 EBTs. So 6 ANPs = 1 whole-of-unit Numeracy-based Project.

<table>
<thead>
<tr>
<th>Industry Stages</th>
<th>Focus area: Number (N)</th>
<th>Focus area: Measurement (M)</th>
<th>Focus area: Financial Numeracy (FN)</th>
<th>Focus area: Probability and Statistics (PS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Assessment Task 13.20

PODR: Applied Numeracy Project - Outputs

In order to successfully complete this Applied Numeracy Project (ANP) for the outputs industry stage you should make use of the PODR: Process to successfully manage these tasks.

- **Planning** and **organising** yourself, timelines, industry contacts, devices and software, and any other resources you need to undertake your investigation.
- **Doing** the investigation including making estimates, performing calculations, using technology and software to access, record, collate and organise data and information; and dealing with problems that may arise in collecting or analysing the data and information.
- **Reviewing** your progress in each EBT as part of your ANP on an ongoing basis, making adjustments (problem-solving); and then reviewing your overall performance across the entire whole-of-unit Numeracy-based Project.

**ANP Outputs: Step 1**

- Choose your focus area(s).
- Negotiate the suitability of these with your teacher.

**ANP Outputs: Step 2**

- Use PODR to plan and organise your investigation.
- Anticipate type of estimates and calculations you would need to use.
- Select the most suitable numerical processes and techniques to use to gather and collect your data and numerical information.

**ANP Outputs: Step 3**

- Apply numerical processes and problem-solving techniques to gather your data and numerical information.
- Evaluate and use suitable devices and software to gather your data and numerical information.

**ANP Outputs: Step 4**

- Choose and apply appropriate estimates, calculations and numerical techniques to interpret, analyse and communicate your data and numerical information.
- Organise and collate your data and numerical information.
- Produce descriptive statements about your data and numerical information.
- Analyse your data and information.
- Draw conclusions (inferences) from your data and numerical information.

**ANP Outputs: Step 5**

- Undertake a review of your performance on the ANP(s).
- Self-assess and review how well you did at collecting, organising, analysing and communicating the data and numerical information.
- Suggest and make improvements for your next ANP(s).
### 13.21 Assessment Task

**Tasks - AT4: Applied Numeracy Projects - Enquiry-based Task**

#### Stage 1: Design your Numeracy-based Project
- i. Negotiate appropriate industry and workplace(s) with teacher.
- ii. Select EBTs from each industry stage, and each focus area.
- iii. Develop draft of Numeracy-based Project Plan.

<table>
<thead>
<tr>
<th>Industry Stage</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBT#</td>
<td></td>
</tr>
</tbody>
</table>

#### Stage 2: Undertake research into processing for your ANP by applying numeracy skills
- i. Undertake your research for this EBT into outputs.
- ii. Outline the processes you will use to collect data and information.
- iii. Estimate, calculate and use technology to collect data and information.
- iv. Apply numerical problem-solving tools and techniques as needed.
- v. Use data and information to perform estimations and calculations.
- vi. Use data and information to make inferences and conclusions.
- vii. Analyse the data and information.

#### Stage 3: Use appropriate software tools and devices
- i. Describe software tools and devices that might be appropriate to collect data and information.
- ii. Describe advantages & disadvantages of using these software tools and devices.
- iii. Explain why you have chosen to use these software tools and devices; and use evidence to justify your choices.
- iv. Use appropriate software tools and devices to show the data and information you have collected.
- v. Evaluate the software tools and devices you used; and their effectiveness for collecting, collating and communicating.

#### Stage 4: Reporting
- Prepare a draft for your final report (Refer pp.298-299)

**Additional information:**

Signed: ___________________________  Date: _____________
# Reporting

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<th>Description</th>
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<td>Report - Communications Planner: Processing</td>
<td>295</td>
</tr>
<tr>
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<td>Report - Communications Planner: Outputs</td>
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</tbody>
</table>

## Activities 14: Reporting

<table>
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<th>Description</th>
<th>Page</th>
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</thead>
<tbody>
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<td>Report - Communications Planner: Inputs</td>
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</tr>
<tr>
<td>14.06B</td>
<td>Report - Communications Planner: Processing</td>
<td>295</td>
</tr>
<tr>
<td>14.07C</td>
<td>Report - Communications Planner: Outputs</td>
<td>296</td>
</tr>
<tr>
<td>14.08D</td>
<td>Report - Evaluation Planner</td>
<td>297</td>
</tr>
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<td>AT5</td>
<td>Numeracy-Based Project: Reporting</td>
<td>298-299</td>
</tr>
<tr>
<td>14.11</td>
<td>Self-Reflection</td>
<td>300</td>
</tr>
</tbody>
</table>

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**Comments:**
14.01 Analysing and Reporting Information

Lots of data and information

As you complete your ANPs you will find that you have a lot of really useful and insightful data and information related to your industry. This data might make perfect sense to you because you have spent hours, collecting and organising that data, i.e. ‘working the numbers’. However, when it comes to communicating your data and information you are going to have to take into account that the audience (a reader, listener, or viewer) might not have anywhere near the insight that you do. So you need to develop ways to present your data and information in a more concise, informative and engaging way.

Take a look at these examples of data and information presented using spreadsheets. Which industry stages do you think each relates to, which focus areas does each cover, and ‘who’ might have prepared this data?

<table>
<thead>
<tr>
<th>Unit</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount</td>
<td>200 kg</td>
<td>180 kg</td>
<td>350 kg</td>
<td>150 kg</td>
<td>250 kg</td>
<td>300 kg</td>
<td>180 kg</td>
</tr>
<tr>
<td>Weight</td>
<td>150 kg</td>
<td>120 kg</td>
<td>250 kg</td>
<td>100 kg</td>
<td>180 kg</td>
<td>250 kg</td>
<td>100 kg</td>
</tr>
</tbody>
</table>

Don’t put your audience to sleep with too many numbers, or images of tables and spreadsheets that make little sense. Instead summarise and explain the key numerical concepts.

Image: AndreyPopov/iStock/Thinkstock
Have a look at the spreadsheets on p.290.

1. From the ANP examples given throughout Unit 2, who would have created these?

2. What information is each spreadsheet communicating?

3. What formulae would have been used to set up the spreadsheets?

4. How ‘easy’ is it to interpret the data and information? Explain.

5. What types of visual representations would you recommend that each person uses to communicate the information more successfully?

6. In your workbooks, create summary statements using descriptive information and numbers to develop clear, concise statements to communicate the main points from the spreadsheets.

7. What other recommendations can you make about how to best present spreadsheet information as part of a written report; and also when presenting spreadsheet numerical information and data from your ANPs to an audience.
### 14.03 Analysing and Reporting Information

#### B Reporting information 2

Pol, La, Kev and Zak have come to you for help in how best to report and communicate some of the information they have gathered during their ANPs. Help them out by completing the table. Advise them for 2 more examples of information that each has gathered. It might be best to work in pairs for this activity.

<table>
<thead>
<tr>
<th>Data and information</th>
<th>‘Written’ Report</th>
<th>Reporting to an audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pol has used spreadsheets to work out different input amounts and cost ratios for all the menu items. But it’s all just tables of numbers. He wants to clearly communicate proportions and rates.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>La</td>
<td></td>
<td></td>
</tr>
<tr>
<td>La has calculated weekly sales amounts and analysed seasonal sales variations. She has used these to predict some likely sales trends for the future. But she’s not sure how best to show this information.</td>
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</tr>
</tbody>
</table>

**Draft Sample: Do Not Copy**
<table>
<thead>
<tr>
<th>Data and information</th>
<th>‘Written’ Report</th>
<th>Reporting to an audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kev has sketches and formulae that show how to measure different jobs when installing toilets and bathroom fittings. But he thinks it would be better to ‘show’ people how to do these tasks rather than just telling them.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kev</td>
<td></td>
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<tr>
<td>Kev</td>
<td></td>
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</tr>
<tr>
<td>Zak has created a mock-up of the size of the farm ‘houses’ for the hens and a possible layout for the farm. Zak knows he can’t draw to save himself, but he still wants to show the overall layout and measurements for his farm in a visual format.</td>
<td></td>
<td></td>
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<tr>
<td>Zak</td>
<td></td>
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<tr>
<td>Zak</td>
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</tbody>
</table>
14.05 Report - Communications Planner: Inputs

Use this communication planner to organise, analyse and communicate your numerical information about **inputs** using the most suitable methods. Note: You might understand the results, but what methods can you utilise to show, explain and communicate so that your ‘audience’ understands the information as well as you do?

<table>
<thead>
<tr>
<th>What is the data and information I’m communicating?</th>
<th>What are the main points I want to communicate?</th>
<th>How could I best summarise this data and information?</th>
<th>What is the best way to communicate this information visually?</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g. Measurement&lt;br&gt;The measurements for the recipe to make the soup daily special so that it makes 30 serves.</td>
<td>e.g. The proportional % ratio of different ingredients needed. The amounts in kgs, litres and cups needed for different measures of ingredients.</td>
<td>e.g. I can describe each ingredient and the amount of each that is needed, based on the total number of portions to be made. But I really need to illustrate the different ratio %’s needed of each ingredient which will be much better represented visually rather than in words.</td>
<td>e.g. Because this data and information shows proportions, a pie chart would be best. I will use an Excel spreadsheet to calculate proportions and then create a chart.</td>
</tr>
</tbody>
</table>
Use this communication planner to organise, analyse and communicate your numerical information about **processing** using the most suitable methods. Note: You might understand the results, but what methods can you utilise to show, explain and communicate so that your ‘audience’ understands the information as well as you do?

<table>
<thead>
<tr>
<th>What is the data and information I’m communicating?</th>
<th>What are the main points I want to communicate?</th>
<th>How could I best summarise this data and information?</th>
<th>What is the best way to communicate this information visually?</th>
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</tbody>
</table>

**Preview**

**Draft Sample:**

*Do Not Copy*
Use this communication planner to organise, analyse and communicate your numerical information about **outputs** using the most suitable methods. Note: You might understand the results, but what methods should you utilise to show, explain and communicate so that your ‘audience’ understands the information as well as you do?

<table>
<thead>
<tr>
<th>What is the data and information I’m communicating?</th>
<th>What are the main points I want to communicate?</th>
<th>How could I best summarise this data and information?</th>
<th>What is the best way to communicate this information visually?</th>
</tr>
</thead>
</table>

**Draft Sample:**

**Preview**

**Draft Sample:**

Do Not Copy
Develop measures and criteria that can be used to evaluate your success as part of your Numeracy-based Project. Consider a specific measure that could be used for each of the areas below. Develop measures and criteria that others can use to evaluate you, as well as self-assessment measures and criteria.

<table>
<thead>
<tr>
<th>Measure/criteria that can be used for evaluation.</th>
<th>How is this measure/criteria useful as part of evaluation?</th>
<th>How can others use this measure/criteria to assess me?</th>
<th>How can I use this measure/criteria to self-assess?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning and organising my Numeracy-based Project.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using numeracy skills, techniques, software tools and devices to collect and record my information.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overcoming barriers and obstacles and solving problems that present in my investigation.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Dealing effectively with other people as part of my investigations, including the use of feedback.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using numeracy skills, techniques, software tools and devices to analyse my information.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicating and reporting the results from my investigations clearly and effectively.</td>
<td></td>
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</tbody>
</table>
14.09 Assessment Task

**AT5 Numeracy-Based Project: Reporting**

**Overview**

For your whole-of-unit Numeracy-based Project you have investigated 6 Enquiry-based Tasks (EBTs) across the three industry stages of inputs, processing, and outputs.

You have also completed at least 1 EBT for each of, Number, Measurement, Financial Numeracy, and Probability and Statistics.

The final stage of your Numeracy-based Project is to prepare, submit, and (where required), present the results of your report.

Your teacher will advise you of the guidelines for preparation, submission and presentation of your report. But you must demonstrate the following.

- Use appropriate mathematical language to suit your industry area.
- Use relevant mathematical symbols and conventions that suit your industry area.
- Utilise software tools and devices to prepare your report and communicate your results.
- Communicate the results of your Numeracy-based Project, in written form, using tables, charts, diagrams and images where appropriate; and present information in multimedia formats (such as video) when relevant.
- Use feedback to evaluate your success in the following:
  - The processes you used to plan your Numeracy-based Project
  - The methods, skills and tools you used to collect your data and information
  - Your use of numerical skill tools and techniques to analyse your results
  - Your choice of information, techniques, tools and devices to communicate your results
  - Your choice of presentation format and communication of data and information
  - Your presentation of an oral multimedia report (if required).
### Assessment Task 14.10

#### Tasks - AT5: Numeracy-based Project - Reporting

In reporting the results from my Numeracy-based Project have I:

1. Used appropriate mathematical language.
2. Used relevant mathematical symbols and conventions.
3. Utilised software tools and devices to prepare my report.
4. Utilised software tools and devices to communicate my results.

In my report have I communicated my results effectively using:

1. Written information (including words and numbers).
2. Visual information such as tables, charts, diagrams and images.
3. Multimedia formats (such as video, audio, etc. where relevant).
4. Other formats as relevant to the industry and investigation.

Have I developed and used criteria to self-assess in relation to my:

1. Planning and organising my Numeracy-based Project.
2. Using numeracy skills, techniques, software tools and devices to collect and record my information.
3. Overcoming barriers and obstacles, and solving-problems, that arose during my investigations.
4. Dealing effectively with other people as part of my investigations, including the use of feedback.
5. Using numeracy skills, techniques, software tools and devices to analyse my information.
6. Communicating and reporting the results from my investigations clearly and effectively.

Obtain feedback and evaluations on my report; and on how effectively I communicated information.

**Reporting**

- Complete and submit my final report.
- Prepare a report to the class (if required).
- Present my report to an audience (if required).

**Additional information:**

Signed: _____________________________________________  Date: _____________
14.11 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 (use a circle) in developing my numeracy skills this unit?

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>not shown</td>
<td>low</td>
<td>reasonable</td>
<td>good</td>
<td>very good</td>
<td>excellent</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>My strongest topics/skills were:</th>
<th>But I need to improve my skills in:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Signed: ___________________________________________ Date: __________

Teacher initials: ________________________________ Date: __________
### NUMERACY INTERMEDIATE - UNIT 2 RECORD

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.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
</tbody>
</table>
**NUMERACY INTERMEDIATE - UNIT 1 RECORD**

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.

<table>
<thead>
<tr>
<th>LO1: Skills and Processes (1)</th>
<th>LO2: Financial Literacy (3)</th>
<th>LO1: Applied Skills and Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
</tbody>
</table>

Preview Draft Sample: Do Not Copy
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.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
<tr>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
<td>Are all tasks completed for this outcome? /Date</td>
<td>All tasks completed for LO? /Date</td>
</tr>
</tbody>
</table>