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# Applied Numeracy Project 9

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## 9.01 Unit 2: Introduction

### Unit 2

Welcome to your studies of Unit 2: Numeracy Senior. 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 an **unfamiliar industry area**, that perhaps you might be interested in working in the future. This is called your **Numeracy-based Project Plan**. Many of you did a similar investigation last year in Numeracy Intermediate.

Image: Ridofranz/iStock/Thinkstock



### Numeracy-based Project Plan: Requirements

In order to satisfactorily complete your **Numeracy-based Project Plan** you have to select, investigate and report on **8 enquiry-based tasks** related to your chosen industry. So the 'big picture' steps that are required are as follows.

- ☐ Select an industry-area that you are unfamiliar with and would like to explore further.
- ☐ Develop one (or more) investigative Numeracy-based Project Plan(s) related to this industry area.
- ☐ Select 8 enquiry-based tasks to investigate in your Numeracy-based Project Plan(s). These investigations are called your **Applied Numeracy Projects (ANP)**.

### Enquiry based-tasks

For your Numeracy-based Project Plan you must choose and investigate 8 **enquiry-based tasks** (EBTs). You then report on your findings from your investigations into each of those. There are a range of suggested **EBTs** listed in the Numeracy Senior 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:

1. Number, 2. Measurement, 3. Financial Numeracy, 4. Probability and Statistics.

Alternatively, you might be able to develop one or more of your own tasks (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**.

## Numeracy-based Project Plan

**Develop your:  
Numeracy-based Project Plan.**

**This will be based on:**

**An industry that you are 'unfamiliar' with:**

- ☐ this industry might match your future employment goals
- ☐ it might be an industry in which you have a particular interest
- ☐ it could be an industry that commonly has the types of occupations in which you are interested.

**Your Numeracy-based Project Plan must include:**

- ☐ your aims
- ☐ your timelines
- ☐ numeracy skills and processes you will use
- ☐ software tools and devices you will utilize
- ☐ communication methods to report your findings/results
- ☐ obstacles or barriers you might have to deal with
- ☐ outcomes to measure your success
- ☐ the need to collaborate with others.

**Investigate 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
- ☐ Financial Numeracy
- ☐ Probability and Statistics

**So across your entire Numeracy-based Project Plan you need to do 8 enquiry-based tasks ensuring that:**

- ☐ at least one must be related to each of these 3 industry stages
- ☐ at least one must be related to each of these 4 focus areas.

**Preview  
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## 9.03 Numeracy-Based Project Plan

Liza is investigating the music industry as part of the Arts and Recreation industry.

Liza is planning to investigate Number, Measurement and Financial Numeracy for the **inputs** stage; Number, Measurement and Financial Numeracy for the **processing** stage; and Financial Numeracy and Probability and Statistics for the **outputs** stage. Liza has covered all **4 focus areas** and each of the **3 industry stages**.

Tone is interested in finding out about the Retail Trade industry.

Tone is planning to investigate Number, Financial Numeracy, and Probability and Statistics for the **inputs** stage; Number and Financial Numeracy for the **processing** stage; and Measurement, Financial Numeracy, and Probability and Statistics for the **outputs** stage.

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



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### A Numeracy-based Project Plan



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

a. What is the correct full title of what you have to complete for this? **I must complete a:** \_\_\_\_\_

b. How do you select the industry to investigate? **My selected industry needs to be:** \_\_\_\_\_  
**and not:** \_\_\_\_\_

c. How many enquiry-based tasks do you need to select? **I must select \_\_\_\_ enquiry-based tasks.**

d. You must select at least 1 enquiry-based task from each of these 4 focus areas. **The four focus areas are:**  
1. \_\_\_\_\_  
2. \_\_\_\_\_  
3. \_\_\_\_\_  
4. \_\_\_\_\_

e. You must ensure that at least 1 enquiry-based task comes from each of these 3 industry stages. **The three industry stages are:**  
a. \_\_\_\_\_  
b. \_\_\_\_\_  
c. \_\_\_\_\_

f. So the name that we use for the 8 investigations you undertake is... **We call your 8 investigations:** \_\_\_\_\_ **or** \_\_\_\_\_

Applied numerical skills B

1. List the industry that you are likely to investigate. Briefly outline key activities of the industry.
2. Identify some of the main work tasks that occur within settings 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.

Industry:

1. Number

Key activities:

Main work tasks:

Numerical skills & calculations:

(e.g. A purchasing officer will calculate an order for bulk ingredients for new vegetable production run.)

2. Measurement

Key activities:

Main work tasks:

Numerical skills & calculations:

(e.g. A food production manager will program the correct ingredients to be used in the mixing machines.)

3. Financial Numeracy

Key activities:

Main work tasks:

Numerical skills & calculations:

(e.g. An accountant will enter and record purchases in the financial records, i.e. debits; as well as money earned from sales, i.e. credits.)

4. Probability and Statistics

Key activities:

Main work tasks:

Numerical skills & calculations:

(e.g. The marketing team will compare and analyse sales patterns across recent time periods and make recommendations.)

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## 9.05 Transformation Process

### 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 process turns inputs into outputs, and can be described as an 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.



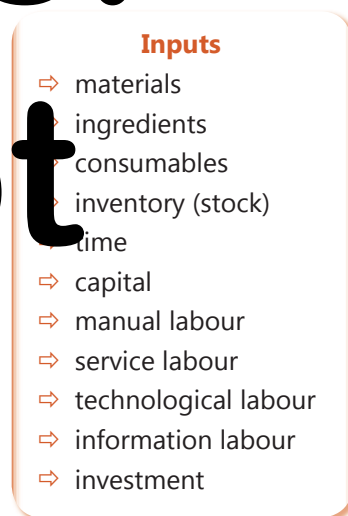
### Industry stages

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

#### a. Inputs

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, machinery, technology, capital investment, time and information.

*For example, a chef in the Accommodation and Food Services industry will use ingredients such as meat, vegetables, fruit, processed grains, oil and other materials, including stocks of small consumables such as condiments and spices. They will use implements and tools, digital scales, cooking equipment, kitchen equipment and fittings, all of which are bought by capital investment from the business owner. Of course they will use their time and expertise, as well as other knowledge and information needed, to perform their work.*



### Choosing your industry

In selecting your 'unfamiliar' industry you might choose:

- ✓ a complementary or supplier industry to your VET course or your work
- ✓ an industry that matches your interest or hobbies
- ✓ an industry that aligns with your personal values
- ✓ an industry that commonly employs an occupation or occupation group you are interested in
- ✓ an industry in which you can apply specialist knowledge and skills that can be applied across all industry settings, such as ICT, bookkeeping, administration, small business, etc.
- ✓ an industry that is growing and innovating and which might be a part of your future pathway.

## Processing

Processing involves combining varied resources so as to produce a good or 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 processing 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 more.

The processing stage uses various processes (natural 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.

### Processing

- ⇒ manufacturing processes
- ⇒ service-provision processes
- ⇒ equipment & machinery processes
- ⇒ customer/client processes
- ⇒ financial processes
- ⇒ technological processes
- ⇒ ICT and data processes
- ⇒ online/digital processes
- ⇒ environmental processes
- ⇒ workplace safety processes
- ⇒ work practices

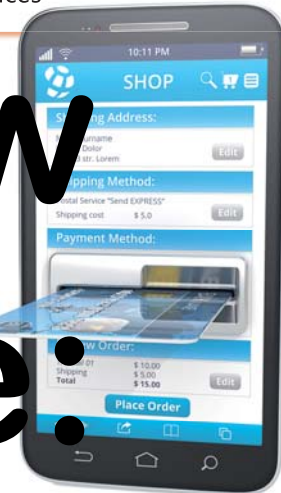


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## Outputs

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 education services for students. This list is also 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. An 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.*

### Inputs

- ⇒ goods or services
- ⇒ consumer goods
- ⇒ consumer services
- ⇒ producer goods
- ⇒ producer services

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## 9.07 Transformation Process

### Industry classification

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) this year you are required to investigate an 'unfamiliar' industry different from your VET studies. 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 features primary, secondary and tertiary industry sector classifications.

- ⇒ **Primary industry** is involved in raw materials such as farming, mining, fishing, logging and so on.
- ⇒ **Secondary industry** is involved in physical processes 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 into 3 further sectors:

- ⇒ **quaternary industry** provides practical 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, community and cultural services, such as health, emergency services, and arts and recreation.

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

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'm going through an identity crisis. Do I work in fast-food, hospitality, restaurant, retail, accommodation and food services or some other industry?



### A Industry classification

Classify each of these industries according to the 5-stage method, and also according to ANZSIC. Do this for the industry you are investigating.

Retail trade	Manufacturing	Agriculture	Medical	Your industry
Transport	Construction	Business Services	Food services	

### Which industry?

In order to properly identify your industry for the 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. *H: Accommodation & Food Services*

⇒ *H44: Accommodation*

⇒ *H45: Food and Beverage Services*

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

e.g. *H45: Food and Beverage Services* gets further broken down into:

⇒ *451: Cafés, Restaurants and Takeaway Food Services*

⇒ *452: Pubs, Taverns and Bars*

⇒ *453: Clubs (Hospitality)*

### Naming your industry

Last year you learned that many VET training packages are closely aligned with ANZSIC industry classifications. Once again this could help you name your industry. Alternatively, you might consider using industry names that are used for the **Industry Modules** as part of **safe@work**.

Many industry stakeholders describe the industry they belong to by using a term that relates directly to the nature of the goods and services they produce or provide. This might especially be the case when you are talking with an owner or manager. You might say that they are part of the plumbing industry, the milk bar industry, the coffee industry or even the eel farming industry.

If the industry stakeholders you deal with for your Numeracy-based Project use an 'informal' name to classify their industry, then 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 that industry name. But if you do adopt an informal industry name, then you need to know which ANZSIC industry it corresponds with, so that you can compare with official statistics. Ask your teacher for advice.

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

#### ANZSIC Industry classifications

A: Agriculture, Forestry and Fishing	L: Rental, Hiring and Real Estate Services
B: Mining	M: Professional, Scientific and Technical Services
C: Manufacturing	N: Administrative and Support Services
D: Electricity, Gas, Water and Waste Services	O: Public Administration and Management
E: Construction	P: Education and Training
F: Wholesale Trade	Q: Health Care and Social Assistance
G: Retail Trade	R: Arts and Recreation Services
H: Accommodation and Food Services	S: Other Services
I: Transport, Postal and Warehousing	
J: Information Media & Telecommunications	
K: Financial and Insurance Services	

#### Industry Modules: safe@ work

- ⇒ Automotive
- ⇒ Building and construction
- ⇒ Electrical
- ⇒ Hairdressing
- ⇒ Health & community services
- ⇒ Horticulture
- ⇒ Hospitality & tourism
- ⇒ Manufacturing
- ⇒ Metals and engineering
- ⇒ Office and business services
- ⇒ Painting
- ⇒ Plumbing
- ⇒ Primary industry
- ⇒ Retail
- ⇒ Veterinary



## 9.09 Transformation Process

### B Inputs, processing and outputs

#### 1. Inputs

- a. List the key inputs usually required by a take-away food enterprise (your choice).
- b. List the key inputs usually required by a education (school) enterprise.
- c. List the key inputs usually required for an enterprise of your choice.
- d. What are some of the most relevant measurement ratios and analysis ratios related to inputs that would be used in each of these types of enterprises?
- e. Share and discuss with your class.
- f. Compare the importance of different types of inputs used by a goods-producer (such as a food manufacturer or a furniture maker), and a service provider (such as a beauty therapist or a lawyer).

#### 2. Processing

- a. List the different processes involved in transforming bulk potatoes and other ingredients into chips!
- b. List the processes involved for a retail clothing enterprise.
- c. List the key processes regularly undertaken for an enterprise of your choice.
- d. What are some of the most relevant measurement ratios and analysis ratios related to processing that would be used in each of these types of enterprises?
- e. Share and discuss with your class.
- f. Compare the importance of different types of processes used by a goods-producer (such as a food manufacturer or a furniture maker), and a service provider (such as a beauty therapist or a lawyer).

#### 3. Outputs

- a. List the outputs usually produced by a footwear manufacturer.
- b. List the outputs usually provided by a hairdresser/barber.
- c. List the outputs usually produced by an enterprise of your choice.
- d. What are some of the most relevant measurement ratios and analysis ratios related to outputs that would be used in each of these types of enterprises?
- e. Share and discuss with your class.
- f. Compare the 'form' of the different types of outputs created by a goods-producer (such as a food manufacturer or a furniture maker), and a service provider (such as a beauty therapist or a lawyer).

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1. What is the transformation process? Give an example.

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

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

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

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

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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.

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## 9.11 Supply Chain

### Supply chain

One way to consider the different industries and industry participants involved in the transformation process is to investigate a supply chain.

A supply chain refers to all the supplier organisations that work together to provide components, materials and support services to an enterprise so that it can make its products. These products include both **producer goods and services** (**intermediate products** that are used by enterprises to make other products), as well as **consumer goods and services** (**final products** that are sold to their end-user).

A supply chain includes all the stakeholders that are involved in the production of the good or service. This of course involves the enterprise that is producing the goods or services, as well as all of the suppliers, contractors and sub-contractors that may be involved in **downstream** or **upstream** processes.

Enterprises use inputs to produce finished goods, such as a bakery producing bread rolls to sell to the public; or to make intermediate goods that are used by other producers, e.g. the bakery producing thousands of bread rolls for cafes and shops.

An enterprise sources inputs, both goods and services, from suppliers who are 'upstream' from them. For example:

- ⇒ McDonald's source their chicken from Inghams or Steagles
- ⇒ Many beverage manufacturers such as Coca-Cola, milk source their drink containers from Amcor
- ⇒ Linfox provides freight services for the Coles group of supermarkets, Liquorland, Kmart and Target stores
- ⇒ Visy provides packaging products for thousands of other business across many industries.

As they are all **B2B** 'customers' of each other, producers rely on all members of the supply chain to provide quality goods and services in a timely fashion. If one link in the supply chain fails then the final product is in jeopardy.

### Industry clients

All members of a supply chain are **industry clients** with one another. The supplier stakeholders usually operate '**upstream**'. They provide a good or service and 'send it on' to the next user. Whereas the final user of the product, the external customers, usually exist, '**downstream**'. They receive the finished product.

Of course many businesses buy finished products from one supplier, then use these as components in new finished product (e.g. fibreglass and steel panels for caravan manufacturing).

Others buy finished products and turn them into new products (e.g. fresh vegetables bought from wholesaler and then used in a restaurant).

Some industries deal almost exclusively with external clients from the general public, such as retail, personal service and accommodation and food service enterprises.

Other industries deal mainly with external clients within other industries, such as wholesale trade, manufacturing and mining. You don't just rock up at a Rio Tinto coal mine and ask for a wheelbarrow of coal do you now?

### Internal supply chain

You can also apply the concept of a supply chain to all of the internal process that make up the transformation process with an enterprise. This applies equally to small, medium and large-sized organisations.

Each person, team or department in the transformation process relies on, and trusts, in the ability of others to do their roles. If the process breaks down then the result is inefficiency, poor quality, lack of service, waste, conflict and other negative outcomes.

We often see this when Gordon Ramsay is screaming at some hapless restaurateur or hotelier, because back-of-house and front-of-house can't co-ordinate their processes to produce and serve a simple meal. Have a watch of *Kitchen Nightmares* or *Hotel Hell* and see for yourself.

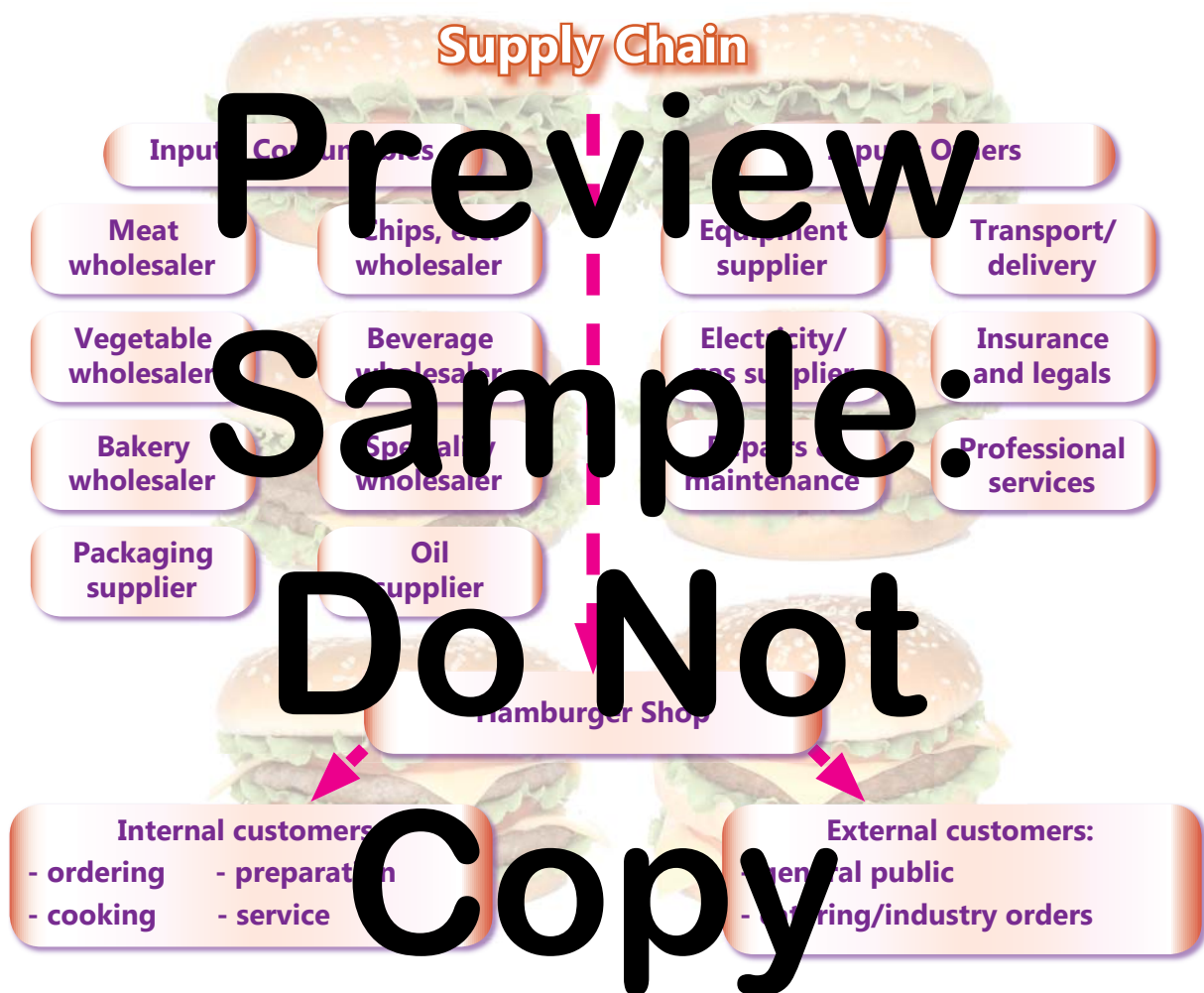


Image: rozelt/  
Depositphotos.com

### Supply chain A

1. Draw a diagram to show all of the participants in the supply chain that would be involved in getting a hamburger into the hands (and soon the mouth) of its final consumer. Which industries would be involved?
2. Visit McDonald's Australia's website at: [www.mcdonalds.com.au](http://www.mcdonalds.com.au)



You can search through Learn to find out about the members of its supply chain.

## 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?



**Appropriate tools and equipment, as well as the training and skills to use these, can improve efficiency.**

Image by alexarts/iStock/Thinkstock

### Productivity

We measure efficiency by calculating productivity. **Productivity** simply measures the **ratio of outputs** compared to the **ratio of inputs**. Out versus in.

For example, if it takes one chef one hour to prepare 10 pizzas, then this chef has a productivity rating of 10 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. This 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 12 per hour using a high-pressure hose. This means that the use of the hose increases productivity by 100%; i.e. 12 cars per hour versus 6 cars per hour. Technology has made this employee much more (and 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.

e.g. Sal can make 20 burgers per hour at a takeaway.

$$\Rightarrow \text{Productivity} = \frac{20 \text{ (burgers)}}{1 \text{ hour}} = 20 \text{ units (burgers) per hour} \\ \text{(i.e. 1 burger every 3 minutes.)}$$

e.g. Sal is paid \$20 per hour.

$$\Rightarrow \text{Productivity} = \frac{20 \text{ (burgers)}}{\$20} = 1 \text{ unit (burger) per dollar.} \\ \text{(And 1 whole burger 'costs' \$1 in Sal's labour.)} \\ \text{(i.e. Labour cost = \$1 per burger.)}$$

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## Productivity A

1. In one sentence describe the meaning of productivity. In another sentence give a numerical example from a workplace to support your explanation.

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2. Calculate the productivity of each worker per week per day and per hour. They each work a 38 hour week with 8 hours days.

Ren can sew 20 jackets a day.	Schtmp can assemble 8 pairs of leather gloves per hour.	Alain is able to serve 48 customers each 4 hour shift.
Dolores is able to serve 18 customers per hour.	Gronk can train 12 clients per 8 hours day.	Niko can make 18 cupboards every 4-hour shift.

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

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4. List some productivity measures that might be relevant for your industry.

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## 9.15 Fixed and Variable Costs

### 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 they sell, they will always have to first meet these fixed costs. These might include initial establishment costs; and also rent, basic payments such as overheads just to stay open including wages and salaries and other expenses. When the enterprise has to cover its variable costs, they will have to have an appropriate **margin** on its sales and services. Then if there is anything left over, after taxes, the owner might record a profit based on its sales or service income.



- ⇒ Total fixed costs should be calculated on a weekly basis.
- ⇒ For example, a new restaurant might have \$250,000 of fixed costs including rent, equipment, wages and other basic expenses that must be covered regardless of how well it is doing! So this equates to \$5,000 per week.
- ⇒ The restaurant might have an average variable cost of \$10 per meal which includes ingredients, extra staff, extra electricity and so on.
- ⇒ If the average spend per customer is \$20 then this means that they have an average variable gross margin of \$10 per sale.
- ⇒ In order to cover their fixed costs over the year they will need to service 25,000 customers ( $\$250,000 / \$10$ ). On a weekly basis that is  $\$5,000 / \$10 = 500$  customers.
- ⇒ That is almost 72 customers, every day, for 7 days a week for 50 weeks. Just to cover costs! A tough gig!

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## Fixed and variable costs A

1. What is the difference between fixed costs and variable costs? Use examples from an enterprises within an industry to illustrate your answer.

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A café has \$35,000 of annual fixed costs including rent, equipment and other basic expenses. About half the customers buy coffee only, averaging \$2 per spend with a \$2 variable cost per coffee. The other half of the customers buy coffee and a snack averaging \$16 with a variable cost of \$9 per spend.

2. How much does the café need to make just to cover its weekly fixed costs? How many 'coffee only', or 'coffee and snack' transactions might this be?
3. Based on their current sales pattern, how many 'coffee only' and 'coffee and snack' customers per week are needed to cover their fixed costs?

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Applied:

1. Choose an industry in which you are interested and list all of the fixed and variable costs that enterprises within this industry would usually experience.
2. Estimate amounts and %'s to show whether fixed costs, or variable costs, would be likely to account for a higher proportion of expenses.
3. How does 'economies of scale' help an enterprise deal with its fixed costs?

## 9.17 Break-Even Analysis

### Break-even analysis

Break-even analysis relates to an understanding of the **margins** involved in an enterprise. It helps a business operator work out how many units they need to clear before they start making a dollar.

### Gross margin

Gross margin refers to the difference between the sale price of an item and the cost of that item.

For example, a milk bar might sell a Mars Bar for \$2. If that Mars Bar cost \$1 to purchase then the gross margin is \$1 or 100%!

By the way, many people mistakenly think that the best way to work out a selling price is to double the cost price. If you follow that 'rule' then you'll find in many businesses you'll be broke within a month; and in the remainder of businesses you will never sell any items and probably be broke within a month!

### Net margin

Net margin is a more valid measure because it takes into account all those other expenses, both fixed and variable that you have to account for.

You calculate your net margin by subtracting your total expenses from your total sales. This leaves a dollar amount which equates in simple terms to net profit (before tax).

For example, the milk bar might have \$3,000 of sales a week, \$1,000 of fixed costs such as rent and \$700 of other costs.

The cost of goods sold might be \$1,000 (for that \$3,000 amount of sales).

Therefore its total expenses = \$2,700. Net profit (before tax) = \$300.

Total sales were \$3,000 so the net margin is 10% ( $\$300/\$3000 \times 100\%$ ).

How does that sound to you? Can a retailer survive on a net margin of just 10%?

☛ But what would happen if the milk bar was able to increase sales to \$1,000 per week? What would be the impact on its net margin?

### Personal applications

A break-even analysis can even apply to your own personal costs associated with working. For example, if you are travelling 30km each way by car to do a 4-hour shift for \$10 per hour, then is it worth it, from a financial point of view? What do you think?

☛ That is one of the issues associated with casual work for younger people (and older people as well) and also why many younger casuals get their parents to drive them to work!

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**Break-even point**

- ⇒ You need to know the likely selling price of each unit (e.g. \$60).
- ⇒ You also need to know the (variable) cost per unit (e.g. \$15).
- ⇒ You also need to know total overhead expenses, i.e. your 'fixed' costs (e.g. \$20,000).

$$\text{Break-even point} = \frac{\text{Overhead expenses}}{(1 - (\text{Cost of Goods Sold} / \text{Total Sales}))}$$

$$\text{Break-even point} = \frac{\$20,000}{(1 - (\$15/\$60))} = \frac{\$20,000}{(1 - 0.25)} = \frac{\$20,000}{0.75}$$

Break-even point = \$26,666.67 of sales.

- ⇒ Break-even number of units to sell:  $\text{Overheads} / (\text{Selling price} - \text{cost price})$   
 $= \$20,000 / (\$60 - \$15) = 444.44$

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# Preview

# Sample:

Break-even: Jan's Jams A

**Part A: Breaking even**

Consider the following information and complete the questions in your workbooks.

Jan's Jams is a local micro manufacturing enterprise running from her home. Jan makes jams, preserves and other culinary delights and pickles. Because she works from home her overheads are quite low. It costs her about \$25,000 (ex GST) per year to run her business, including the cost of goods sold.

Her average selling price is \$8 (ex GST) and the average cost of making these items and the packaging is \$2.50 (ex GST).

1. How much are Jan's fixed costs per year?
2. What is her gross margin on sales?
3. Calculate the break-even point for Jan's Jams.
4. How many units would she need to sell to achieve this?

Jan is thinking of expanding and hiring a small studio kitchen. This will reduce her cost per item by 50% but the rent and new set-up will double her fixed costs annually.

5. Calculate the new gross margin, break-even point and break-even units per year.
6. What would you advise Jan about her plans to expand?

Applied:

What numeracy skills and techniques would you need to use to calculate the break-even point for enterprises within an industry that you are investigating? Give it a try.

## 9.19 ABC Inventory/Sales Analysis

### ABC Inventory/Sales analysis

The **80-20 rule** says that generally you can assign the bulk of outcomes to a few major causes. Most problems and issues are due to a few significant factors and the others are usually trivial. Focus on the major items and this will lead you to solving the core of your problems. ABC analysis uses this 80-20 approach to inventory (stock) and sales management. ABC analysis involves 3 categories reflecting the relative dollar value, importance of the stock, or sales, to an enterprise.

- ⇒ **Class A items:** Fewer items but higher total spending and investment.
- ⇒ **Class B items:** Moderate amount of items with moderate spending and investment.
- ⇒ **Class C items:** Lots of items but lowest total spending and investment.

For example, a hardware store may carry thousands of small lines but with only an overall relatively minor total inventory investment and lower potential return per item.

They make money on these **Class C items**, such as hardware fixings, masking tape and batteries through high volume sales. Because these are items in which the organisation invests the smallest amount, this gives them the highest count, for 10% of total dollar spending on all inventory. The number of inventory items may be quite high, perhaps 50% or more. So we can say that these Class C items are the low cost items of inventory that account for the smallest proportion of costs. But together they generate a lot of individual low-value sales, usually in conjunction with Class B items; and hopefully they encourage the purchase of Class A items because they attract customers into the store.

The store might also have a range of moderately priced **Class B items** that account for a fair amount of their inventory investment. These items might record steady and consistent sales. They make a consistent return on items such as hand tools and paint because these are purchased frequently and regularly across their customer base. The investment in Class B items might account for 15%-25% of total dollar spending on all inventory, but the number of inventory items may be moderate, perhaps 20-35%. So we can say that these are the mid-range items of inventory that account for some of the costs while generating a steady return.

The store might also carry a small range of high-priced **Class A items**, but these might account for a larger proportion of their inventory investment. These could include quality items such as trade-level power tools, outdoor settings and fancy BBQs. Although these goods are sold less frequently, they do provide a high return on each item sold. The investment in Class A items might be as high as 70-80% of total dollar spending on all inventory, but the number of inventory items may be quite small, perhaps 20% or lower.

So we can say that these are the more expensive items of inventory that account for a lot of the costs, but potentially a lot of the revenue.

Image: Purestock/Thinkstock



# Numeracy-Based Project Plan<sup>10</sup>

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Comments:

## 10.01 PODR Planning

### Achieving goals

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 times it can be daunting to achieve long-term goals. Some people find it hard to effectively plan and organise themselves to achieve their strategic goals. These people can struggle to plan and organise to do the right things, at the right times. This is a bit like the anxiety that the media 'says' that Year 12s should feel when leaving school and going on to study at TAFE or uni or to join the workforce for the next 50 years!

But you're not like that, just as some of you experienced last year when doing your investigation for Numeracy Intermediate Unit 2. You know that goal-setting and planning helps to build resilience. And the 'media' and other noisy parties don't often speak to enterprising VCAL and Applied Learning students who have built resilience, flexibility and adaptability over the course of their studies.

Once again, 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.

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### A Learning from the past

Did you do the Numeracy-based Project plan for Numeracy Intermediate Unit 2? If so, list things you did well; and improvement strategies that you can apply this year.

## 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.

*e.g. 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.

*e.g. Work out all the required tasks, resources, people and timelines needed to achieve the main 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 well beforehand.

*e.g. Undertake your investigation of 8 enquiry-based tasks in the workplace on an ongoing basis. In doing so, 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.*

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

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## PODR the past B

Discuss examples when you have previously applied PODR skills. As a class come up with a list of the most important numeracy skills that you should use as part of planning, organising, doing and reviewing for your Numeracy-based Project Plan.




## 10.03 My Project Plan

### 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 at certain stages throughout 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 8 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  
✓ the skills you have learnt  
⇒ Describe your methods to communicate the data.  
⇒ Discuss potential issues and problems.  
⇒ Determine the need to work with others.

**1C: Doing - Apply a range of numerical skills to investigate your industry**  
Research 8 enquiry-based tasks.  
⇒ Choose numerical processes to find and collect data.  
⇒ Collect relevant data.  
⇒ Apply problem-solving strategies.  
⇒ Estimate, calculate and describe the data.  
⇒ Analyse the data.

**1D: Planning, organising, doing and reviewing - Present your data using software tools and devices**  
Use software tools & devices.  
⇒ Describe those you could use and their advantages and disadvantages.  
⇒ Explain which one best represent the data.  
⇒ Use these to represent and communicate your data.  
⇒ Evaluate these for showing and representing 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 guide you in developing your plan. 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)					
Requirement	Information/Explanation		Due dates/Done		
What is my overall goal?					
a. Select your <b>industry</b> area.					
b. & c.	<b>Inputs:</b> Enquiry-based tasks I will investigate are:				
	Consult with your teacher and choose 8 enquiry-based tasks to investigate				
	<b>Processing:</b> Enquiry-based tasks I will investigate are:				
Have you chosen at least <input type="checkbox"/> 1 for each of the 3 <b>industry stages</b> , and <input type="checkbox"/> 1 from each of the 4 <b>Numeracy focus areas</b> ? Tick these off.		<u>Number</u> Inputs: <input type="checkbox"/> Processing: <input type="checkbox"/> Outputs: <input type="checkbox"/>	<u>Measurement</u> Inputs: <input type="checkbox"/> Processing: <input type="checkbox"/> Outputs: <input type="checkbox"/>	<u>Financial Numeracy</u> Inputs: <input type="checkbox"/> Processing: <input type="checkbox"/> Outputs: <input type="checkbox"/>	<u>Probability &amp; statistics</u> Inputs: <input type="checkbox"/> Processing: <input type="checkbox"/> Outputs: <input type="checkbox"/>
d.	Develop a <b>plan</b> with: <input type="checkbox"/> your aims <input type="checkbox"/> required numeracy skills <input type="checkbox"/> your overall timeline <input type="checkbox"/> 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** for your overall project.



Your teacher will guide the class in developing your plan, but try to complete your plan 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.

1b: Organising - Design your Numeracy-based Project Plan (LO1 e-j)			
	Requirement	Information /Explanation	Due dates/Done
e.	Develop your <b>timeline</b> for completion including ongoing drafting and reporting stages.		
f.	Identify: <input type="checkbox"/> <b>numerical skills</b> processes <input type="checkbox"/> <b>software tools &amp; devices</b> <input type="checkbox"/> <b>other skills</b> you will use. Explain why you have chosen to use these.		
g.	Describe how you will use <b>software tools and devices</b> to present your data.		
h.	Describe the <b>communication media and techniques</b> that you will use to present your data.		
i.	Identify and discuss <b>issues and problems</b> that might prevent you from doing your investigations effectively.		
j.	<b>Work with others</b> , when and where required, to develop your plan.		

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**1b: Project Timeline**

Create your project timeline here. Break the project timeline into 1 week intervals.  
List key tasks and milestones you will need to achieve.

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10.07 My Project Plan - Doing

AT1c Numeracy-based Project - Doing

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 guide the class in developing this stage of your plan, but try to complete your plan 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.

1c: Doing - Apply a range of numerical skills to investigate your industry (LO2 a-g)			
	Requirements	Information	Explanation
			Due dates/Done
a.	Research your enquiry-based tasks.		
b.	What numerical processes will you use to collect data for each of these 8 enquiry-based tasks?		
c.	Collect relevant data related to these 8 enquiry-based tasks. Apply techniques such as estimation, computation and use of technology.		
d.	What numerical problem-solving strategies will you use for your investigations. How will you use these; and why?		
e.	Use the data to make estimates and calculations. Describe what your estimates and calculations suggest.		
f.	Discuss the difficulties you experienced in collecting the data and information.		
g.	Use 2 or more methods to analyse the data related to each of the 8 enquiry-based tasks.		

1c: Doing - Apply a range of numerical skills to investigate your industry (LO2 a-f)	
<p><i>Enquiry-based task 1</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>	<p><i>Enquiry-based task 2</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>
<p><i>Enquiry-based task 3</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>	<p><i>Enquiry-based task 4</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>
<p><i>Enquiry-based task 5</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>	<p><i>Enquiry-based task 6</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>
<p><i>Enquiry-based task 7</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>	<p><i>Enquiry-based task 8</i></p> <p>Description:</p> <p>Numerical processes:</p> <p>Key data:</p> <p>Problem-solving strategies:</p> <p>Data estimates &amp; calculations:</p> <p>Analysis of data:</p>

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## 10.09 My Project Plan - Software

### AT1d Numeracy-based Project - Software Tools & Devices

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 guide the class in developing this stage of your plan, but try to complete your plan 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.

1d: Planning, organising, doing and reviewing - Represent your data using software tools and devices (LO3 a-f)		
Requirement	Information/Explanation	Due dates/Done
a. Describe the <b>software tools and devices</b> that you could use to show the data from your investigation of the 8 enquiry-based tasks.		
b. Discuss <b>advantages and disadvantages</b> of those <b>software tools and devices</b> in representing your collected data.		
c. Explain which <b>software tools and devices</b> are most <b>like to best represent the data</b> you have collected; and say why.		
d. Use the <b>software tools and devices</b> to <b>represent and communicate the data</b> you have collected for your investigation into the 8 enquiry-based tasks.		
e. Evaluate the <b>effectiveness</b> of your <b>chosen software tools and devices</b> in showing and representing your findings.		
f. Use <b>more than 2 types of software tools and devices</b> .		

## Numeracy-based Project - Reporting AT1e

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 guide the class in developing this stage of your plan, but try to complete your plan 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.

1e: Doing and reviewing - Communicate your findings from your investigation (LO4 a-e)		
Requirement	Information, explanation	Due dates/Done
a. <b>Communicate your results effectively using appropriate mathematical language.</b>		
b. <b>Communicate your results effectively using appropriate mathematical symbols and conventions.</b>		
c. <b>Communicate your results effectively using suitable software and tools.</b>		
d. <b>Communicate your results to a relevant audience (as negotiated with your teacher).</b>		
e. <b>Evaluate your performance in this investigation including:</b> - 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.		

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## 10.11 Assessment Task Planner

<b>Name:</b>		<b>Dates:</b>			
<b>Industry:</b>					
<b>Tasks - AT1: Design your Numeracy-based Project Plan</b>		<b>Re- quired</b>	<b>Due by</b>	<b>Done</b>	<b>Teacher initials</b>
<b>Stage 1a:</b>					
		<input checked="" type="checkbox"/>			
		<input checked="" type="checkbox"/>			
<b>Stage 1b:</b>					
		<input checked="" type="checkbox"/>			
<b>Stage 1c:</b>					
		<input checked="" type="checkbox"/>			
<b>Stage 1d:</b>					
		<input checked="" type="checkbox"/>			
		<input checked="" type="checkbox"/>			
<b>Stage 1e:</b>					
		<input checked="" type="checkbox"/>			
		<input checked="" type="checkbox"/>			
<b>Reporting</b>					
⇒ Prepare and submit your final report.		<input checked="" type="checkbox"/>			
⇒ Prepare a report to the class (if required).		<input checked="" type="checkbox"/>			
⇒ Present your final report to the class (if required). 		<input checked="" type="checkbox"/>			
<b>Additional information:</b>					
Signed: _____ Date: _____					

# Industry Stages - Inputs 11

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Comments:

## 11.01 Inputs

### Inputs

Inputs are the resources that are 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.

### Inputs

Enterprises combine varied inputs in different proportions, and utilise these inputs as part of goods and/or processing to produce outputs. Key inputs can be in the form of:

- time
- raw and processed materials
- ingredients
- consumables
- inventory (stock)
- manual labour
- service labour
- technological labour
- capital investment
- information
- information labour.

### 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 your 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 amounts, and \$ costs
- calculate materials, labour and other input usage and productivity ratios.

### Applied Numeracy Projects

These are potential investigations that would suit **inputs** for most industries.

- **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. (PS)
- **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 can negotiate with your teacher to investigate other industry-specific, inputs-related issues that might better suit the nature of your industry or investigation.

1. Outline the various inputs commonly used by enterprises across industry generally.
2. Describe the specific types of inputs used by an enterprise from an industry of your choice.

1: Inputs generally	2: Inputs specifically for:
Materials:	
Labour:	
Equipment:	
Capital:	
Information:	
Other:	

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## 11.03 Inputs - Materials

### Materials

Materials as part of the transformation process can include:

- ⇒ **raw materials**
- ⇒ **processed materials**
- ⇒ **stock** (inventory)
- ⇒ **consumables**.

#### Raw materials

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

Goods-producing industries such as agriculture, forestry and fishing, mining, materials manufacturing and a fresh food manufacturers make extensive use of raw materials as inputs in their transformation processes. Key examples include:

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

#### Processed materials

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

Processing is carried out by goods-producing manufacturing industries involved in grain milling, food processing, textiles and fibre processing, rubber processing, oil refining, metals smelting, non-metal processing and fossil fuel oil refining. Some key 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.

#### Stock

Stock (inventory) includes both raw and processed items that are supplied and sold as **trading stock** by wholesalers and retailers.

Stock also includes materials used as **production stock** by enterprises throughout all industries to produce their goods, or to provide their services. e.g. Flour for bakers, timber for carpenters, hair care products for hairdressers, food ingredients for a restaurant and engine parts for a mechanic.

Examples of trading stock and/or production stock include:

- ⇒ fresh food and vegetables supplied by wholesalers, markets and retailers
- ⇒ manufactured items of processed materials and goods supplied by wholesalers, markets and retailers
- ⇒ products for sale in shops, e.g. groceries, clothing, shoes, electrical, household items.

#### Consumables

Consumables are all those other material inputs that any enterprise naturally uses up as part of the production of goods, or the provision of services. These are the materials that the enterprise needs on hand to support its operations. Enterprises don't sell these consumables otherwise they would be treated as stock. Instead they 'consume' dozens of different types of day-to-day supplies in their operations.

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 many services that use transport, office supplies are consumables for almost every enterprise, and screws, nuts, bolts, cables and other small fixings would be consumables for many trades and practical and manual enterprises.

Some enterprises get truckloads of materials or stock each month, each week, each day, or even more than once a day from different suppliers!



Images adapted from:  
iStockphoto.com

# Preview

Inputs - Materials B

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.

Industry	Enterprise(s):
What do they do? (sell, produce, provide)	
Materials: Classify these as raw materials (RM) or processed materials (PM).	
Stock: What stock items do they buy up or sell? Consider production stock and trading stock.	
Consumables: What other items do they use up as part of their operations?	

# Sample: Do Not Copy

## 11.05 Inputs - Materials

### Numeracy in action

Some of the most relevant areas for you to investigate for the **inputs stage** of your Applied Numeracy Projects are the varied amounts, measures, costs and patterns of usage 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 this checklist 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. So the data and numerical information that you collect through your investigations might be useful for more than one focus area.

# Preview

### 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.

Materials Inputs and Consumables	Trading Stock and Production Stock
<input type="checkbox"/> Classifying different types of materials, ingredients and consumables. (N)	<input type="checkbox"/> Identifying patterns in materials usage and costs. (FN,PS)
<input type="checkbox"/> Estimating and calculating the total amounts (quantity) and weights of different types of materials, etc.. (N,M)	<input type="checkbox"/> Estimating and calculating the total quantities of stock. (N,M)
<input type="checkbox"/> Investigating the measurements of different materials, etc.. (M)	<input type="checkbox"/> Investigating the measurements of different stock items. (M)
<input type="checkbox"/> Measuring different types of materials, etc.. (M)	<input type="checkbox"/> Estimating and calculating costs of specific stock items. (FN)
<input type="checkbox"/> Estimating and calculating costs of specific materials, etc.. (FN)	<input type="checkbox"/> Working out quantity and cost proportions, and ratios of different stock items. (M,FN)
<input type="checkbox"/> Working out proportions and ratios of different materials, etc.. (N,M)	<input type="checkbox"/> Estimating and calculating total stock costs. (N,FN)
<input type="checkbox"/> Working out cost proportions and ratios of different materials, etc.. (M,FN)	<input type="checkbox"/> Estimating and calculating waste of stock. (N,FN)
<input type="checkbox"/> Estimating and calculating total material costs. (FN)	<input type="checkbox"/> Comparing stock costs from different suppliers. (FN,PS)
<input type="checkbox"/> Estimating and calculating total ingredient costs. (FN)	<input type="checkbox"/> Comparing stock costs over time. (FN,PS)
<input type="checkbox"/> Estimating and calculating total consumables costs. (FN)	<input type="checkbox"/> Comparing stock costs with other firms or industries. (FN,PS)
<input type="checkbox"/> Estimating and calculating amount of waste and the cost of waste of materials and ingredients. (M,FN)	<input type="checkbox"/> Comparing alternative types of stock, including sustainable materials. (N,FN,PS)
<input type="checkbox"/> Investigating and evaluating waste ratios. (M)	<input type="checkbox"/> Predicting patterns in stock usage and costs. (N,PS)
<input type="checkbox"/> Comparing material costs from different suppliers. (N,FN)	<input type="checkbox"/>
<input type="checkbox"/> Comparing materials costs over time. (FN,PS)	<input type="checkbox"/>
<input type="checkbox"/> Comparing materials costs to other firms or industries. (FN,PS)	
<input type="checkbox"/> Comparing alternative types of materials, including sustainable materials. (M,FN,PS)	

### ANP - Beefy Burgers

Chaxxsen is investigating Beefy Burgers which is part of the Accommodation and Food Services industry. After interviewing the owner, and being allowed to analyse some spreadsheets and invoices he has obtained the following data and information related to the areas of Number, Measurement, and also Financial Numeracy.

- ⇒ The hamburger shop orders approximately 100kg of beef mince per week to make its own patties.
- ⇒ Each hamburger patty weights about 200g.
- ⇒ The hamburger patties need to be about 8cm diameter and about 1.5 to 2cm thick.
- ⇒ The shop chef can make 5 patties per kg of mince, 50kg of mince can make about 250 hamburger patties.
- ⇒ The mince for each patty costs about 50 cents.
- ⇒ A standard burger will also include about 300 grams of other items. That means the meat to other ingredients ratio is about 1:1.5.
- ⇒ The buns are baked fresh daily but only about 80% of these are used.
- ⇒ A standard burger also includes cheese, tomato, onions, lettuce and sauce.
- ⇒ The cost of these other items is about 50c per cheese slice, 10c per slice of tomato, 10s of lettuce, 5c per serve of onions and about 20c for squirt of sauce.
- ⇒ The shop also sells other items such as fried chips and drinks. It orders about 100kg of chips a week.
- ⇒ The frozen chips cost about \$1.50/kg.
- ⇒ About 1 in 3 customers buys chips with a burger.
- ⇒ About 1 in 10 customers buys chips only.
- ⇒ The serving sizes of chips are small (about 200g), medium (about 350g), large (about 500g) and family (about 1kg).
- ⇒ Stock of beverages includes cola, lemon, orange, lemonade, favoured mineral water, sports drink, still water and orange juice.
- ⇒ The hamburger shop has an electricity bill of about \$2,000 per 3 months.
- ⇒ The hamburger shop has a gas bill of about \$1,500 per 2 months.

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### Inputs - Materials in action B

Consider the information gathered by Chaxxsen from Beefy Burgers. Suggest 2 focus areas you would recommend to use for his ANP. Describe some calculations that Chaxxsen could make based on the numerical data and information he has collected.

Focus area 1:	Focus area 2:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

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 these **ANP: Inputs - Materials Investigation** pro-formas.

ANP Inputs Materials	ANP: Inputs - Materials Investigation 1	
	Inputs: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Preview	
	Numerical techniques and technologies I will use to organise and use the data.	
	Sample:	
	Estimates related to the data and information.	
	Do Not	
	Calculate using the data and information.	
	Copy	
Summary information about the data and information.		
	ANP Inputs Materials	

## ANP: Inputs - Materials Investigation 2

Inputs: EBT Focus area: ANP 2

ANP  
Inputs  
Materials

Numerical processes I will use to collect data and information.

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

# Preview

Estimates related to the data and information.

# Sample:

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Calculations using the data and information.

# Copy

Summary information about the data and information.

ANP  
Inputs  
Materials

## 11.09 Inputs - Labour

### Labour

Labour refers to the human effort that goes into the transformation process. 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!

Labour involves the:

- ⇒ **skills of workers**
- ⇒ **level of worker expertise**
- ⇒ **time and its associated labour cost that a worker puts into a task.**

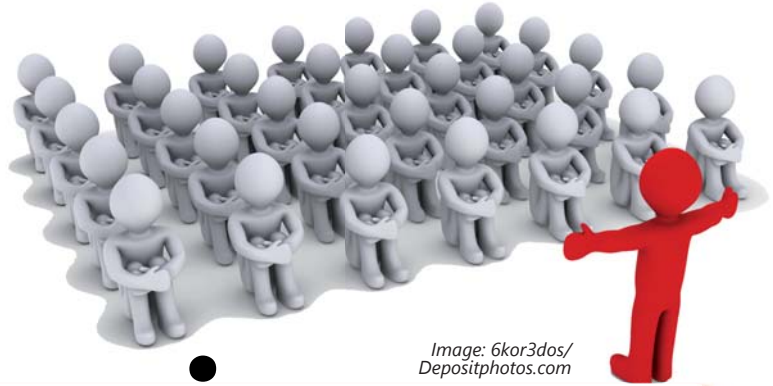


Image: 6kor3dos/  
Depositphotos.com

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Time is one of the key measures of labour as an input. Wage-earning workers are employed for set lengths of time as part of their shifts. Some work overtime. Salaried workers are not employed on an hourly basis. Many award and registered agreements have recommended weekly hours for salaried workers but include lots of unpaid overtime.

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 restaurant might need 400 people-hours per week for back-of-house and food prep and in the kitchen, 600 hrs/week for the front-of-house, and another 100 hrs/week for support job roles.

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

But it is important to remember that different workers might cost more or less to the enterprise. e.g. Juniors and apprentices are 'cheaper', casuals may cost more per hour and managers will usually be paid more, but are likely to work unpaid overtime.

e.g. A retailer employs a full-time adult, an adult casual, a junior casual, a 17 year-old full-time trainee and a store manager. So who do you think is more likely to be rostered on for the Sunday shifts? And why so?

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

e.g. If a chef only makes 30 meals on a slow night they will be paid the same as if they were making 100 meals on a very busy night. So if the chef is paid \$300 for their night's work, this means that the slow night costs:

- ⇒ \$10/meal (\$300/30 meals) in chef labour
- ⇒ \$3/meal (\$300/100 meals) on the busier

Labour time and/or cost can be counted or calculated by:

- ⇒ how many workers are needed
- ⇒ how many labour hours are required
- ⇒ when times (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 salaried worker
- ⇒ cost of contracted or outsourcing labour

- ⇒ various productivity ratios related to any, or all, of the above.

So which of these measures do you think would suit your industry investigation?



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iStock/Thinkstock.com

### Labour: Skills and expertise

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

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.

e.g. If you pay peanuts then you get monkeys!

Different tasks may require various levels of expertise, including highly skilled specialists, supervision and management staff, 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
- ⇒ employing Australian Apprentices
- ⇒ employing newly qualified recent graduates
- ⇒ some job tasks have higher labour costs due to expertise needed
- ⇒ cheaper labour vs more expensive and experienced expertise
- ⇒ paying salaries vs paying wages.

# Preview

Image: extracted from: <https://www.depositphotos.com/11111111/11111111/11111111.html>



# Sample:

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.

Enterprises:

What do they do: i.e. sell, produce or provide?

Common job tasks required:  
e.g. Pre-cutting all salad items.

Labour inputs needed:  
e.g. At least one worker to be here before opening, for 3 hours.

Other skills/expertise needed:  
e.g. Might need a supervisor.

# Do Not

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## 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 this checklist and see which might apply to the industry (and enterprises and work settings) you are investigating for your Applied Numeracy Projects.

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. Some data and numerical information that you collect through your investigation might be useful for more than one focus area.

Preview  
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#### Inputs - Labour

- ✓ Identify numerical processes to collect data (and information).
- ✓ Use numerical techniques and technologies to organise and use the data.
- ✓ Estimate, calculate, compare, analyse and communicate using the data.
- ☐ Classifying and counting different types of workers. (N)
- ☐ Classifying and counting different levels of workers. (N)
- ☐ Counting numbers of workers overall. (N)
- ☐ Measuring labour hours and time overall. (M)
- ☐ Working out costs of different jobs. (FN)
- ☐ Measuring labour cost per job/task. (N,FN)
- ☐ Counting numbers of workers, worker hours in total and equivalent full-time workers. (N)
- ☐ Counting numbers of workers and worker hours for specific types of workers. (N)
- ☐ Counting numbers of workers and worker hours for specific types of jobs. (N,M)
- ☐ Working out cost of labour per week. (N,FN)
- ☐ Working out cost of labour in total. (FN)
- ☐ Working out cost of management labour. (FN)
- ☐ Working out costs of outsourced labour. (FN)
- ☐ Comparing costs of apprenticeship labour. (N,FN)
- ☐ Comparing costs of traineeship labour. (N,FN)
- ☐ Comparing costs of junior labour. (N,FN)
- ☐ Comparing labour costs from different sources. (N,FN)
- ☐ Calculating different labour productivity ratios and measures. (N,M,PS)
- ☐ Comparing internal labour costs with outsourced labour costs. (N,FN)
- ☐ Comparing full-time, part-time and casual labour costs. (N,FN)
- ☐ Predicting patterns in labour hours and costs. (N,M,PS)
- ☐ Comparing labour costs for different job classifications. (N,M,PS)
- ☐ Comparing labour costs over time. (FN,PS)
- ☐ Comparing labour costs with other firms or industries. (FN,PS)
- ☐ Comparing alternative types of labour including contract labour. (FN,PS)
- ☐ Predicting patterns in labour amounts and costs. (N,FN,PS)
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

## ANP - Retro Rags

Chalsee is investigating the Retail Trade industry - specifically clothing retailing. Chalsee is especially interested in retro fashion and sustainability so she is investigating some second-hand, vintage and recycled clothing stores and comparing these to clothing stores that sell new trendy fashion items. Chalsee interviews the owner, Millie Cent, of the local store Retro Rags and recorded the following data and information related to the areas of Number, and also Financial Numeracy.

- ⇒ The shop is run by the Millie as the owner/manager who works full-time 50 hours per week in the store, plus additional time running the business.
- ⇒ The store uses a pool of 5 casual staff who work various shifts around their family, study and other work commitments. Their shift lengths are 4 hours. The casuals share 66 hours work between them each week.
- ⇒ Millie didn't think it was appropriate to say how much each staff member was paid, but she said they followed the hourly rates, casual loadings and penalty rates as specified in the Retail Industry award.
- ⇒ One of the casuals is 16 and he works 12 hours across Saturday and Sunday.
- ⇒ Another of the casuals is 19 and she works all day Saturday and Sunday, for the 8 hours the shop is open on each of the 2 days of the weekend.
- ⇒ One of the casuals is a 'lead casual' in for Millie on an 'as basis' as the acting manager, when Millie has to travel for business trips or when she has to be absent for other reasons. When this happens Millie pays her an extra 25% rate to reflect the higher responsibility. Millie reckons this normally happens about 3 days for every 4 weeks.
- ⇒ During the busier seasons Millie may have to increase the casual hours by about 50%; and she is wondering if it might be better to have a permanent part-time worker.
- ⇒ Millie is also interested about hiring a trainee as a full-time Australian Apprentice. She also thinks that the trainee could help out with a lot of the business commitments, and thereby cut the extra time Millie spends on the business on top of the shop hours.
- ⇒ Millie normally makes about \$60,000 in profit per year before tax, and is wondering how much she earns per hour. She has to put in another 20 hours a week work on the business.
- ⇒ Millie is also wondering how her work hours and average earnings compare to other clothing stores, and also to average workers in Australia.

Preview  
Sample:  
Do Not  
Copy

Consider the information gathered by Chalsee from Retro Rags. Suggest 2 focus areas you would recommend she use for her ANP. Describe some calculations that Chalsee could make based on the numerical data and information she has collected.

Focus area 1:	Focus area 2:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

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 these **ANP: Inputs - Labour Investigation** pro-formas for your industry.

ANP Inputs Labour	ANP: Inputs - Labour Investigation 1	
	Inputs: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Preview	
	Numerical techniques and technologies I will use to organise and use the data.	
	Sample:	
	Estimates related to the data and information.	
	Do Not	
	Copy	
	Calculations using the data and information.	
Summary information about the data and information.		

ANP  
Inputs  
Labour

## ANP: Inputs - Labour Investigation 2

ANP  
Inputs  
Labour

Inputs: EBT Focus area: ANP 2

Numerical processes I will use to collect data and information.

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

# Preview

Estimates related to the data and information.

# Sample:

# Do Not

# Copy

Summary information about the data and information.

ANP  
Inputs  
Labour

## 11.15 Inputs - Other

### Other inputs

All enterprises make use of a diverse range of inputs (besides materials and labour) as a part of the transformation process. The main types are:

- ⇒ **equipment inputs**
- ⇒ **capital inputs**
- ⇒ **information inputs.**

All industries rely heavily on the use of equipment as an input and this could be a very important input to focus on throughout your investigation. This is especially relevant for enterprises within practical, manual or technical industries that involve a lot of technology and equipment such as media and telecommunications, construction, manufacturing, transport, wholesale, agriculture and others.

Equipment inputs will become even more relevant when you investigate the processing stage. Equipment, machinery and technology are key drivers of the transformation process for goods production industries, and also for many capital-intensive service industries.

Capital inputs can be used either to start up a business, to expand, and/or to finance the acquisition of equipment, machinery, technology and other assets. But it is probably best that you don't make capital inputs the focus of your investigation unless you are investigating finance, or a similar industry, that effectively buys and sells 'capital'. Instead, you can focus on what enterprises use the capital for, such as a starting up, expansion, buying equipment, innovating, etc.

Information is an important input in many industries, and as a 'product' is bought and sold. If you are investigating media firms or professional services then you could focus on information as inputs. In addition, the operations of many firms are becoming digitised, and a key driver of future innovation within industry is in the provision of digital information. So you could consider investigating information supply enterprises in order to learn more about the likely impact of digital innovation.

Image: Kuzihar/iStock/Thinkstock



**The capital investment required for the equipment, machinery, plant, and technology for large-scale industrial manufacturing is huge.**

**Preview  
Sample:  
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### Equipment inputs

Equipment inputs include the various tools, implements, equipment, machinery, vehicles and technological devices and systems to produce goods and to provide services.

Enterprises across all industries invest in practical, useful and state-of-the-art equipment to produce their goods or provide their services.

Equipment varies greatly: compare timber logging with a fitness centre, a train operator with a bicycle mechanic, and even a food manufacturer with a secondary school.

Equipment is usually industry-specific which enables workers to efficiently perform work

- ⇒ A laptop is an essential tool for ICT technicians who do service call-outs to clients on-site
- ⇒ A commercial hairdryer is an essential item of equipment for a hairdresser in personal services industries
- ⇒ A forklift is a vital item of mobile plant for warehouse staff in the Wholesale Trade industry
- ⇒ Diagnostic implements and equipment are vital technologies for doctors in the medical profession.

It might be useful to investigate different types of equipment, the costs of the various equipment and even maintenance, repair, and upgrade costs required for the types of equipment commonly used as inputs for enterprises in your industry. e.g. A courier thinking of switching to an electric van.

Some types of equipment might be used in almost any industry, such as ICT devices, furniture and fittings, lighting, vehicles, etc., and other 'universal' equipment.

At times equipment may require modification to suit the particular operations of the enterprises within an industry. The functionality of equipment might be dependent upon customised or specialised software and apps to make it effective for tasks required in that industry. e.g. New technology computers, blueprints, mobile devices, specific office and shop layouts, display lighting, modified trucks and vans and so on.

You are well aware that all enterprises purchase equipment by using capital funds, i.e. the money invested in the business. (Although many enterprises do prefer to lease equipment).

Equipment costs are particularly relevant when new enterprises start up, as they will have to invest significant funds into acquiring equipment at this formative stage. This often creates barriers to entry in some industries. (i.e. It costs too much to get started, e.g. mining!) This might make for an interesting enquiry-based task for your ANP; by investigating start-up equipment costs as an input for a new enterprise in a particular industry.

Enterprises also have to upgrade equipment as they grow to keep up with competitors, industry trends and regulations.

Preview

Sample:

### Capital inputs

Capital represents the money that a person invests either to start up an enterprise, or to purchase tools, machinery, plant and equipment, and technology on a ongoing basis.

Capital can also be represented by owner's equity, which accumulates and reinvests profits in the enterprise (retained earnings). Generally you would be better off dealing with capital as an input in terms of the purposes that enterprises use this capital for; e.g. to acquire equipment, machinery, technology, etc. (i.e. investment in the business).

However, if you are investigating start-up enterprises within your industry, then you might consider investigating capital as an input. And for those of you interested in accounting, business and finance then capital could be an input to investigate. Of course if you're investigating the Financial and Insurance services industry then capital would be a key input to investigate.

And when investigating not-for-profit community services, or arts and creative industries, capital is also a potential input to investigate as it might be sourced through grants, government funding, and even crowdfunding (which is an interesting emerging trend to investigate).

Do Not

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### Information input

In the digital age an increasing number of enterprises in different industries have to source and purchase information as an input.

The Information, Media and Telecommunications industry is obviously very information dependent. Media firms, broadcasters and digital suppliers have to 'purchase' their content - just like purchasing meat for a hamburger!

Many specialist ICT developers sell their services as information (e.g. consultancy and advice), or buy in specialist labour and information to modify and create software and apps. These information services 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); they also buy people-information and biodata (demographics) including people's digital profiles and 'histories'.


So if you are interested in these types of industry operations, then you might investigate information as an input.

## 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**.

 As a class work through this checklist and see which might apply to the industry (and enterprises and work settings) you are investigating for your Applied Numeracy Projects.

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. So the data and numerical information that you collect through your investigations might be useful for more than one focus area.

Preview  
Sample:  
Do Not  
Copy

- ✓ 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.
- ☐ Classifying different types of equipment. (N)
- ☐ Measuring different types of equipment. (M)
- ☐ Describing measuring techniques related to the use of equipment. (N)
- ☐ Describing digital measuring techniques related to the use of devices. (N,M)
- ☐ Working out costs of different equipment. (FN)
- ☐ Counting amounts of different types of tools and implements. (N)
- ☐ Counting amounts of different types of equipment. (N)
- ☐ Classifying and counting amounts of different types of machinery. (N)
- ☐ Working out costs of specific tools. (FN)
- ☐ Working out costs of specific machinery. (FN)
- ☐ Working out costs of specific vehicles. (FN)
- ☐ Working out total costs of tools. (N,FN)
- ☐ Working out total costs of machinery. (N,FN)
- ☐ Working out total costs of vehicles. (N, FN)
- ☐ Working out cost of equipment in total. (N, FN)
- ☐ Working out 'invisible' equipment costs such as insurance, storage and maintenance. (FN)
- ☐ Working out 'hidden' equipment 'labour' costs such as having to pay a specialist operator. (FN)
- ☐ Calculating the cost of replacing equipment. (FN)
- ☐ Estimating and calculating the cost of 'start-up' equipment. (FN)
- ☐ Comparing equipment costs to 'replace' labour. (FN,PS)
- ☐ Comparing equipment costs from different suppliers. (FN,PS)
- ☐ Comparing the costs of second-hand with new equipment. (FN,PS)
- ☐ Comparing equipment costs over time. (FN,PS)
- ☐ Comparing equipment costs to other firms or industries. (N,PS)
- ☐ Comparing costs of leasing equipment compared to buying. (FN,PS)
- ☐ Comparing alternative types of equipment including digital equipment. (FN,PS)
- ☐ Predicting trends in equipment innovation and costs. (N,FN,PS)
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

## ANP - The Keyboard Worriers

Rory is doing a VET course in IT but he also has a band, The Keyboard Worriers with a few of his computer mates. They play a blend of tech-metal and have had a few local gigs. Rory, who does most of the managing of the band, thinks it would be good to investigate the local music industry as part of the wider Arts and Recreation Services industry. This way he can find out if the band can make a go of it, and if they might be able to grow beyond just being a hobby-band.

Rory knows that running a band is expensive. For some gigs - at parties - they have to provide all their own equipment. Although they have the basic gear that suits small shows, they have had to sometimes hire amps, mics and mixers for bigger shows. One time they even had to pay a guy from the hire shop to do their mixing. This cost more than they got paid! But they had a good time and the crowd really rocked-out. It was a learning experience, and as a result Rory now applies the PODR process to plan all their gigs so they don't get caught out again.

- ⇒ Rory wants to find out what basic gear they would need in order to get some better and bigger shows that might pay off for them.
- ⇒ He also wants to find out the relative costs of hiring versus buying.
- ⇒ He thinks investigating second-hand equipment is also a good idea.
- ⇒ Rory wants to find out how much they might earn on average for different shows, such as the \$50 that the local pub pays for a one-off gig, the \$50 that the local 8 Ground Coffee Café pays for its weekly gigs. In fact he wants to find out the different industry-standard payment amounts generally that the band might expect to get for different gigs. He needs this to estimate how much they should invest to equip the band.
- ⇒ He also knows that equipment needs to be stored correctly and that they need a lot of support stuff such as a spare AV leads and back-up instruments in case something goes wrong.
- ⇒ He thinks if they use a tripod to mount the mics, rather than just their friend's phone, this might help raise their digital profile.
- ⇒ Rory has a number of contacts in the industry, including other bands and people in the instrument and hire shops. But he knows he needs to find out much more about the 'real' industry, how it works and how much they'll need to invest to step-up to the next level. He has also heard that some community events won't book a band unless they have public liability insurance, so he needs to look around about all these other 'invisible' inputs.

Preview:  
Do Not

Inputs - Equipment in action B

Consider the information that Rory has to find out. Suggest 2 focus areas you would recommend he use for his ANP. Describe some calculations that Rory could make based on the type of numerical data and information that he collects.

Focus area 1:	Focus area 2:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

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 these **ANP: Inputs - Equipment Investigation** pro-formas.

ANP Inputs Equipment	ANP: Inputs - Equipment Investigation 1	
	Inputs: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Preview	
	Numerical techniques and technologies I will use to organise and use the data.	
	Sample:	
	Estimates related to the data and information.	
	Do Not	
	Copy	
	Calculations using the data and information.	
Summary information about the data and information.		
	ANP Inputs Equipment	

## ANP: Inputs - Equipment Investigation 2

Inputs: EBT Focus area: ANP 2

ANP  
Inputs  
Equipment

Numerical processes I will use to collect data and information.

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

Preview

Estimates related to the data and information.

Sample:

Do Not

Calculations using the data and information.

Copy

Summary information about the data and information.

ANP  
Inputs  
Equipment

11.21 ANP: Inputs Investigation

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 this data and information.

ANP Inputs		ANP: Inputs (Overall) - Investigation	
Name(s):		Date:	
Industry:		Workplace:	
Inputs: (Consider materials, labour, equipment and/or other inputs) Key examples and processes involved and how these are used.			
Inputs: (Materials, labour, equipment, other) Numerical <u>processes</u> I can/will use to collect <u>estimates</u> of data & information.		Inputs: (Materials, labour, equipment, other) Numerical <u>techniques</u> I can/will use to make <u>estimates</u> using data & information.	
Inputs: (Materials, labour, equipment, other) Applied examples of <u>estimates</u> using these numerical processes and techniques.			

ANP: Inputs (Overall) Investigation (cont.)	
<p>Inputs: (Materials, labour, equipment, other) Numerical <u>processes</u> I can/will use to do <u>calculations</u> using the data &amp; information.</p>	<p>Inputs: (Materials, labour, equipment, other) Numerical <u>techniques</u> I can/will use to do <u>calculations</u> using the data &amp; information.</p>
<p>Inputs: (Materials, labour, equipment, other) Applied examples of <u>calculations</u> using these numerical processes and techniques.</p>	
<p>Use the estimates and/or calculations to develop descriptive summary statements.</p>	
<p>Analysis based on the estimates and/or calculations: What are some <u>key</u> conclusions/inferences I can make from the data?</p>	
<p>Other: How the data and information might best be communicated. (e.g. Numbers, words, visual, etc..)</p>	

11.23 Assessment Task

AT2 Applied Numeracy Project - EBT: Inputs

Overview

For your whole-of-unit **Numeracy-based Project** you have to select 8 **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 3 EBTs** related to **inputs** for your **Numeracy-based Project**; (perhaps **3** if you are investigating an industry that uses lots of inputs).
- ⇒ It is best to select **more than 2-3 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, Measurement 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 your undertaking and completing each of your 8 EBTs. So 8 ANPs = 1 Whole-of-unit **Numeracy-based Project**.

Numeracy-based Project

Name:

Dates:

Industry:

Workplace(s)

Industry Stages	Focus area: Number (N)	Focus area: Measurement (M)	Focus area: Financial Numeracy (FN)	Focus area: Probability and Statistics (PS)
Inputs				
Processing				
Outputs				

**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.

# Preview

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

# Sample:

- ANP Inputs: 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.

# Do Not

- 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.

# Copy

- 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

Name:		Dates:		Industry Stage: Inputs	
Industry:		Focus areas:		ANP#	
Workplace(s):					
Tasks - AT2: Applied Numeracy Project - Enquiry-based Task		Re-quired	Due by	Done	Teacher initials
<b>Stage 1: Design your Numeracy-based Project</b>					
i. Negotiate appropriate industry and workplace(s) with teacher.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii. Select EBTs from each industry stage, and each focus area.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iii. Develop draft of Numeracy-based Project Plan.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv. Get teacher feedback and finalise Numeracy-based Project Plan.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Stage 2: Undertake research for your ANP by applying numeracy skills</b>					
i. Undertake your research for this EBT input.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii. Outline the processes you will use to collect data and information.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iii. Estimate, calculate and use technology to collect data and info.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv. Apply numerical problem-solving tools and techniques as needed.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
v. Use data and information to perform estimation and calculations.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
vi. Use data and information to make inferences and conclusions.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
vii. Analyse the data and information.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Stage 3: Use appropriate software tools and devices</b>					
i. Describe software tools and devices that might best represent the data and information.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii. Describe advantages & disadvantages of using these software tools and devices.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iii. Explain why you have chosen to use these software tools and devices; and use evidence to justify your choices.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv. Use appropriate software tools and devices to hold the data and information you have collected.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
v. Evaluate the software tools and devices you used; and their effectiveness for collecting, collating and communicating.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Stage 4: Reporting</b>					
⇒ Prepare a draft for your final report. (Refer pp.317-318)	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional information:					
Signed: _____ Date: _____					

# Industry Stages - Processing 12

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Comments:

## 12.01 Processing

### Processing

Processing refers to all of the actions and activities that are undertaken by enterprises to produce goods and services as part of their **goods 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 **inputs, labour** and **capital** inputs, that are managed and co-ordinated 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.

### Processes

Enterprises use varied and diverse processes to transform inputs into outputs (goods or services).

Key processes include:

- ☐ work practices
- ☐ manufacturing processes
- ☐ service-provision processes
- ☐ equipment & machinery processes
- ☐ technological processes
- ☐ information processes
- ☐ ICT and data processes
- ☐ online/digital processes
- ☐ customer/client processes
- ☐ financial processes
- ☐ environmental processes
- ☐ workplace safety processes

### Efficiency and multi-factor productivity

One of the factors that drives processing operations is the achievement of **efficiency** in the use of resources through **multi-factor productivity**. Multi-factor productivity refers to achieving productivity in all resources involved in the transformation process, including materials, stock, consumables and labour, as well as all of the varied equipment and technology items. Enterprises design goods production or service provision processes, and create work practices to achieve multi-factor productivity, i.e. to minimise time, cost and waste, and to generate a better return on their inputs.

Enterprises use a range of general and specific numerical techniques to estimate and measure efficiency and productivity. 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 efficiency and multi-factor productivity. For example:

- ☐ measure physical materials, or count stock and other materials used in processing
- ☐ estimate and calculate labour time, and input and calculate labour costs required for processing
- ☐ calculate and show different proportions of materials, labour and other inputs involved in processing different items or services
- ☐ estimate and calculate total materials, labour and other input amounts, and total \$ costs involved in processing different items or services
- ☐ calculate average materials, labour and other input amounts, and \$ costs involved in processing different items or services
- ☐ compare and analyse materials and labour amounts and costs, and the cost of acquiring and running equipment involved in processing different items or services
- ☐ calculate materials, labour, equipment, waste and other usage and productivity ratios involved in processing different items or services.

### Applied Numeracy Projects

These investigations will suit **processing** depending on the nature of the industry. Materials, goods-based and practical operations will use different processes, compared to those used by people, community or information service providers.

- ☐ **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. (PS)
- ☐ **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 other industry-specific, processing-related issues in negotiation with your teacher.

# Preview

Processing A

What would be some of the different processes involved for an adventure tourism operator, such as those that offer scuba diving, kite sailing, para-sailing, white-water rafting and other similar activities?

Labour processes

Equipment and machinery processes

Materials stock & consumables processes

ICT and data processes

Safety processes

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## 12.03 Processing - Goods

### Processing - Primary and secondary industries

Goods production industries tend to use a lot of materials inputs, combined with labour, and equipment and technology, to produce tangible or physical goods outputs. These include:

- ⇒ **primary production**
- ⇒ **goods manufacturing**
- ⇒ **industrial manufacturing**
- ⇒ **construction** (which is also a service industry).

Chocolate is a 'good good',  
but too much can be a bad bad!



Image: OtnaYdur/  
Depositphotos.com

#### Primary production

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

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

Primary producers will mine many different many diverse practical, manual and technical processes needed for their day-to-day and longer-term operations.

Primary producers are increasingly using digital technologies to automate many of their manual and technical processes.

Primary production involves processes such as:

- ✓ sowing
- ✓ growing
- ✓ raising
- ✓ harvesting
- ✓ fishing
- ✓ catching
- ✓ logging
- ✓ mining
- ✓ extracting.

#### Manufacturing - Goods

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.

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

Goods manufacturing involves varied processes such as:

- |                |                        |
|----------------|------------------------|
| ✓ making       | ✓ building             |
| ✓ constructing | ✓ assembling           |
| ✓ mining       | ✓ brewing              |
| ✓ refining     | ✓ printing             |
| ✓ tanning      | ✓ cooking (industrial) |
| ✓ smelting     | ✓ weaving              |
| ✓ moulding     | ✓ knitting             |
| ✓ slaughtering | ✓ sewing               |
| ✓ butchering   |                        |
| ✓ crafting     |                        |

#### Construction

The construction industry makes goods and also provides services.

Technically many large structures that are made are goods; including 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, as contractors or 'subbies'.

e.g. Kitchen cabinetry 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.

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

Industry:

Enterprise(s):

Use of materials in goods processing.

Use of labour in goods processing.

Use of equipment and machinery in goods processing.

Use of other goods processing methods.

**Preview  
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## 12.05 Processing - Goods

### Numeracy in action

For your Numeracy-based Project it is likely that you will investigate at least **3** enquiry-based tasks for the **processing stage**.

All enterprises combine a range of processes 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.

Of course good producers use different types and skill levels of labour. And the use of varied industry-specific equipment, machinery and technology is vital in these industries; and many enterprises are very capital-intensive. Ongoing digital innovation is also leading to the automation of many of the processing functions.

Enterprises set and monitor **targets** related to **cost ratios**, **materials** and **labour productivity**, **waste reduction**, **safety** and other measures. They also compare **labour** versus **technology costs** when deciding whether to upgrade production methods or to **automate**. **Waste** can be a huge issue in these industries and this also impacts on sustainability targets.

As a class work through the checklist and see which might apply to the industry (and enterprises and work settings) you are investigating for your Applied Numeracy Project.

- Processing - Goods production**
- ✓ 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.
- |   |  |
|---|--|
| <ul style="list-style-type: none"><li><input type="checkbox"/> Counting, estimating and calculating amounts of materials involved in processing for different items or processes. (N)</li><li><input type="checkbox"/> Counting, estimating and calculating totals of materials involved in processing operations. (N)</li><li><input type="checkbox"/> Counting, estimating and calculating amounts and totals of different processes made for overall processing; and for varied processes. (N)</li><li><input type="checkbox"/> Classifying and measuring different types of materials used for processing. (N,M)</li><li><input type="checkbox"/> Describing the different measuring units, tools, devices and processes required. (M)</li><li><input type="checkbox"/> Explaining measurement techniques for common work tasks. (M)</li><li><input type="checkbox"/> Describing calculations that are required for different processes. (M)</li><li><input type="checkbox"/> Measuring, describing and calculating processing times. (M)</li><li><input type="checkbox"/> Examining time-based measures and requirements in the production process. (M)</li><li><input type="checkbox"/> Measuring and calculating productivity and efficiency rates. (M)</li><li><input type="checkbox"/> Estimating and calculating amount of waste generated by weight or time. (M)</li><li><input type="checkbox"/> Calculating total processing \$ costs. (FN)</li><li><input type="checkbox"/> Estimating and calculating costs of different materials used for processing. (M,F,N)</li><li><input type="checkbox"/> Comparing processing material costs from different suppliers. (FN,PS)</li></ul> | <ul style="list-style-type: none"><li><input type="checkbox"/> Calculating processing \$ costs per item for different products. (FN)</li><li><input type="checkbox"/> Working out total cost of materials used in processing. (N,M,FN)</li><li><input type="checkbox"/> Describing materials processing ratios, productivity or costs. (M,FN)</li><li><input type="checkbox"/> Comparing different types of potential material costs. (PS,FN)</li><li><input type="checkbox"/> Calculating productivity and efficiency rates in time and dollars. (M,FN)</li><li><input type="checkbox"/> Estimating and calculating cost of waste generated. (FN)</li><li><input type="checkbox"/> Comparing with past amounts, percentages and statistics. (N)</li><li><input type="checkbox"/> Comparing with industry benchmarks and guidelines. (S)</li><li><input type="checkbox"/> Estimating and projecting future amounts, percentages and statistics. (PS)</li><li><input type="checkbox"/> _____</li><li><input type="checkbox"/> _____</li><li><input type="checkbox"/> _____</li><li><input type="checkbox"/> _____</li></ul> |
|---|--|

## ANP - Choco-holy

Ti is doing a VET course in Hospitality Operations but he thought it would be important to investigate the manufacturing industry, specifically food manufacturing. This is a key area of manufacturing in Australia, and a growing number of workers with commercial and operational hospitality knowledge are being employed in industrial food production.

Ti has researched a local speciality confectionary maker who produces high-end chocolates and treats. During a tour of the factory Ti learned a lot about the different inputs, including materials, stock, labour and the use of equipment. Ti wants to see how these combine in production as part of the processing stage. Ti has collected this information.

- ⇒ Different proportions and ratios of industrial ingredients (he has the costs from the inputs stage).
- ⇒ How proportions and ratios of industrial recipes are altered to make different product varieties.
- ⇒ Processing times to make different confectionary items.
- ⇒ Storage, ambient and production temperatures needed to manage the ingredients and the production process.
- ⇒ Production run volumes and times to make desired quantities of units, and to produce different product types.
- ⇒ How higher-cost and/or-intensive processes are needed for decoration, finishing and packing of higher-priced items.
- ⇒ The cost of the newer production and bulk packaging equipment that has been installed, and how this compares to previous labour costs.
- ⇒ The number of workers needed for different production runs and shift times, and the cost of these employees.
- ⇒ The types of consumables in the production that enter the production process, including power.
- ⇒ The amount of waste materials that there is a lot of and wasted time, due to cleaning, production breakdowns, errors and faults.
- ⇒ How the enterprise re-purposes items that fail quality control.

Ti thinks that he'll need to develop a production diagram or infographic to fully explain and describe the processing stage. He is also going to come up with a range of productivity and efficiency measures to analyse some of the 'numbers'.

## Processing - Goods in action B

Consider the information gathered by Ti from Choco-holy. Suggest 2 focus areas that you recommend Ti use for his ANP. Describe some calculations that Ti could make based on the numerical data and information he has collected.

Focus area 1:	Focus area 2:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

12.07 Processing - Goods

ANP Processing - Goods Investigation

If you are investigating an industry that 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 these **ANP: Goods Investigation** pro-formas.

ANP Processing Goods	ANP: Processing - Goods Investigation 1	
	Processing: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Preview	
	Numerical techniques and technologies I will use to organise and use the data.	
	Sample:	
	Estimates related to the data and information.	
	Do Not	
	Calculations using the data and information.	
	Copy	
Summary information about the data and information.		
ANP Processing Goods		

## ANP: Processing - Goods Investigation 2

ANP  
Processing  
Goods

Processing: EBT Focus area: ANP 2

Numerical processes I will use to collect data and information.

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

Preview

Estimates related to the data &amp; information.

Sample:

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Summary information about the data &amp; information.

ANP  
Processing  
Goods

## 12.09 Processing - Services

### Processing - Services

The majority of economic activity and employment in Australia is within service industries. In fact almost 9 out of every 10 workers in Australia are employed in service industries. Service processes can vary widely depending on the nature of the service that occurs.

For example, consider the difference between child-care, media, financial, education, hospitality, community, transport, healthcare and ICT services. And what about the different service processes offered by a taxi driver, a firefighter, an accountant and a performing artist? So what types of services does your industry provide?

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

⇒ **Practical services**

⇒ **Goods-trading services**

⇒ **Information services**

⇒ **People services**

⇒ **Community services**

Many services have to be combined for the processing stage as part of the supply chain.

#### Practical services

Practical services involve the provision of food and hospitality services, public and private transport services, transport, delivery and courier services, repairs, and construction services.

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 and home repairs, driving people around and installing and even home-delivery of meals!

Many of these types of service providers tend to use specialised equipment, machinery, vehicles and technologies as part of capital-intensive processes. These service providers also rely on the use of different skill levels and expertise from their labour inputs.

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 workers in the Accommodation and Food Services industry are aged 15-24, with most younger workers engaged in the hospitality sector.

Types of service activities involve:

- ✓ automotive repairs
- ✓ home repairs
- ✓ making
- ✓ serving
- ✓ cooking
- ✓ building
- ✓ supplying
- ✓ delivering
- ✓ transporting
- ✓ installing
- ✓ crafting.



Key examples of practical services include:

- ⇒ repairs and 'servicing'
- ⇒ food services
- ⇒ arts and crafts
- ⇒ water, gas and electricity supply
- ⇒ hotels and accommodation
- ⇒ home maintenance
- ⇒ transport
- ⇒ couriers
- ⇒ construction.

Image: ginasanders/Depositphotos.com

Image: alphaspirt/Depositphotos.com

### Goods-trading services

Goods-trading services involve processes such as selling, buying, retailing, wholesaling and trading. These activities might extend into importing and exporting.

The two key types of goods-based services are wholesale trade and retail trade. More than 30% of all employees who work in retail trade in Australia are aged 15-24. Over 13% of the total workforce is employed in retail (almost 1.3m as at Nov. 2017).

Wholesalers supply stock and supplies in bulk to manufacturers, retailers and other enterprises. Wholesalers might also source goods from overseas and sell locally produced goods into export markets.

Retailers such as supermarkets, furniture stores and electronics retailers use both face-to-face and online processes to offer and sell products (stock) to customers.

Goods-trading service providers rely on industry-specific equipment, shop fittings, warehouses, vehicles, and sophisticated B2B and B2C digital and ICT networks, to support their retail or wholesale operations.

The use of human labour is often a key component of goods-trading as part of customer service processes in retailing. Wholesalers normally use sales reps and account managers to look after industry clients.

However, the use of innovative digital technologies is altering the nature of customer and client service processes significantly.



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Information services are growing areas of service-provision. This is happening as the Australian economy continues to expand, creating economic growth across all industries.

This is also influenced by ongoing innovation in digital information technologies that are changing the ways that people communicate, and also changing how people locate and consume media and information.

Contemporary information services usually involve sophisticated capital-intensive technological systems. These may be driven by a global network that gets modified to local use and conditions, (consider Apple, Google and Netflix.)

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).

Industry stakeholders and consumers are switching to digital services to access software and media products as data, rather than buying physical products. (e.g. Cloud-based hosting for sharing docs, 'leasing' virtual software or streaming music and films rather than buying CDs and DVDs.)

Enterprises often purchase information services and data that are developed and delivered by outsourced specialists or contractors. (e.g. ICT, finance, business advice and analytics.) Many firms are buying demographic and online data as part of their market profiling and customer targeting. Some examples of information-services include:

- ⇒ media
- ⇒ digital entertainment
- ⇒ telecommunications
- ⇒ ICT services
- ⇒ internet and online services
- ⇒ mobile media 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.

## 12.11 Processing - Services

### People services

Many services throughout industry are provided directly to people by qualified professionals and/or practical or technical industry specialists.

People services are usually quite labour-intensive and focus on the provision of a service directly to a person. Consider direct personal services such as hair and beauty, counselling and support, and fitness and health. At times, people services might be provided to groups of people, such as with education and training programs.

You should note that many community services are also people-focused, including education, health and medical, care providers, welfare and support, and many of the varied government services.

You don't need to distinguish if the enterprises in your industry are 'people-services' or 'community-services'. Instead you can say that they are people-focused community services.

However, if the people-service is provided on a profit-basis, or a fee-for-pays basis, then the main objective of the process might not necessarily be very community-focused. People services usually make use of equipment and technologies to assist and support workers to provide their services to clients. This acts as operational infrastructure to support workers, as it is usually the labour, skills and expertise of workers which drives the provision and quality of people-services.

Some examples of the intersection between labour and technology in people-services are:

- ⇒ A hairdresser/barber will regularly use specialised tools and equipment to support their years of training and expertise. But scissors can't cut hair on their own.
- ⇒ Teachers will make use of ICT devices and classroom equipment for different purposes, but it is the quality of the teacher that drives education and learning, and not whether students have an iPad.
- ⇒ Practical education and TAFE training might need to take place in workshops, studios or kitchens. This is vital for industry-specific training that is led and guided by a quality trainer.
- ⇒ Hospitals and health-care facilities rely on extensive diagnostic, treatment and surgery equipment and technologies. But it's the quality and expertise of doctors, nurses and care providers that creates the service.

### 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, including personalised welfare, care and support.

However, some community services broaden to whole-of-society services such as police, fire-fighting, defence and many government services.

Some community services involve outdoor participation such as sports and recreation.

Others might be environmentally-focused involving pressure buddy groups.

Others offer community support such as welfare agencies, religious organisations and various community groups.

As always, tools, equipment and other work-related technologies are used to varying degrees by workers who perform community services. Consider the reliance on equipment by VICA, paramedics, medical professionals, police officers or defence force personnel.

The types of equipment needed vary starkly (and in cost!) with the equipment used by charities, religious bodies and local arts programs.

Beyond agencies, the quality of the people who deliver community services that is most important.



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

Industry:	Enterprises/work settings:
What do they do: i.e. sell, produce or provide?	
How materials are used in service processes.	
Use of labour in processing.	
Use of equipment and machinery in processing.	
Use of information in processing.	
Other information	

Preview  
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Do Not  
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## 12.13 Processing - Practical Services

### Numeracy in action

For your Numeracy Project it is likely that you will investigate at least **3** (or more) 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. Of course these processes are supported, driven and overseen by labour, equipment, machinery and technology, information and other processes.

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 this checklist and see which might apply to the industry (and enterprises and work settings) you are investigating for your Applied Numeracy Project.

Preview  
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- 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.
- |  |   |
|--|---|
| <input type="checkbox"/> Counting different types of materials used in processing. (N)                                   | <input type="checkbox"/> Measuring and calculating labour time for processing tasks. (N,M)                              |
| <input type="checkbox"/> Measuring different types of materials used in processing. (M)                                  | <input type="checkbox"/> Measuring and calculating labour cost for processing tasks. (N,M,FN)                           |
| <input type="checkbox"/> Working out costs of different materials used in processing. (N,FN)                             | <input type="checkbox"/> Measuring and calculating total labour costs and time. (N,M,FN)                                |
| <input type="checkbox"/> Describing the different measuring units, tools, devices and techniques used in processing. (M) | <input type="checkbox"/> Estimating and calculating machinery processing task times. (N,M)                              |
| <input type="checkbox"/> Measuring different types of consumables used in processing. (M)                                | <input type="checkbox"/> Estimating and calculating costs of operating machinery. (N,FN)                                |
| <input type="checkbox"/> Measuring, describing and calculating production times. (N)                                     | <input type="checkbox"/> Estimating, planning and calculating time and costs of transport. (N,FN)                       |
| <input type="checkbox"/> Measuring, describing and calculating service processing times. (M)                             | <input type="checkbox"/> Comparing processing ratios with past amounts, percentages and statistics. (PS,N)              |
| <input type="checkbox"/> Measuring, describing and calculating total processing times. (M)                               | <input type="checkbox"/> Comparing processing material costs from different suppliers. (FN,PS)                          |
| <input type="checkbox"/> Calculating service processing productivity rates. (N,M)  | <input type="checkbox"/> Comparing processing labour costs with different firms. (N,PS)                                 |
| <input type="checkbox"/> Calculating labour processing productivity rates. (M,FN)  | <input type="checkbox"/> Comparing overall processing times/costs with different firms. (M,FN,PS)                       |
| <input type="checkbox"/> Working out costs of different stock used in processing. (N,FN)                                 | <input type="checkbox"/> Comparing processing times and productivity with industry benchmarks and guidelines. (PS,M,FN) |
| <input type="checkbox"/> Working out total cost of materials used in processing. (N,FN)                                  | <input type="checkbox"/> Estimating and projecting future amounts, percentages and statistics. (PS,M,FN,N)              |
| <input type="checkbox"/> Working out costs of different ingredients used in processing. (N,M,FN)                         | <input type="checkbox"/> _____  |
| <input type="checkbox"/> Working out total cost of ingredients used in processing. (M,FN)                                | <input type="checkbox"/> _____  |
| <input type="checkbox"/> Describing ingredient processing ratios, proportions or costs. (N,M,FN)                         | <input type="checkbox"/> _____  |
| <input type="checkbox"/> Describing different materials ratios, proportions or costs. (N,M,FN)                           | <input type="checkbox"/> _____  |
| <input type="checkbox"/> Examining processing waste amounts, ratios and costs. (N,M,FN)                                  | <input type="checkbox"/> _____  |

## ANP - D'Service Cycle

Rona has been into bikes all her life. She rides everywhere, races, uploads videos of tricks to YouTube and earns some extra cash fixing and modifying bikes for locals. Rona is investigating the Retail Trade industry - specifically bicycle sales and repairs. She has approached some bike shops and one, D'Service Cycle was very impressed with her interpersonal skills and applied knowledge. Although she is doing a VET course in Outdoor Recreation she was able to get a 1-week work placement with them to help support the investigations needed for her Numeracy-based Project. Rona spent much of her time working on servicing and repairs. The shop sells bikes but has an expanding operation in repairs and servicing. The boss wants to know how much stock they use up when repairing and servicing so that they can charge more accurately for this service, as this seems to be 'swallowing' a lot of time and money. He wants to know if the service and repair processes are 'paying off' and whether they should focus more staff, and therefore more time and money, on expanding the repairs and servicing operations. This might also mean shifting some focus away from bike sales, which will reduce the amount of expensive stock sitting around; as well as the staff time that is wasted on tyre kickers who come in and just want a chat. This could also free up floorspace to enable the shop to expand the service centre, as it is very cramped and hard to work effectively if more than one worker is doing repairs at the same time.

Rona will compare different processes by using the time sheets and job logs to count and calculate the labour time that goes into the bike repairs and servicing, compared to retail tasks. She'll create a proportional breakdown for different types of service and repair jobs. Rona is then going to get the different labour \$ wage rates from the boss or two other productive shops. She will compare these to the total labour time and labour costs that are needed to run the repairs of the shop. Rona might do a pie chart comparison to show weekly averages of each of these types of labour as a proportion of the total.

Rona is also going to analyse the different inputs that go into servicing and repairs processes over a 1-week period. She will collate the information and organise the stock that is used into its cost price, and normal sale price. Rona will also track all the consumables that get used, as they seem to be an 'invisible' cost at the moment.

Rona also needs to look at the bigger picture for her industry so she will investigate a range of different job classes, their industry settings and compare the results to her own workplace. She doesn't know how much bike repairers should be paid compared to retail sales staff - that is something she will have to find out. She will need to investigate award rates, Australian apprentice pay levels and The National Training Wage, and set out comparison information in a spreadsheet table. Rona is also going to develop an infographic that explores key measurement techniques, units, devices, tools and equipment that are used in the bike shop for selling and customising bikes. These include determining suitable bikes for height and ages, wheel sizes, seat heights, different sized tyres for varied types of riding and even recommended weight loads (which is important when customising).

## Processing - Practical Services in action

B

Consider the information gathered by Rona for D'Service Cycle. Suggest 2 focus areas for Rona to use for her ANPs. Describe some calculations that Rona could make based on the numerical data and information she has collected.

Focus area 1:	Focus area 1:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

12.15 Processing - Practical Services

ANP Processing - Practical Services

If you are investigating an industry area that uses or makes physical products extensively as part of its service process then you should complete these ANP: Practical Services Investigation pro-formas.

ANP Processing Practical Services	ANP: Processing - Practical Services Investigation 1	
	Processing: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Numerical techniques and technologies will be used to organise and use the data.	
	Estimates related to the data & information.	
	Calculations using the data & information.	
	Summary information about the data & information.	

ANP  
Processing  
Practical  
Services

## ANP: Processing - Practical Services Investigation 2

Processing: EBT Focus area: ANP 2

ANP  
Processing  
Practical  
Services

Numerical processes I will use to collect data and information.

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

# Preview

Estimates related to the data & information.

# Sample:

# Do Not

# Copy

Summary information about the data & information.

ANP  
Processing  
Practical  
Services

## 12.17 Processing - Other Services

### Numeracy in action

For your Numeracy Project it is likely that you will investigate at least **3** 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 this checklist and see which might apply to your industry.

#### Processing - Other 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.
- ☐ Counting different types of services provided. (N)
- ☐ Counting types, levels and totals of workers involved for different types of services; and overall. (N)
- ☐ Estimating and counting amounts of trading stock for retail and wholesale services. (N)
- ☐ Estimating amounts and total of support resources, such as consumables and equipment needed to provide the services. (N)
- ☐ Calculating amounts of consumables used in service provision. (N,M)
- ☐ Working out total cost of consumables used for services. (N,FN)
- ☐ Describing measuring techniques needed to provide the services. (M)
- ☐ Describing safety measures and targets involved in processes. (M)
- ☐ Calculating equipment time and \$ needed for different services. (M,FN)
- ☐ Calculating labour time and \$ needed for different services. (M,FN)
- ☐ Calculating travel time and \$ needed for different services. (M,FN)
- ☐ Measuring stock sizes and weights for retail and wholesale services. (N,M)
- ☐ Measuring and calculating labour time for different job tasks. (N,M)
- ☐ Measuring and calculating labour costs for different job tasks. (M,FN)
- ☐ Measuring and calculating total labour costs and time. (M,FN)
- ☐ Describing different labour skills needed for varied tasks. (M)
- ☐ Calculating labour productivity rates for different service types, or workers. (M,FN)
- ☐ Calculating overall service provision productivity rates. (M,FN)
- ☐ Estimating and calculating equipment processing task times. (M,FN)
- ☐ Estimating and calculating costs of operating equipment. (M,FN)
- ☐ Estimating and calculating travel time/costs for varied services. (N,M,FN)
- ☐ Estimating and calculating cost of information. (FN)
- ☐ Measuring service client needs through quality indicators. (N)
- ☐ Counting and calculating time and costs of travel overall. (N,M,FN)
- ☐ Comparing service costs from different providers. (PS,FN)
- ☐ Comparing cost of outsourced labour from different firms. (PS,FN)
- ☐ Comparing amounts of production stock and trading stock with historical amounts. (N,PS,FN)
- ☐ Comparing all service times/costs with different firms. (PS,M)
- ☐ Comparing past processing amounts, percentages and statistics. (PS,N,M)
- ☐ Comparing processing data and information with industry benchmarks and guidelines. (PS,N,M)
- ☐ Estimating and projecting future processing amounts, percentages, costs and statistics. (PS,N,M,FN)
- ☐ Comparing the productivity rates and costs of using labour versus using technology. (M,PS,FN)
- ☐ Comparing wages and salaries across different industry settings. (PS,FN)
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

## ANP - Lanny and Community Services

Lanny, is doing a VET course in Horticulture but is very passionate about social issues and community welfare. But he knows that it is very hard for community groups to get funding to meet their costs, and that the generosity of volunteer labour and skills is a key to enabling community groups to provide their services to the public.

Lanny is undertaking a broad-based investigation into the role of volunteers in not-for-profit enterprises throughout the community services industry. He has also investigated the award wages for different community workers as part of the inputs stage.

For the processing stage Lanny is going to focus on some key community services, such as the work done by environmental groups, animal rescue and welfare, providing meals and support to people suffering from food insecurity, and other relevant services in his local area.

Lanny wants to calculate how much it costs to operate the processes that drive community services. He will use the information he has about labour costs, equipment and other related input expenses, and apportion these to the different services offered by community enterprises.

He is then going to estimate and find out labour hours required for each of the different services, and calculate how much time goes into dealing with each 'client' on an average basis. He can then work out the cost of these services per person.

Lanny is also calculating input and volunteer costs based on how much the enterprise would have had to pay if it hired volunteers to do these tasks. This also includes investigating how much work when professionals, local and other people donate their skills for free, such as when the local animal rescue team had their cages built by the volunteers from the TAFE. Not only corporate organisations have programs to encourage their workers to donate their time and skill during work time as part of community services program.

Lanny also wants to investigate some wider industry trends to see what % of donations and raised funds get used directly for the actual service or support that the agencies are offering. He has found out that organisations like Clean Up Australia and Sea and Bin Clean up put the majority of their funds into their operational processes. But he has contacted some 'sink charity operators, some of them backed by big names, whose aim is to raise a lot of the funds on costs of administration and marketing processes, as well as pay fund raisers for the time they are putting in to support. He has also heard about the growing trend of 'freegulls', people who only volunteer in charity shops to cherry pick the best donated goods, such as designer clothes, bags and shoes, to sell at markets and on eBay, or to keep for themselves!

So much to investigate when it comes to, the often invisible, labour-intensive processes involved in community services!

## Processing - Other Services in action B

Consider the information needed by Lanny about community services. Suggest 2 focus areas for Lanny to use in his ANP. Describe some calculations that Lanny could make based on the numerical data and information he needs to collect.

Focus area 1:	Focus area 2:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

12.19 Processing - Other Services

ANP Processing - Other Services

If you are investigating an industry area that uses retail or wholesale service 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 these **ANP: Other Services Investigation** pro-formas.

ANP Processing Other Services	ANP: Processing - Other Services Investigation 1	
	Processing: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Preview	
	Numerical techniques and technologies I will use to organise and use the data.	
	Sample:	
	Estimates related to the data & information.	
	Do Not	
	Copy	
	Calculations using the data & information.	
Summary information about the data & information.		
ANP Processing Other Services		

## ANP: Processing - Other Services Investigation 2

ANP  
Processing  
Other  
Services

Processing: EBT Focus area: ANP 2

Numerical processes I will use to collect data and information.

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

Preview

Estimates related to the data &amp; information.

Sample:

Do Not

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Summary information about the data &amp; information.

ANP  
Processing  
Other  
Services

## 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 this data and information.

ANP  
Processing

### ANP: Processing (Overall) Investigation

Name(s):		Date:	
Industry:		Workplace:	
<p>Processing: (Consider materials, labour, equipment, other processes) Key materials and processes involved and how these are used.</p>			
<p>Processing: (Materials, labour, equipment, other) Numerical <u>processes</u> I can/will use to collect <u>estimates</u> of data &amp; information.</p>		<p>Processing: (Materials, labour, equipment, other) Numerical <u>techniques</u> I can/will use to make <u>estimates</u> using data &amp; information.</p>	
<p>Processing: (Materials, labour, equipment, other) Applied examples of <u>estimates</u> using these numerical processes and techniques.</p>			

ANP: Processing (Overall) Investigation (cont.)	
Processing: (Materials, labour, equipment, other) Numerical <u>processes</u> I can/will use to do <u>calculations</u> using the data & information.	Processing: (Materials, labour, equipment, other) Numerical <u>techniques</u> I can/will use to do <u>calculations</u> using the data & information:
Processing: (Materials, labour, equipment, other processes) Applied examples of <u>calculations</u> using these numerical processes and techniques.	
<p>Preview</p> <p>Sample:</p> <p>Use the estimates and/or calculations to develop descriptive summary statements.</p> <p>Do Not</p>	
Analysis based on the estimates and/or calculations: What are some key <u>conclusions/inferences</u> 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 8 **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 **3** (or even perhaps **4** EBTs) related to **processing** for your Numeracy-based Project, because processing crosses over into all other operations of an enterprise.
- ⇒ It is best to select **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 for 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 8 EBTs. So 8 x ANPs = 1 Whole-of-unit Numeracy-based Project.

Numeracy-based Project

Name:

Dates:

Industry:

Workplace(s)

Industry Stages	Focus area: Number (N)	Focus area: Measurement (M)	Focus area: Financial Numeracy (FN)	Focus area: Probability and Statistics (PS)
Inputs				
Processing				
Outputs				

**PODR: Applied Numeracy Project - Processing**

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 this with your teacher.

**ANP Processing: 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 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).

Preview  
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## 12.25 Assessment Task

<b>Name:</b>	<b>Dates:</b>	<b>Industry Stage: Processing</b>	
<b>Industry:</b>	<b>Focus areas:</b>	<b>EBT#</b>	
<b>Workplace(s):</b>			

Tasks - AT3: Applied Numeracy Projects - Enquiry-based Task	Re-quired	Due by	Done	Teacher initials
<b>Stage 1: Design your Numeracy-based Project</b>				
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.	✓			
iv. Get teacher feedback and finalise Numeracy-based Project Plan.	✓			
<b>Stage 2: Undertake research into processing for your ACP by applying numeracy skills</b>				
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 to all techniques used.	✓			
v. Use data and information to perform estimation and calculations.	✓			
vi. Use data and information to make inferences and conclusions.	✓			
vii. Analyse the data and information.	✓			
<b>Stage 3: Use appropriate software tools and devices</b>				
i. Describe software tools and devices that might best represent 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.	✓			
iv. Use appropriate software tools and devices to handle the data and information you have collected.	✓			
v. Evaluate the software tools and devices you used; and their effectiveness for collecting, collating and communicating.	✓			
<b>Stage 4: Reporting</b>				
⇒ Prepare a draft for your final report. (Refer pp.317-318)	✓			

Additional information:

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

# Industry Stages - Outputs 13

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Comments:

## 13.01 Outputs

### Outputs

Outputs refer to products made, or the services provided, by enterprises as a result of their **production process** or **service-provision** process. 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 houses 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 directly to the end user in 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 store 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. (PS)
- ❑ **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.

1. Describe outputs commonly produced by enterprises across industry generally.
2. Describe the specific types of outputs created by varied enterprises within an industry of your choice.

1: Outputs generally	2: Outputs specifically for:
Materials:	Materials:
Goods:	Goods:
Practical services:	Practical services:
People services:	People services:
Information services:	Information services:
Other:	Other:

Preview  
Sample:  
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## 13.03 Outputs - Goods

### Goods

Different types of goods outputs could include:

- ⇒ raw materials
- ⇒ processed materials
- ⇒ manufactured goods
- ⇒ stock
- ⇒ food, beverages and hospitality items.

Remember me? My 'good good' output, is Marcel the Goat's finest fetta cheese!



Image: Angela940/  
iStock/Thinkstock

# Preview Sample:

### Raw Materials

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 live stock
  - ⇒ 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 and Manufactured goods

Processed materials outputs are resources that have been turned 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.

Manufacturing uses varied inputs and processes to create outputs that are either:

- ⇒ intermediate goods for other enterprises in the supply chain (e.g. timber that is sold to a construction enterprise), or
- ⇒ final goods that will be sold to consumers (e.g. pre-packaged frozen food).

In Australia, manufacturing is still a fairly large industry (almost 1,000,000 workers); especially in food/chemical, and industrial/construction manufacturing sub-sectors. However, we do have an increasing amount of technological and industrial equipment, and consumer 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!

## 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:

- ⇒ 90 covers per day for a restaurant
- ⇒ 18kg coffee per week for a café
- ⇒ 20 barrels per week for a pub
- ⇒ 800 pies per month for a take-away.

## Outputs - Goods A

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

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

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## 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 be able 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 this checklist 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 other focus areas (e.g. Number and Probability and Statistics, or Financial Numeracy and Probability and Statistics); and/or be related to another industry age.

# Preview

Sample:  
Do Not  
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### Outputs - Goods

- ✓ 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.
- ☐ Estimating different types and amounts of outputs. (N)
- ☐ Classifying and counting different types of outputs. (N)
- ☐ Estimating and counting different purchasers of outputs. (N)
- ☐ Estimating and measuring sizes of varied outputs. (N,M)
- ☐ Estimating and measuring time taken to produce varied outputs. (N,M)
- ☐ Estimating and projecting future output amounts, percentages and statistics. (N,M,PS)
- ☐ Estimating and calculating weights, lengths and volume of outputs per unit and per order. (N,M)
- ☐ Estimating order amounts and prices. (N,M,FN)
- ☐ Calculating order amounts and prices. (N,FN)
- ☐ Processing orders, amounts and prices. (N,N)
- ☐ Estimating employee sales amounts & %'s. (N,FN)
- ☐ Calculating employee sales amounts & %'s. (N,FN)
- ☐ Calculating customer sales amounts & %'s. (N,FN)
- ☐ Calculating hourly sales amounts & %'s. (N,M,FN)
- ☐ Calculating daily sales amounts & %'s. (N,M,FN)
- ☐ Calculating weekly sales amounts & %'s. (N,M,FN)
- ☐ Calculating different price ratios and profit margin ratios. (N,M,FN)
- ☐ Calculating stock turnover. (N,M).
- ☐ Estimating and predicting sales amounts and trends. (N,FN)
- ☐ Examining unsold waste amounts, ratios and trends. (N,M,FN)
- ☐ Comparing and analysing sales volumes over time. (N,M,PS)
- ☐ Comparing and analysing sales volumes with other firms. (N,M,PS)
- ☐ Comparing and analysing revenue amounts over time. (N,M,N,P)
- ☐ Comparing and analysing revenue amounts with other firms. (N,FN,PS)
- ☐ Comparing and analysing profit levels over time. (FN,PS,N)
- ☐ Comparing and analysing profit levels with other firms. (FN,PS,N)
- ☐ Calculating, comparing and analysing gross and net margins with past performance and industry benchmarks. (N,PS,N)
- ☐ Analysing amounts, measures and prices of outputs over time. (FN,PS,N,M)
- ☐ Comparing and analysing outputs sold by different workers/departments. (PS,N,M)
- ☐ Comparing amounts, measures and costs for different types of outputs. (FN,PS,N,M)
- ☐ Predicting changes in output trends in the future. (PS,N,M)
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_
- ☐ \_\_\_\_\_

### ANP - Goods outputs

Chaxksen is going to analyse the sales data for Beefy Burgers. He is going to prepare a spreadsheet to organise item sales, sales proportions and total sales amounts by hour and by day, over a 1 week period. He is then going to use his findings to make suggestions to the boss about how they can capitalise on popular items, as well as developing some strategies that could be implemented to move more of the lower-selling products. He will then try to predict some future sales levels that could happen by changing the product mix.

Chaxksen is also going to calculate and analyse gross and net margins across the entire product range and then use the data to calculate weighted averages of each product's contribution to overall revenue and profit levels. He knows that some items do sell a lot and contribute a lot of revenue, such as burgers, however, chips have a much better gross margin; and drinks cost 'nothing' in time or labour to make, just an investment in stock. He is also going to do some wider industry research to compare the margins, revenues and profits of Beefy Burgers with other similar enterprises in his industry.

Chalsee at Retro is also going to analyse sales data including time of day, the day of week, and special times such as seasons, trading and holidays. Chalsee wants to learn more about small business so she is going to analyse the costs of buying stock. She knows that the records the cost of stock purchases and also basic day-to-day financial operations including sales data.

Chalsee is also going to conduct a wider industry comparison of operating margins in the retail clothing industry, the costs of buying second-hand stock items compared to new stock items, and an analysis of the different timeframes associated with sourcing and selling old vs new. She also wants to do some research into how second-hand and vintage stores reduce waste and landfill, help lower-income people and contribute to more sustainable use of resources.

Ti is going to investigate the production level of different collectable items and their gross and net margins. He will look at sales on a monthly basis and do calculations to determine which items are more popular and more profitable. He is also going to investigate quality control issues in the food manufacturing industry and use examples to calculate how much this costs in materials waste, lost labour time and machinery operating time. He is also going to use his knowledge to suggest novel ways of re-purposing waste and quality control rejects into different products.

Preview  
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### Outputs - Goods in action B

Consider the information about the guys and their industries. Suggest 2 focus areas that you recommend they choose for their ANPs. Describe calculations that would need to be made using the numerical data and information that they need to collect.

Focus area 1:	Focus area 2:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

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 these **ANP: Outputs - Goods Investigation** pro-formas.

ANP Outputs - Goods	ANP: Outputs - Goods Investigation 1	
	Outputs: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Numerical techniques and technologies I will use to analyse and use the data.	
	Examples related to the data & information.	
	Calculations using the data & information.	
	Summary information about the data & information.	

ANP  
Outputs -  
Goods

Preview  
Sample:  
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ANP: Outputs - Goods Investigation 2

Outputs: EBT Focus area: ANP 2

ANP  
Outputs -  
Goods

Numerical processes I will use to collect data and information.

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

Preview

Estimates related to the data & information.

Sample:

Do Not

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Calculations using the data & information.

Summary information about the data & information.

ANP  
Outputs -  
Goods

## 13.09 Outputs - Services

### Services

In the commercial world, many enterprises provide service outputs to customers and 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**.

# Preview

### 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 goods
- ✓ installing equipment
- ✓ providing haircuts
- ✓ making and assembling 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. a car wash, or a barber.

Other practical service providers will estimate a 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 the job. If the quote is too low, they will be squeezed by the market and their profit margin will be too narrow.

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 and product services.

*Image: monkeybusinessimages/  
iStock/Thinkstock*



### Information 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
- ⇒ page views/impressions.

Others might be measured on a client-service basis which takes into account time taken, 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 longer 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 their variable costs (e.g. labour time and consumables) as well as their fixed costs (e.g. equipment, vehicle and rent) into the price of their services.

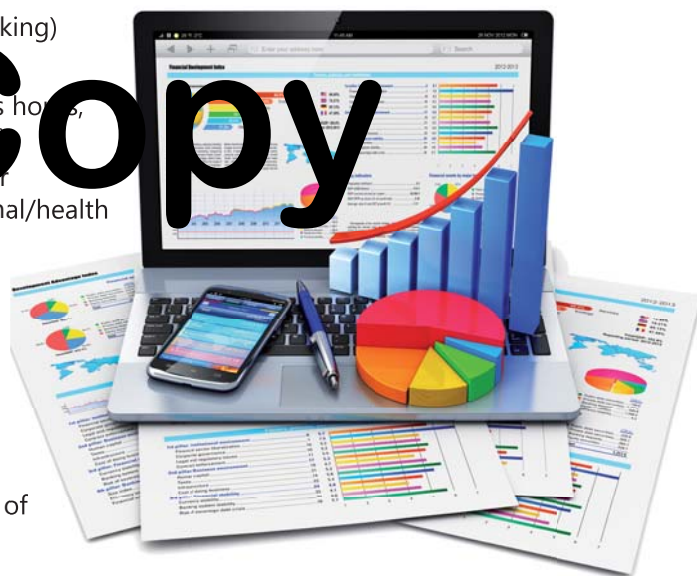
Often these service providers have to tender for a contract and then do their work (their processing) in such a way that ensures that they can deliver their outputs in a cost-effective manner.

Therefore, as 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

Image: scanrail/  
Depositphotos.com



## 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 satisfaction 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 15 Year 12 VCAL numeracy students, for 4 hours a week, over 32 weeks.

From these, various labour output and productivity 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 unemployed job-seeking clients who gain employment
- ⇒ the number of in-home care clients serviced per staff member per week
- ⇒ the response time for call-outs for roadside assist.

Some community service outputs might be harder to quantify by using quality and quantitative measures to 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 art organisation that mounted an exhibition of 10 local artists that attracted 1,000 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.

**It is not always easy to measure the outputs, related to certain types of people and community services, simply in numbers. Sometimes quality measures might be more useful.**



Image:  
monkeybusinessimages/  
iStock/Thinkstock

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

Industry:	Enterprises/work settings:
What do they do: i.e. sell, produce or provide?	
Description of services: What type of services do they provide, and to whom?	
Measures: How would they use measurements in relation to providing these services, and what measures would they use?	
Time: What time scale would they use for measurement of service provision, and why? (i.e. per hour, per day, per week, etc.)	
Margins: What might be some of the margins associated with these outputs of services.	
Other information	

Preview  
Sample:  
Do Not  
Copy

## 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 this checklist 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 other focus areas (e.g. Number and Probability and Statistics or Financial Numeracy and Probability and Statistics); and/or related to another industry stage.

- Preview**  
**Sample:**  
**Do Not**  
**Copy**
- ✓ Identify numerical processes to use data and information.
  - ✓ Use numerical techniques and technologies to organise and use the data.
  - ✓ Estimate, calculate, summarise, analyse and communicate using the data.
- |  |  |
|--|--|
| <input type="checkbox"/> Estimating amounts of service outputs. (N)  | <input type="checkbox"/> Calculating service fees generated by workers in \$ and %'s. (PS,FN,N)  |
| <input type="checkbox"/> Classifying and counting different types of service outputs. (N)                                    | <input type="checkbox"/> Calculating service fees generated from workers in \$ and %'s. (FN,M,PS)  |
| <input type="checkbox"/> Estimating and calculating service outputs of/clients for, outputs (service) (M)                    | <input type="checkbox"/> Comparing service outputs over time. (PS,N)   |
| <input type="checkbox"/> Estimating and measuring service to produce/provide service outputs. (N,M)                          | <input type="checkbox"/> Comparing service volumes with other firms. (S,N)   |
| <input type="checkbox"/> Measuring for quality control related to outputs. (N,M)   | <input type="checkbox"/> Comparing revenue or profit amounts over time. (PS,FN)  |
| <input type="checkbox"/> Measuring outputs for practical services. (N,M)   | <input type="checkbox"/> Comparing revenue, margins and profit levels with other firms. (PS,N)   |
| <input type="checkbox"/> Estimating and measuring client contact times for people services. (N,M)                            | <input type="checkbox"/> Comparing service outputs 'sold' by different workers/departments. (PS,FN,M)  |
| <input type="checkbox"/> Weighing and measuring practical service outputs. (N,M)   | <input type="checkbox"/> Calculating different ratios and service profit margin ratios. (PS,M,FN)  |
| <input type="checkbox"/> Describing changes in amounts, measures, sizes and prices of service outputs over time. (N,M,FN,PS) | <input type="checkbox"/> Estimating and predicting service amounts and trends. (PS,N)  |
| <input type="checkbox"/> Measuring service times spent on different tasks. (M)   | <input type="checkbox"/> Examining waste amounts, ratios and costs from services. (PS,M,FN,N)  |
| <input type="checkbox"/> Performing debit and credit financial transactions. (FN)  | <input type="checkbox"/> Comparing amounts, measures and costs for different types of service outputs. (FN,PS,N,M)                                 |
| <input type="checkbox"/> Analysing debit and credit financial transactions. (FN)   | <input type="checkbox"/> Calculating service ratios and profit margin ratios on different services. (N,M,FN)                                       |
| <input type="checkbox"/> Evaluating service quality KPIs related to meeting objectives. (N,M)                                | <input type="checkbox"/> Calculating, comparing and analysing gross and net margins with past performance, and with industry benchmarks. (FN,PS,N) |
| <input type="checkbox"/> Calculating different service ratios and profit margin ratios. (PS,FN,N,M)                          | <input type="checkbox"/> Analysing amounts, measures and prices of service outputs over time. (FN,PS,N,M)  |
| <input type="checkbox"/> Estimating and calculating \$ price/fee of different service outputs, and in total. (FN,N)          | <input type="checkbox"/> Comparing and analysing service outputs sold by different works/departments. (PS,N,M)                                     |
| <input type="checkbox"/> Estimating and calculating daily, weekly and total (service) revenue amounts. (FN,N,M)              | <input type="checkbox"/> Predicting changes in service output trends in the future. (PS,N,M)   |
| <input type="checkbox"/> Estimating and calculating daily, weekly and total (service) profit amounts. (FN,N,M)               | <input type="checkbox"/> _____   |
| <input type="checkbox"/> Estimating and calculating \$ margin of different outputs of services, and in total. (FN,N)         | <input type="checkbox"/> _____   |
| <input type="checkbox"/> Estimating and calculating margins of different service outputs, and in total. (FN,N,PS)            | <input type="checkbox"/> _____   |

## ANP - Service outputs

Rory from The Keyboard Worriers is going to investigate music industry 'output' data and information related to the number of performers and bands, venues and gigs available, average income from a gig (taking into account promotion, travel time and set-up), attendance patterns and other relevant information that he can research. He also wants to find out if it is worth bands outputting CDs, vinyl or even cassettes (he's heard these are making a comeback), as opposed to using digital download formats. He knows that the costs of physical formats are higher; but so too are the potential margins. He is going to do some calculations to work this out and do comparisons. He is also interested in comparing music industry sales trends, including local vs domestic, indie vs popular; and also come up with some probabilities of specific genres of music which can find a cult following. He also wants to find out how much local indie performers are likely to make from CD and merch sales at gigs, and whether it might be better to just give away digital tracks online in order to attract a live following.

Rona at D'Service Cycle is going to analyse sales data for the shop including days of the week and different seasonal trends. She is going to compare sales data with service and repairs data, so as to calculate and analyse which type of operations are more profitable for the business - sales of bikes, sales of parts and accessories, or service and repairs?

Rona thinks she needs to know more about how small business runs, so she is going to analyse the accounting records to see how stock and the service and repairs operations are recorded; and also how the owner manages the day-to-day financial operation including sales and costs.

Rona is also going to conduct a wider retail industry comparison of operating margins for different types of small retailers and retail products. She also wants to do some research into how online retailing might be impacting on traditional face-to-face retail operations, particularly for speciality items.

Lanny is going to investigate broader community service trends throughout society by researching some key community services. He wants to find out the types and scope of the services they provide, different support needs and demographics of their most vulnerable clients they support, how many 'output' units different services provide (e.g. crisis support services, support hours, etc.) as well as other relevant data and information. He will also estimate and calculate operating margins based on the cost of inputs, especially labour costs and the contribution of volunteer labour time and skills.

Lanny is also going to contact different industry stakeholders to research whether the scope of some problems is growing, and what might be some of the likely trends for the future; and how these trends could cause strain on community service providers and threaten their ability to keep delivering quality outputs to help others. He will also compare the findings from his wider industry research to local community service providers.

## Outputs - Goods in action B

Consider the information about the guys and their industries. Suggest 2 focus areas that you recommend they choose for the ANP. Describe calculations that would need to be made using the numerical data and information that they need to collect.

Focus area 1:	Focus area 1:
Calculation 1:	Calculation 1:
Calculation 2:	Calculation 2:
Calculation 3:	Calculation 3:
Calculation 4:	Calculation 4:

13.15 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 these ANP: Outputs - Services Investigation pro-formas.

ANP Outputs - Services	ANP: Outputs - Services Investigation 1	
	Outputs: EBT Focus area: ANP 1	
	Numerical processes I will use to collect data and information.	
	Numerical techniques and technologies I will use to analyse and use the data.	
	Examples related to the data & information.	
	Calculations using the data & information.	
	Summary information about the data & information.	

ANP  
Outputs -  
Services

ANP: Outputs - Services Investigation 2

Services: EBT Focus area: ANP 2

ANP  
Outputs -  
Services

Numerical processes I will use to collect data and information.

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

Preview

Estimates related to the data & information.

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Calculations using the data & information.

Summary information about the data & information.

ANP  
Outputs -  
Services

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 results and information.

ANP Services		ANP: Outputs (Overall) - Investigation	
Name(s):		Date:	
Industry:		Workplace:	
Key examples and types of <u>outputs</u> (i.e. the form that these take for goods or services).			
Outputs: Numerical <u>processes</u> I can/will use to collect <u>estimates</u> of data & information.		Outputs: Numerical <u>techniques</u> I can/will use to make <u>estimates</u> using data & information.	
Outputs: Applied examples of <u>estimates</u> using these numerical processes and techniques.			

ANP: Outputs (Overall) Investigation (cont.)	
<p><b>Outputs:</b> Numerical <u>processes</u> I can/will use to do <u>calculations</u> using the data &amp; information.</p>	<p><b>Outputs:</b> Numerical <u>techniques</u> I can/will use to do <u>calculations</u> using the data &amp; information:</p>
<p><b>Outputs:</b> Applied examples of <u>calculations</u> using these numerical processes and techniques.</p> <p><b>Preview</b></p> <p><b>Sample:</b></p>	
<p>Use the estimates and/or calculations to develop descriptive summary statements.</p> <p><b>Do Not</b></p>	
<p><b>Analysis based on the estimates and/or calculations:</b> What are some key <u>conclusions/inferences</u> you can make from the data?</p> <p><b>Copy</b></p>	
<p><b>Other:</b> How the data and information might best be communicated. (e.g. Numbers, words, visual, etc..)</p>	

13.19 Assessment Task

AT4 Applied Numeracy Projects - EBT: Outputs

Overview

For your whole-of-unit **Numeracy-based Project** you have to select 8 **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 3 EBTs**, related to **outputs** for your Numeracy-based Project.
- ⇒ It is best to choose no more than **2 EBT** for **outputs** to match any single focus area of Number, Measurement, Financial Numeracy or Probability and Statistics.
- ⇒ Some EBT focus areas for processing may overlap, 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 EBTs. So 8 ANPs = whole-of-unit **Numeracy-based Project**.

Numeracy-based Project

Name:

Dates:

Industry:

Workplace(s)

Industry Stages	Focus area: Number (N)	Focus area: Measurement (M)	Focus area: Financial Numeracy (FN)	Focus area: Probability and Statistics (PS)
Inputs				
Processing				
Outputs				

**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.

# Preview

**ANP Outputs: Step 1**

- ☐ Choose your focus area(s).
- ☐ Negotiate the suitability of this 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.

# Do Not

**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.

# Copy

**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

Name:	Dates:	Industry Stage: Outputs			
Industry:	Focus areas:	EBT#			
Workplace(s):					
Tasks - AT4: Applied Numeracy Projects - Enquiry-based Task		Re-quired	Due by	Done	Teacher initials
<b>Stage 1: Design your Numeracy-based Project</b>					
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.	✓				
iv. Get teacher feedback and finalise Numeracy-based Project Plan.	✓				
<b>Stage 2: Undertake research to process information for your ACP by applying numeracy skills</b>					
i. Undertake your research for this EBT into output.	✓				
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 to all techniques used.	✓				
v. Use data and information to perform estimation and calculations.	✓				
vi. Use data and information to make inferences and conclusions.	✓				
vii. Analyse the data and information.	✓				
<b>Stage 3: Use appropriate software tools and devices</b>					
i. Describe software tools and devices that might best represent 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.	✓				
iv. Use appropriate software tools and devices to handle the data and information you have collected.	✓				
v. Evaluate the software tools and devices you used; and their effectiveness for collecting, collating and communicating.	✓				
<b>Stage 4: Reporting</b>					
⇒ Prepare a draft for your final report. (Refer pp.317-318)	✓				
Additional information:					
Signed: _____ Date: _____					

# Reporting

# 14

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p. Due date/Done?

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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 the example of data and information presented ‘poorly’ using a spreadsheet. Which industry stages do you think this relates to, which focus areas does it cover, and ‘who’ might have prepared this data?



Don't put your audience to sleep with too many numbers on pages, tables and spreadsheets that make little sense. Instead summarise and explain the key numerical concepts.

Image: AndreyPopov/iStock/Thinkstock

		M				W										SA				SU	
Beefos	17	\$8.00	\$136.00		\$8.00	\$6.00	23	\$10.00	\$4.00		\$8.00	\$20.00	56	\$8.00	\$40.00	48	\$8.00	\$384.00	39	\$8.00	\$312.00
Deluxe	14	\$10.00	\$140.00	5	\$10.00	\$50.00	9	\$10.00	\$50.00	18	\$10.00	\$10.00	11	\$10.00	\$110.00	32	\$10.00	\$320.00	18	\$10.00	\$180.00
Kidlies	4	\$4.00	\$16.00	0	\$4.00	\$0.00	9	\$4.00	\$36.00	9	\$4.00	\$36.00	17	\$4.00	\$68.00	44	\$4.00	\$176.00	8	\$4.00	\$32.00
Vego	7	\$8.50	\$59.50	0	\$8.50	\$0.00	2	\$8.50	\$17.00	8	\$8.50	\$68.00	12	\$8.50	\$102.00	9	\$8.50	\$76.50	11	\$8.50	\$93.50
Chips xl	4	\$9.00	\$36.00	1	\$9.00	\$9.00	8	\$9.00	\$72.00	9	\$9.00	\$81.00		\$9.00	\$63.00		\$9.00	\$108.00	9	\$9.00	\$81.00
Chips l	12	\$7.00	\$84.00	6	\$7.00	\$42.00		\$7.00	\$42.00	12	\$7.00	\$84.00	6	\$7.00	\$42.00		\$7.00	\$168.00	19	\$7.00	\$133.00
Chips m	5	\$5.00	\$25.00	2	\$5.00	\$10.00		\$5.00	\$85.00	9	\$5.00	\$45.00		\$5.00	\$75.00		\$5.00	\$80.00	11	\$5.00	\$55.00
Chips s	9	\$3.00	\$27.00	2	\$3.00	\$6.00	3	\$3.00	\$5.00	24	\$3.00	\$72.00	12	\$3.00	\$36.00		\$3.00	\$48.00	8	\$3.00	\$24.00
Soft drink	17	\$2.50	\$42.50	4	\$2.50	\$10.00	11	\$2.50	\$27.50	22	\$2.50	\$55.00	34	\$2.50	\$85.00	38	\$2.50	\$95.00	16	\$2.50	\$40.00
Sports	2	\$4.50	\$9.00	0	\$4.50	\$0.00	0	\$4.50	\$0.00	3	\$4.50	\$13.50	4	\$4.50	\$18.00	12	\$4.50	\$54.00	0	\$4.50	\$0.00
Mineral	3	\$3.50	\$10.50	1	\$3.50	\$3.50	5	\$3.50	\$17.50	2	\$3.50	\$7.00	6	\$3.50	\$21.00	18	\$3.50	\$63.00	11	\$3.50	\$38.50
Water	23	\$2.00	\$46.00	7	\$2.00	\$14.00		\$2.00	\$24.00	14	\$2.00	\$28.00	31	\$2.00	\$62.00	16	\$2.00	\$32.00	4	\$2.00	\$8.00
Juice	4	\$4.00	\$16.00	0	\$4.00	\$0.00	3	\$4.00	\$12.00	5	\$4.00	\$20.00		\$4.00	\$20.00	9	\$4.00	\$36.00	12	\$4.00	\$48.00
	121		\$647.50	35		\$200.50	11		\$673.00	167		\$550.00			\$225.00	294		\$1,640.50	166		\$1,045.00
																				1143	
				1	222	31.7	\$1,776.00	\$253.71		\$8.00									\$6,442.00		
				2	107	15.3	\$1,070.00	\$152.86		\$10.00									\$5.64		
				3	91	13.0	\$364.00	\$52.00		\$4.00											
				4	49	7.0	\$416.50	\$59.50		\$8.50									\$920.29		
				5	50	7.1	\$450.00	\$64.29		\$9.00											
				6	108	15.4	\$756.00	\$108.00		\$7.00								M-F	\$3,756.50		
				7	74	10.6	\$370.00	\$52.86		\$5.00								S&S	\$2,685.50		
				8	89	12.7	\$267.00	\$38.14		\$3.00											
				9	142	20.3	\$355.00	\$50.71		\$2.50											
				10	21	3.0	\$94.50	\$13.50		\$4.50											
				11	46	6.6	\$161.00	\$23.00		\$3.50											
				12	107	15.3	\$214.00	\$30.57		\$2.00											
				13	37	5.3	\$148.00	\$21.14		\$4.00											

Have a look at the spreadsheet on p.308.

1. What information is the spreadsheet communicating? From the ANP examples given throughout Unit 2, who would have created this?

2. How 'easy' is it to interpret the data and information? Suggest improvements.

# Preview

3. What format would have been used to set up the spreadsheet?

# Sample:

4. What types of visual presentations would you recommend that the person uses to communicate the information more successfully?

# Do Not Copy

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



Chaxksen, Chalsee, Rory, Ti, Rona and Lanny 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 might have gathered. Work in pairs for this activity.

Data and information	'Written' Report	Reporting to an audience
Chaxksen has set up spreadsheets to work out different input amounts and cost ratios for all the food items. But it's all just tables of numbers. He wants to clearly communicate proportions and rates.		
Chaxksen:		
Chaxksen:		
Chalsee 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.		
Chalsee:		
Chalsee:		
Rory has got a lot of info about the cost of gear needed to set up and equip the band, but it varies widely depending on his information source, especially online advice. How could Rory communicate these variations?		
Rory:		
Rory:		

Preview  
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Data and information	'Written' Report	Reporting to an audience
Ti has photos, diagrams and flowcharts that show some of the production processes and work flows at the chocolate factory; as well as formulae for the production mixes for different products. He's not sure how to organise and show this information.		
Ti:		
Ti:		
Rona has got lots of data that shows the differences between costs, revenue, hours, profits and margins for sales, and for the service and repair. All these are all in a series of tables with information she extracted from her investigation. How could she communicate this?		
Rona:		
Rona:		
Lanny has a huge range of statistics from different community service providers that communicate their volumes of outputs in different ratios, such as: per/person, per/hour, per/weight and per/\$. Lanny thinks an infographic might be a good idea, but he isn't sure what images to use.		
Lanny:		
Lanny:		

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14.05 Report - Communications Planner: Inputs

A 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?

Report - Communications Planner: Inputs			
What is the data and information I'm communicating?	What are the main points I want to communicate?	How could I best summarise this data and information?	What is the best way to communicate this information visually?
e.g. Measurement The measurements for the recipe to make the soup daily special so that it makes 30 serves.	e.g. The proportional % ratio of different ingredients needed. The amounts in kgs, litres and cups needed for	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 % needed of each ingredient which will be much better represented visually rather than in words.	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.

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## Report - Communications Planner: Processing B

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?

Report - Communications Planner: Processing			
What is the data and information I'm communicating?	What are the main points I want to communicate?	How could I best summarise this data and information?	What is the best way to communicate this information visually?
<h1>Preview Sample: Do Not Copy</h1>			

14.07 Report - Communications Planner: Outputs

C Report - Communications Planner: Outputs

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?

Report - Communications Planner: Outputs			
What is the data and information I'm communicating?	What are the main points I want to communicate?	How could I best summarise this data and information?	What is the best way to communicate this information visually?
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## Report - Evaluation Planner D

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.

Report - Evaluation Planner			
Measure/criteria that can be used for evaluation.	How is this measure/criteria useful as part of evaluation?	How can others use this measure/criteria to assess me?	How can I use this measure/criteria to self-assess?
<b>Planning and organising my Numeracy-based Project.</b>			
<b>Using numeracy skills, techniques, software tools and devices to collect and record my information.</b>			
<b>Overcoming difficulties, barriers and obstacles and solving problems that arise during my investigations.</b>			
<b>Dealing effectively with others as part of my investigations, including the use of feedback.</b>			
<b>Using numeracy skills, techniques, software tools and devices to analyse my information.</b>			
<b>Communicating and reporting the results from my investigations clearly and effectively.</b>			

## 14.09 Assessment Task

### AT5 Numeracy-Based Project: Reporting

#### Overview

For your whole-of-unit **Numeracy-based Project** you have investigated 8 **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) where relevant.
- ☐ Use feedback to evaluate your success in relation to:
  - ✓ 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 numeracy skills, tools and techniques to analyse your results
  - ✓ Your choice of information, techniques, tool and devices to communicate your results
  - ✓ Your choice of presentation format and communication of data and information
  - ✓ Your presentation (an oral multimedia report if required).



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Name:		Dates:		Reporting	
Industry:					
Workplace(s):					
Tasks - AT5: Numeracy-based Project - Reporting		Re- quired	Due by	Done	Teacher initials
<b>In reporting the results from my Numeracy-based Project have I:</b>					
i. Used appropriate mathematical language.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii. Used relevant mathematical symbols and conventions.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iii. Utilised software tools and devices to prepare my report.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv. Utilised software tools and devices to communicate my results.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>In my report have I communicated my results effectively using:</b>					
i. Written information (including words and numbers).	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii. Visual information such as tables, charts, diagrams and timelines.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iii. Multimedia formats (such as video, audio, etc. where relevant).	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv. Other formats as relevant to the industry and investigation.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
⇒ Submit a draft, and then my report based on feedback.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Have I developed and used criteria to self-assess in relation to me:</b>					
i. Planning and organising my Numeracy-based Project.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ii. Using numeracy skills, techniques, software tools and devices to collect and record my information.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iii. Overcoming difficulties, barriers and obstacles, and solving problems, that arose during my investigations.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
iv. Dealing effectively with other people as part of my investigations, including the use of feedback.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
v. Using numeracy skills, techniques, software tools and devices to analyse my information.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
vi. Communicating and reporting the results of my investigations clearly and effectively.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
⇒ Obtain feedback and evaluations on my report; and on how effectively I communicated information.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<b>Reporting</b>					
⇒ Complete and submit my final report.	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
⇒ Prepare a report to the class (if required).	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
⇒ Present my report to an audience (if required).	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Additional information:					
Signed: _____ Date: _____					

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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?

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

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

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

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

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





