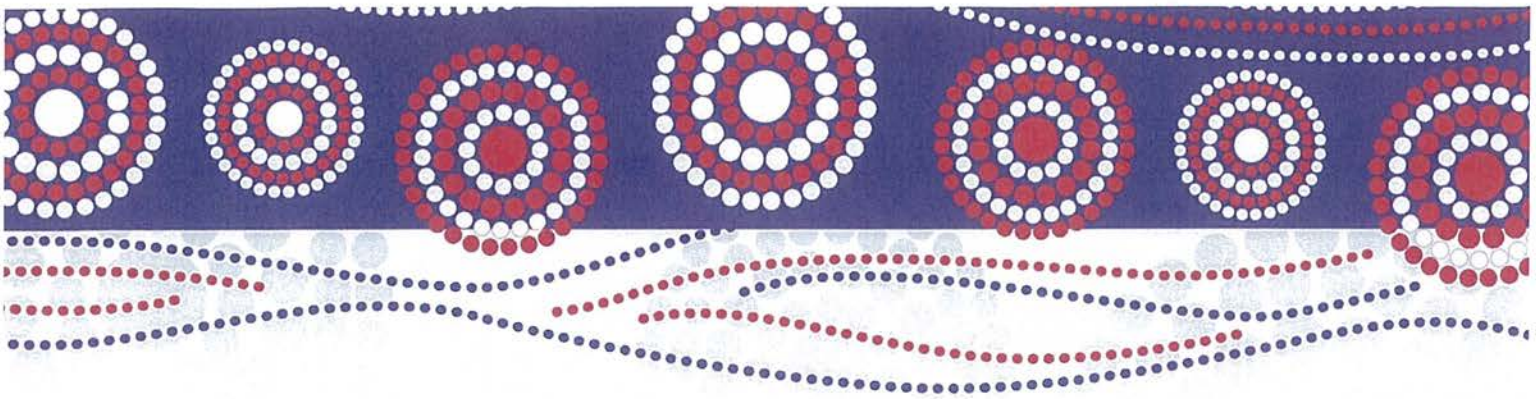
Gorokan High School Workbook

YEAR 10

BOOKLET 2



ENGLISH

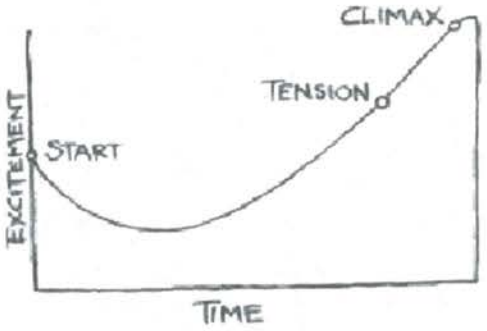
Reading & Stories of

Writing Stories of Suspense

The Seven Steps to Super Stories

Anyone can write a successful story! You just need to follow these seven simple steps:

Step 1: Plan for Success



Top Tip: A joke, a movie, a TV sitcom, a book and a great story - what do they all have in common? They all follow the same 'story graph'. Start with a bang, slowly build up the tension and end on a real high point.

Step 2: Sizzling Starts

Top Tip: Start where the action is. Not at the beginning of the day where nothing is happening. Begin when the volcano starts oozing lava or as you walk in the door to the big disco competition.

Step 3: Tightening Tension

Top Tip: You must believe the hero (male or female) will fail. The tornado is too strong, the villain is too evil, the black forces of depression are too overwhelming. Yet, through strength, talent and determination, somehow our hero wins.

Step 4: Dynamic Dialogue

Top Tip: Think of dialogue as a mini play in the story. Let your characters walk, talk or even stalk - that's how we get to know them.

Step 5: Show, Don't Tell

Top Tip: If I tell you I am generous, do you believe me??? No way. But if I buy all 20 raffle tickets to help cancer research, are you more convinced? Actions really do speak louder than words.

Step 6: Ban the Boring Bits

Top Tip: Everyone gets up, gets dressed, travels to school...it's not exciting. So why write about it? Ban all mention of the 'boring B' words - beds, breakfast and bus trips. Think like the movies, the heroes never travel, they just arrive...

Step 7: Exciting Endings

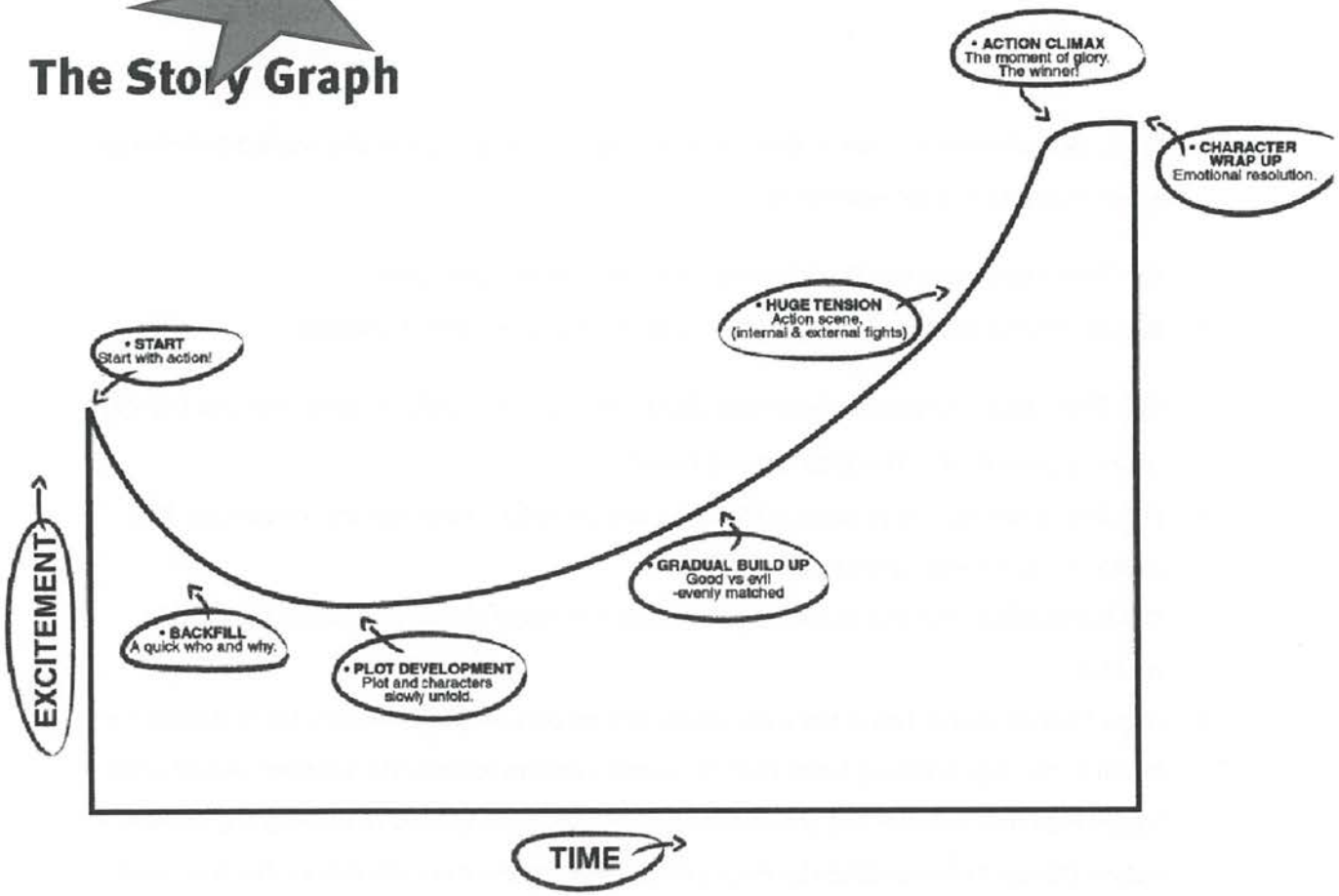
Top Tip: Would you tell a joke without knowing the punch line? If you want to build to a big climax you have to know where you are heading.

Step 1

Writing Stories of Suspense

Step 1: Plan for Success

The Story Graph



An excellent way to plan your story is to use the story graph.

- **Start:** Start where the action is. Not at the beginning of the day but at the 'moment of change' when things start to get interesting.

  Eg. "Don't look now but there's a bull breathing down your back."

- **Backfill:** Fill the audience in very briefly about the characters and the setting.

  Eg. "The Heavenly Holiday farm was slightly left of the middle of nowhere and I swear only my parents and the flies knew it existed."

- **Plot Development:** The problem is identified and the other characters are introduced. The problem may be internal or external.
- **Gradual Buildup:** The plot continues to develop, the character works towards solving the problem.
- **Huge Tension Scene:** This is the scene where the heroine only has five minutes to disarm the bomb or the ship is sinking faster than the passengers can escape. The problem should seem bigger than the character and the audience should be thinking 'they're never going to make it!'
- **Action Climax:** This should be the most exciting point of the story-the climax. The hero comes out a winner (or sometimes a loser)
- **Character Wrap up:** The climax is usually all action but sometimes there is a final scene where the characters resolve the emotional side of the story. The guy gets the girl, the star footy player thanks the coach, etc.

❾ Activity:

Draw a blank story graph (you can trace the one on the previous page) and use it to plan a story. Plot a few points for each section.

Some suggested titles:

- The most embarrassing moment of my short life
- The last day of Winter
- Shocked!
- Mum was so proud

Writing Stories of Suspense

Writing Stories of Suspense

Ok so if you're not into graphs, another way you can effectively plan your story before you begin writing is to write a few dot points to the questions below:

1. Your story has to start with action!

-Where will the start of your story take place?

-What will be happening?

2. Backfill. No boring info please, just the vital who, what and why.

3. What is the main problem/conflict in your story?

4. Things get very bad, the problem/conflict escalates. How?

5. What happens in the tension scene? Build the excitement by making your character really suffer or scared.p

6. The Climax. Amazingly they win! (or tragically they lose ☹)How? What are their rewards? How do they feel?

Tip: You need to know how you are going to end your story before you begin writing!

Step 2: Sizzling Starts:

A great beginning should instantly grab a reader's attention and make them want to keep reading. There are lots of ways to create sizzling starts, here are 5 suggestions:

Start with a bang!

I wondered why the baseball was getting bigger. Then it hit me.

Make the reader curious

Let me explain about the divorce, the beach house and the bacon.

Create a moment of change

Everything was going well until my mum said "we're moving to India...and Dad's not coming."

Use humour

Use Dialogue

"It's just a rat," I whispered, my breathing ragged.

Mike gripped my arm with frozen fingers, "Rats don't growl"

❾ Activity: Quick Starts

Write the opening paragraph for each of the following story ideas. You don't have to write the whole story just a sizzling start! You only have one minute for each. Ready. Set. Go!

- A ghost story starring a three-legged dog
- There's a plant in the lounge room that is growing very fast. It eats ants and beetles and now the cat is getting scared.
- A man dies wearing purple but he hates the colour purple.
- She's a sophisticated, elegant fashion model...with a dog that farts.

Writing Stories of Suspense

❾ Activity: Very BAD beginnings!

- Brainstorm what makes a bad beginning (eg. Clichés, over-describing, etc.)
- Using the ideas you brainstormed, write a VERY BAD beginning. Have fun with this! Read your bad beginnings out to the class and then solemnly promise me that you will NEVER write this badly again!!

Step 3: Tightening Tension

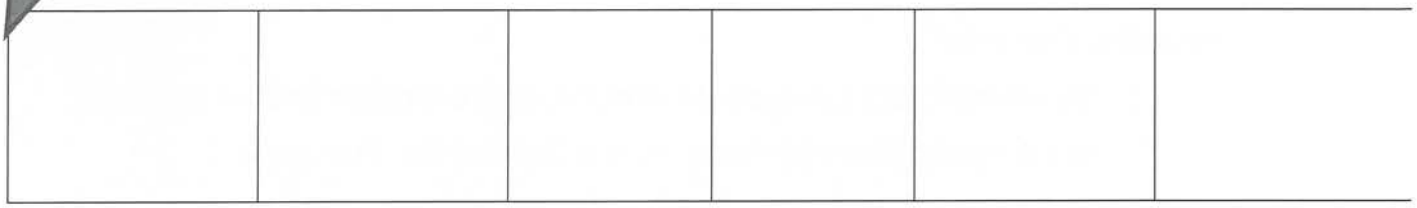
To create tension in your writing you must make the reader feel like they are involved in the action. An effective way of creating tension is to use **sensory imagery**.

Sensory imagery describes a scene using references to all the senses-what you can see, hear, taste, touch and smell as well as what you feel emotionally.

❾ Activity: Creating Sensory Imagery

- Choose one of the settings below and list all the things you could see, hear, taste, touch, smell and feel if you were experiencing the setting.
  - A bushfire
  - A storm
  - A surf competition
  - A city street

Setting:					
What can you See?	**What can you hear?**	**What can you touch?**	**What can you taste?**	**What can you smell?**	**How do you feel?**



- Write a descriptive paragraph detailing the setting you chose. Try and incorporate poetic techniques such as similes and metaphors into your sensory imagery.

Step 4

Step 4: Dynamic Dialogue

Dialogue has three functions:

1. To reveal character
2. To move the plot forward
3. To make a scene more dramatic

→ Choose one of the following emotions and settings. Write a conversation between two characters to reveal the emotion and setting without explicitly naming them. Read out to the class to see if they can guess the emotion and setting.

Emotions:	Setting:
*Depressed	*The beach
*Love	*A cubby house
*Frightened	*On a bus
*Nasty	*At a disco
*Jealous	*A family reunion
*Angry	*Under the bed

Writing Stories of Suspense

*Excited *In a spaceship

Eg. **Nasty** at **a family reunion:**

"Hey Aunt Sue have you seen Albert?"

"Who's Albert?"

"You know my pet mouse, he's missing and I'm really worried."

"I haven't seen your dirty mouse, now beat it."

(Nephew leaves dejected. Aunty pulls mouse from her pocket, grins evilly then calls...)

"Here Kitty, Kitty, Kitty."

1. Try writing 2 more conversations using the same setting but different emotions.
2. Use the conversation you like the best as the basis for a short story.

Tip: Remember to use correct punctuation when writing dialogue and begin a new line when each new character talks.

Step 5: Show Don't Tell

What do these ideas reveal about the character?

- The woman with sagging shoulders and a toddler tugging at her skirt.
- The man rubbing the back of his neck.
- The girls talking to the boy and playing with her hair.

Describing or 'showing' something in creative writing is a lot more effective than simply telling the reader what is happening.

Eg **Telling:**

Cassandra the model was really tall and really stuck-up.

Showing:

Cassandra strutted up the driveway like the world was her catwalk. I rushed to the door and greeted her excitedly.

"Hi," she said flatly, checking out my outfit with a mixed look of boredom and disgust, "Vinnies having a sale are they?" She pushed past me into the hallway and did the model slow-

motion walk to the nearest chair dramatically ducking her head under the light as if she would hit it. Ok yes she's tall but trust me, she's not that tall.

It takes longer to show not tell but the writing is so much more convincing and engaging!

The following activities will help you effectively show not tell.

❾ Activity: Key Words

- Write a paragraph for each of the following ideas but do not use the underlined words.

*I hate PE!

*My little sister is soooo annoying

*Thunder storms scare me

*Today I'm craving chocolate cake

Writing Stories of Suspense


⑨Activity: Showing not telling Feelings

What happens when you feel...


Frightened	**Embarrassed**	**Sad**
Excited	**Nervous**	**Happy**
Shy	**Shocked**	**Tired**
Angry	**Cold**	**Pain**
Hungry	**Jealous**	**Hot**

Write a paragraph incorporating one of the feelings above -Show don't tell!

Step 6: Ban the Boring Bits!

Try to avoid: 'One day...'

'Beep, beep, beep, my alarm went off...'

'And then...'

'I started...'

Everybody wakes up in the morning, gets dressed, brushes their hair and spends a lot of time travelling. It's a part of life but it's boring!! Try to avoid writing about these situations unless something abnormal and engaging happens as you are eating breakfast. If there are parts of your story that are boring or don't move the plot forward, scrap them!

❾Activity: Editing out the boring bits (beds, breakfast, bathroom, buses...)

- Using everything we have learnt so far, rewrite the following passage to make it more interesting:

(Make sure your rewrite includes an action beginning, backfill, dialogue, tension, sensory imagery and poetic devices such as similes and metaphors.)

I woke up that morning, got out of bed and raced down the stairs. I stuffed my face full of cereal and then had three bits of toast and jam. Mum had two cups of coffee and more toast. Then we got into the car and drove through five sets of traffic lights towards the shopping centre but I needed to go to the toilet in a hurry so Mum did a U-turn and found the first available public toilet. I washed my hands before heading back to mum in the parked car. I opened the door and climbed in. Mum had the radio on and the newsreader was droning on about a fire. And then Mum gasped and looked down at me with a tear in her eye, "The shopping centre has burnt down!"

Writing Stories of Suspense

Step 7: Exciting Endings

You must know how your story is going to end before you begin writing!

"Start at the end!! It's too easy to write the first chapter and get stuck-but if you write the ending first you need to know who and what you are writing about." –Jackie French-

❾Activity: The final sentence.

- Choose one of these final lines and create a story graph to plot the rest of the narrative.

*Dad never found out about Davey the Dragon. I sure wasn't going to tell him.

*I walk to school now, it's safer that way.

*She reached out caught the bubbles in her hand and laughed.

*I'll never ever say sorry.

- Write a sizzling start for the story you plotted.

❾Activity: An exciting ending

- Choose one of the situations below and write an exciting ending for the story. You should aim to write 3 or 4 paragraphs. Remember to use sensory imagery and dialogue.

*The light is fading on the mountain side and the fog is getting thicker when one climber breaks his leg...

*A group is trapped in a cellar with a locked door and no window...

*Two characters are in the middle of the ocean in a small boat with a big leak and a broken motor...

*It is the final minutes of a grand final and the team needs two pints to win...

Never, ever, ever use the "I woke up and it was just a dream ending! It is clichéd and tacky and makes a reader feel ripped off! It may have worked in *The Wizard of Oz* but it hasn't worked since!!

Writing Stories of Suspense

Monster Quiz

Match the following monsters with the correct definition:

Monster	Answer	Definition
A. Werewolf		A gigantic three-headed dog.
B. King Kong		An Australian monster who lives in billabongs
C. Gollum		A woman with snakes for hair that turns people to stone
D. Minotaur		A monster shark
E. Count Dracula		A giant gorilla
F. Bunyip		Ape-like underworld cannibals
G. Zombie		A miserly whining creature (in *The Hobbit*)
H. Cerberus		A monster made from recycled human parts
I. Frankenstein's Monster		A creature with acid blood that lives in space
J. Godzilla		Tiny monsters that go crazy if they get wet after midnight
K. Dragon		An ancient nobleman with a taste for blood
L. Phantom of the Opera		Also called 'the abominable snowman'
M. Hydra		A radioactive, fire-breathing lizard, 100m tall
N. Medusa		An ancient Egyptian, risen from the dead.
O. Alien		A man who has turned into a wolf
P. Mummy		A many-headed serpent whose heads grow back when cut off
Q. Morlocks		A fire-breathing monster with wings and claws.
R. Jaws		A dead person whose soul is possessed by another
S. Yeti		A mad musician whose face is hideously disfigured.
T. Gremlins		A giant creature, half man, half bull.

❾ **Match the following monsters with the correct definition:**

Activity: Visual Task

Choose 3 of the monsters above and draw what you imagine them to look

...

Writing Stories of Suspense

Create Your Own Monster

Using the chart we completed last lesson for inspiration, create your own terrifying monster.

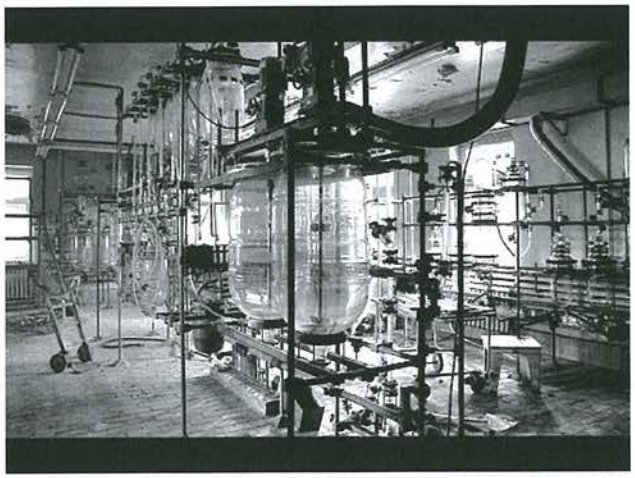
1. In your English book, write a detailed profile describing your monster. Use the following sub-headings to organise your information:
   - Name
   - Origin (where the monster came from)
   - Body covering (hair, skin, scales, etc)
   - Movement
   - Distinguishing features
   - Special powers/abilities
   - Habitat (describe where the monster lives)
   - Enemies
   - Other information

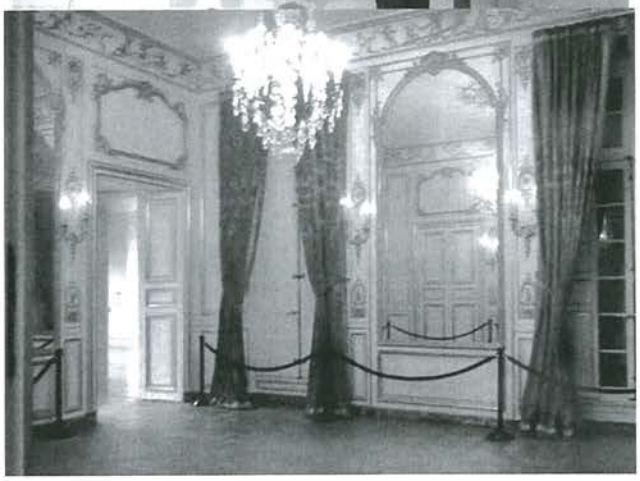
2. Using the above information, write a paragraph describing your monster. Remember to use sensory images.
3. Draw a picture of your monster
4. Write the opening paragraph of a scary story featuring your monster. (Remember to write a sizzling start that will engage your reader!)

Writing Stories of Suspense

Suspenseful Settings

- Brainstorm 5 settings appropriate for a scary story.
- Write a list of the features that characterise each setting eg. A graveyard: thick fog, headstones, shadows or silhouettes, pale moonlight, an owl, a freshly dug grave...
- Choose one of the images below. Imagine you are there and write a descriptive paragraph detailing your suspenseful setting. Remember to show not tell.





Writing Stories of Suspense

Brainstorming ideas for your suspenseful story:

1. Spend two minutes on each of the opening lines below and write a sizzling start:

Ü The clock struck midnight and a grey mist began creeping through the graveyard as if it was alive...

- Ü The cauldron of thick purple liquid started to bubble over and before I could stop it...
- Ü Earnest sighed in frustration, pushed his broken glasses back on his nose and turned away from his workbench...
- Ü The sleek black cat started to hiss...
- Ü The old house sat alone on the hill...
- Ü I felt the muscles and ligaments stretching and groaning, my jaw became long and my teeth grew sharp.

2. Did any of those sizzling starts inspire you? If so choose one to continue writing. If not think of an original, engaging idea and start afresh.

Following the seven steps, complete your suspenseful story and submit for marking. You should write at least 2 pages.

Date: _____

Writing Probe 42

Finally there will be no more wars, fights or battles. But this is only possible if...

TOTAL WORDS WRITTEN
_____

My writing;

- ☐ Includes ALL full stops
- ☐ Includes ALL capital letters
- ☐ Makes sense
- ☐ Includes complex sentences
- ☐ Includes commas to show phrasing
- ☐ _____

Date: _____

Writing Probe 43

The day I dreaded the most had come! I really didn't want to do this. I had to share what my father's job was. I didn't want people to know he was a...

TOTAL WORDS WRITTEN

_____

My writing;

- ☐ **Includes ALL full stops**
- ☐ **Includes ALL capital letters**
- ☐ **Makes sense**
- ☐ **Includes complex sentences**
- ☐ **Includes commas to show phrasing**
- ☐ _____

Date: _____

Writing Probe 44

Hannah asked "But what exactly does freedom mean"? Lily replied "Freedom is..."

TOTAL WORDS WRITTEN

_____

My writing;

- ☐ **Includes ALL full stops**
- ☐ **Includes ALL capital letters**
- ☐ **Makes sense**
- ☐ **Includes complex sentences**
- ☐ **Includes commas to show phrasing**
- ☐ _____

Date: _____

Writing Probe 45

This can't be happening! Doesn't matter how much I tried, I couldn't lie. It all started when...

TOTAL WORDS WRITTEN

_____

My writing;

- ☐ **Includes ALL full stops**
- ☐ **Includes ALL capital letters**
- ☐ **Makes sense**
- ☐ **Includes complex sentences**
- ☐ **Includes commas to show phrasing**
- ☐ _____

Date: _____

Writing Probe 46

I was never very religious but I started praying when...

TOTAL WORDS WRITTEN
_____

My writing;

- ☐ Includes ALL full stops
- ☐ Includes ALL capital letters
- ☐ Makes sense
- ☐ Includes complex sentences
- ☐ Includes commas to show phrasing
- ☐ _____

Date: _____

Writing Probe 47

"Pssshhh, please nothing could ever scare me, I had seen it all"! That's what I used to say until...

TOTAL WORDS WRITTEN

_____

My writing;

- ☐ **Includes ALL full stops**
- ☐ **Includes ALL capital letters**
- ☐ **Makes sense**
- ☐ **Includes complex sentences**
- ☐ **Includes commas to show phrasing**
- ☐ _____

Date: _____

Writing Probe 48

I will tell you a story that is only half true. The story begins with...

TOTAL WORDS WRITTEN
_____

My writing;

- ☐ **Includes ALL full stops**
- ☐ **Includes ALL capital letters**
- ☐ **Makes sense**
- ☐ **Includes complex sentences**
- ☐ **Includes commas to show phrasing**
- ☐ _____

Date: _____

Writing Probe 49

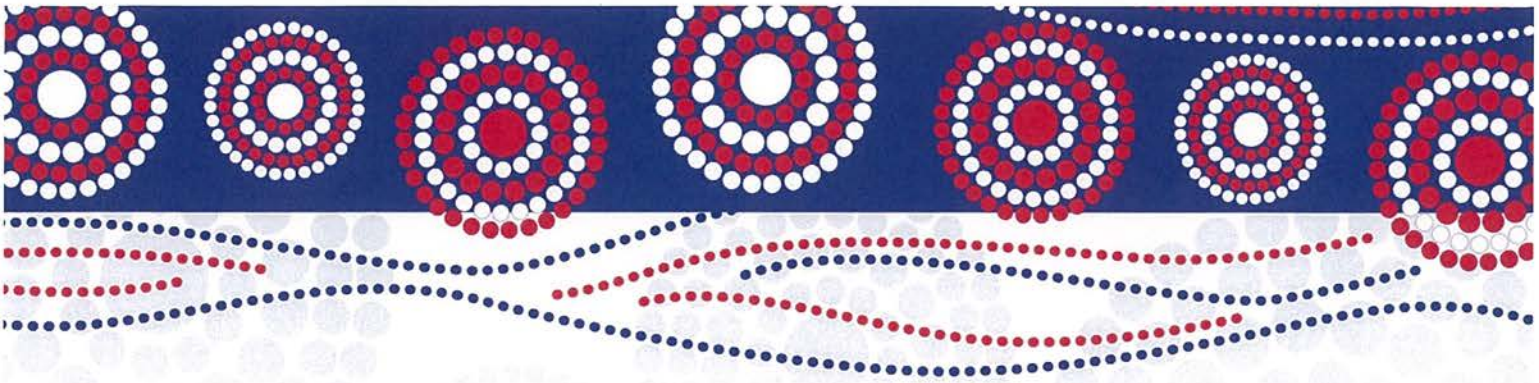
I woke up from the same reoccurring dream. I wasn't scary, it was embarrassing. In my dream, I...

TOTAL WORDS WRITTEN

_____

My writing;

- ☐ **Includes ALL full stops**
- ☐ **Includes ALL capital letters**
- ☐ **Makes sense**
- ☐ **Includes complex sentences**
- ☐ **Includes commas to show phrasing**
- ☐ _____



5.1/5.2 FINANCIAL MATHS

Gorokan High School

Mathematics Online Learning

Week 2 and 3

Year 10

5.1/5.2

Financial Maths

Name:

Year 10 Stage 5.1/5.2 Mathematics

Financial Mathematics

Investing Money

Name: _____

Teacher: _____

Online Learning – Printed Work

Week 2 and 3

Investing Money

Use the following words to complete the paragraph below:

benefit	investment	interest rate	term	investor
principal	account	Interest	invest	balance

An _____ is the act of investing money.

To _____ means to allocate money in the expectation of some _____ in the future.

When money is invested, the bank or financial institution borrows that money, so pays the _____ a return for the use of their money. This return is called interest.

_____ is an amount of money paid in return for investing money into a bank or financial institute.

How much interest is paid depends on the type of _____ the money is invested in, how long the money is invested for and what interest rate is offered on the account.

An _____ is expressed as a percentage (usually as an annual percentage rate) and is calculated on the principal amount or the _____ _of the account. The interest rate is used to calculate the amount of interest returned to the investor.

The _____ is the original amount invested into the account.

When investing money you are required to keep the money in the account for a certain period of time. The period of time the money is invested for is the _____ of the investment.

Per annum (p.a.) means per year.

In this topic we will be looking at two different investment options; simple interest and compound interest, as well as buying on terms.

Simple Interest

Simple interest is the name given to the type of *interest* that is calculated on the *principal* of an investment for the full *term* the money is invested.

It is "simple" in that the amount of interest paid does not change for the term of the investment.

For example, if $5000 is invested for 3 years at 5% p.a.

Principal (P) = $5000, Term (n) = 3 years, and Interest Rate (r) = 5% or $\frac{5}{100}$

Interest earned per year is:

$5000 x $\frac{5}{100}$ = $250 so for 3 years the interest is $250 x 3 = $750

This can be illustrated using a table:

Calculate the final balance if $2000 is invested at 2.5% p.a. for 5 years in a simple interest account.

Principal (P) = $2000, Term (n) = 5 years and Interest Rate (r) = 2.5% or $\frac{2.5}{100}$

Complete the 5th year and calculate the final balance of the investment

Time	Principal	Interest	Principal + Interest	Balance
1st year	2000	2000 x $\frac{2.5}{100}$ = 50	2000 + 50	$2050
2nd year	2050	50	2050 + 50	$2100
3rd year	2100	50	2100 + 50	$2150
4th year	2150	50	2150 + 50	$2200
5th year				

Balance at the end of the investment is _____.

As you can see from the table, the interest paid each year does not change for the term of the investment, hence why these accounts are referred to as "simple interest" accounts.

To calculate the interest earned you can simply multiply the interest earned on the first year by how many years the money is invested.

Interest = $50 x _____ years

= $_____

This calculation is usually performed using the *Simple Interest formula.*

$I = Prn$ where I is the amount of interest in dollars
P is the principal.
r is the percentage interest rate per time period expressed as a decimal
n is the number of time periods.

Note: the *number of time periods* refers to the **term** of the loan.

Worked Example 1

Calculate the interest earned on an investment of $6000 into an account with a simple interest rate of 5% p.a. for 6 years.

Solution

P = 6000 r = $\frac{5}{100}$ (per year) n = 6 (years)

Using the formula:

$I = Prn$

$I =$ _____ $\times \frac{5}{100} \times$ ____

$= \$1800$

So, interest earned is _____.

Worked Example 2

Calculate the total balance of an account if $4500 is invested for 7 years at a flat rate of 3.25% p.a.

(Note: flat rate is the same as simple interest)

Solution

P = _____ r = _____ n = _____

$I = Prn$

$I =$ _____ $\times$ $\frac{\quad}{100} \times$ ____

$I =$ _____

Total Balance = Principal + Interest

= _____ + $1023.75

= _____

So, final balance is _____.

Worked Example 3

Calculate the interest earned on an investment of $25 000 for 6 months in a flat rate account earning 4.75% per annum.

Solution

$P = 25000$ $r = \frac{4.75}{100}$ $(per\ year)$ $n = 6\ (months)$

Note: investment is in months but rate per year, so need to change into a monthly rate

$I = Prn$

$I =$ _____ $\times \frac{4.75}{100} \div 12 \times 6$

This changes the rate to a monthly rate (12 months in a year)

$I =$ _____

So, interest earned is $_____

Exercise 1 (note simple interest and flat rate mean the same thing)

1) Find the simple interest earned on the following investments:
   a) $4000 invested at 9% pa for 5 years

   b) $2350 invested at 7% pa for 8 years

   c) $10 850 invested for 10 years at 6% pa

   d) $370 invested for 8 years at 4% pa

   e) $75 000 invested for 11 years at 5% pa

2) One million dollars is invested for 7 days at 7.25% p.a. interest. How much interest is earned? (Take 1 year = 365 days.)

3) Find the simple interest on:
   a) $8250 for 4 months at 1% per month

   b) $3790 for 8 months at 6% p.a.

   c) $9875 for 3½ months at 9% p.a.

   d) $6840 for 1.5 years at 15% p.a.

4) Find the total balance at the end of each of the following investments:
   a) $708 at 8% pa after 6 months

   b) $235 at 5.25% pa after 14 months

   c) $1860 at 7.5% p.a. after 5 years

   d) $200 at 6.75% pa after 9 months

   e) $176.77 at 6% p.a. after 6 years

   f) $10 000 at 13% pa after 6 months

5) Rhain invested $9000 for 18 months at a 7% p.a. flat interest rate.
   a) How much interest did he earn?

   b) Calculate the final balance of his account.

Application of Simple Interest

For the application of simple interest, it helps to convert the percentage to a decimal first.

Practise

Convert the following percentages to decimals:

a) 12% b) 5% c) 9% d) 1.5%

e) 10.5% f) 3.25% g) 8¾% f) 3½%

Sometimes the interest earned is known and you need to calculate the Principal or Term of the investment. The following examples illustrate this.

Worked Example 4

$5000 is invested at 5% p.a. and earns $125 in interest. What was the term of the investment?

Solution

What do we know?

$I = \$125$ $P = 5000$ $r = \frac{5}{100} =$ _____ *(as a decimal)* $n = ??$

Using $Prn = I$

$5000 \times 0.05 \times n = 500$

So, $n = \frac{500}{\_\_\_\_\_ \times 0.05}$

$n =$ ____

Therefore, the term of the investment was 2 years.

To calculate the Term of an investment use:

$$n = \frac{I}{P \times r}$$

Worked Example 5

An amount is invested at 3.5% p.a. for 6 years earns $1680 in interest. Find the original amount invested?

Solution

What do we know?

$I = \$1680$ $P = ???$ $r = \frac{3.5}{100} =$ _____ *(as a decimal)* $n = 6$

Using $Prn = I$

$P \times 0.035 \times 6 = 1680$

So, $P = \frac{\_\_\_\_\_}{0.035 \times 6}$

$P = \$8000$

Therefore, original amount invested was _____.

To calculate the Principal of an investment use:

$$P = \frac{I}{r \times n}$$

Exercise 2

1) Consider the problem:
Paul wants to earn $2500 in interest. He is going to deposit his money into a flat rate account at 5.2% p.a. for a period of 5 years, how much would he need to invest?

a) Circle which of the following amounts you are trying to find?

Term Principal Interest Rate Interest Final Balance

b) How much would he need to invest?
I = _____ P = _____ n = _____ r = _____(decimal)

2) Jackie earned $570 on an investment for 3 years at 7.75% per annum. What was the original amount of her investment? (give your answer to the nearest dollar)
I = _____ P = _____ n = _____ r = _____ (decimal)

3) Consider the problem:
$6400 is invested at 5.45% pa flat interest and earns $1744 in interest. How long was the money invested for?

a) Circle which of the following amounts you are trying to find?

Term Principal Interest Rate Interest Final Balance

b) How long was the money invested for?
I = _____ P = _____ n = _____ r = _____

4) Kai invested $18 000 at 2.4% p.a. and earned $3456 interest. What was the term of his investment?
I = _____ P = _____ n = _____ r = _____

5) Andrew invested \$7500 at 6½% p.a. and had a final balance of \$11,400.
   a) How much interest did he earn? *(Hint: Interest = Final Balance – Principal)*

   b) What was the term of the investment?
   I = _____ P = _____ n = _____ r = _____

6) \$5000 was invested at 6½% p.a. and the balance at the end of the investment period was \$8450.
   a) How much interest was earned on the investment?

   b) What was the term of the investment?
   I = _____ P = _____ n = _____ r = _____

7) Pauline invested a sum of money for 5 years at7.5% p.a. and had a final balance of \$8250. How much did she originally deposit? *(Hint: Find the amount of interest earned first.)*

8) Jaxson wanted to earn \$4500 in 10 years by investing in a simple interest account at 6¼% p.a. How much would he need to invest today to reach his goal?

9) On the day Sarah was born her dad invested \$1000 in a simple interest account for her to use when she turned 21 years old. If the rate of the investment was 16.5% pa, what will the balance of her account be on her 21st birthday when she gets to withdraw the money?

BUYING ON TERMS

When an item is bought **on terms**, a deposit is paid and the item is received immediately. The balance of the price is then borrowed and the balance plus simple interest is repaid in equal instalments over a fixed period.

Worked Example 6

Beccy bought a lounge suite worth $4800 on terms. She paid an upfront payment of $500 and equal monthly instalments of $215 over 24 months.

a) How much did she pay in total for the lounge suite?

Deposit =$500 Monthly Instalment = $215 Term = 24 months

Total amount paid = Deposit + Monthly instalment x term

= $_____ + $215 x _____

= $500 +$ _____

= $5660

b) How much interest did she pay?

Interest = Amount paid – Cost of item

= $_____ – $_____

= $_____

c) How much money did she borrow?

Borrowed = Cost of Item –Deposit

= $_____ – $500

= $_____

Worked Example 7

Joe bought a new car on terms. He paid a 10% deposit and fortnightly payments of $250.95 over 3 years. The price of the car was $15 900.

a) How much did Joe pay for the car on terms?

Deposit = 10% of $_____ = 0.1 x 15900 = $_____ Fortnightly Payment = $_____

Term = 3 years = 3 x _____ fortnights (in a year) = 78 fortnights

Total Cost = Deposit + Fortnightly Instalment x Term

= $_____ + $_____ x 78

= $21 164.10

Joe paid $_____ in total.

b) How much money would Joe have saved paying cash for the car?

The money saved is the total of the _____ paid.

Interest = Total Paid – Cost

= $21 164.10 –_____

= $5264.10

Joe would have saved $_____paying by cash.

Buying On Terms – Exercise 3 (Oxford Insight 9 Exercise 5L)

1 A snow skiing set costing $742 can be bought on terms for $75 deposit and 24 monthly instalments of $34. Complete the following.

a Total cost of buying the snow skiing set on terms =

b Amount saved by paying cash =

2 A surfboard costing $699 can be bought on terms for $79 deposit and 24 monthly instalments of $33

a Calculate the total cost of buying the surfboard on terms.

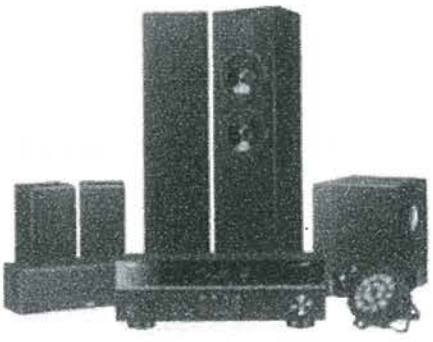
b How much would you save by paying cash?

3 A laptop computer costing $2298 can be bought on terms for $229 deposit and 18 monthly repayments of $135.60.

a Calculate the total cost of buying the computer on terms.

b How much would you save by paying cash?

4 A home theatre system costing $1598 can be bought on the following terms: 10% deposit and 48 weekly instalments of $37.15.



a Calculate the total cost of buying the system on terms.

b How much would you save by paying cash?

5 A sound system costing $879 can be bought on the following terms: 15% deposit and 26 fortnightly repayments of $39.98.

a Calculate the total cost of buying the sound system on terms.

b How much would you save by paying cash?

Interest Free Loans

Interest free loans allow consumers to take goods home and pay them off over a period of time. If the total amount is paid with in the specified period then the consumer pays no interest.

However, if the consumer does not pay for the goods in total within the required period, they will pay a higher than average interest rate on the total price of the goods purchased.

Buying an item on these terms is beneficial only if you pay off the goods in the required time.

Take advantage of our payment options

Terms & conditions

50 Months Interest Free - Equal Payments

Conditions of 50 Months Instalment Interest Free until September 2022: Available to approved GO MasterCard customers on transactions made between 02/07/18 and 05/08/18 where the amount financed is $750 or more. Offer available on purchases from Harvey Norman franchises. Excludes mobile phones, gaming consoles, gift cards, hot water system supply & installation, Octopuss installation services, Microsoft Surface Studio, Apple and Miele products. Excludes brands and other products that are offered for sale under agency agreements with Harvey Norman franchises. Offer available on advertised or ticketed price. Total amount is payable by 50 approximate equal monthly instalments (exact amounts specified in your statement). If there is an outstanding balance after the interest free period ends in September 2022, interest will be charged at 29.49%. This notice is given under the GO MasterCard Conditions of Use, which specify all other conditions for this offer. A $25.00 Establishment Fee applies to new approved applicants. Account Service fee of $4.95 per month applies. Also available to existing CreditLine, Gem Visa and Buyer's Edge customers. Refer to product websites for conditions, fees and charges. Credit is provided by Latitude Finance Australia (ABN 42 008 583 588). Australian Credit Licence 392145.

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The Terms and Conditions state what you will have to pay during the interest free period and the interest rate charged if you have any outstanding balance at the end of the period.

a) There are two fees you will be charged: Establishment fee and Account Service fee, state what they are below:

1. _____
   _____
   _____
2. _____
   _____
   _____

b) What interest rate will be charged if you have an outstanding balance at the end of the period?

_____

c) Calculate the total of the Account Service fee payable for any purchase over the 50 month period.

d) Hugh purchased a fridge under this contract. The fridge was priced at $5675.

i. Calculate the total amount (including fees and charges) Hugh will pay if he was to pay off the fridge over the 50 month period and no interest is payable.

ii. Calculate the amount Hugh paid each month to make sure he covered what was required over the 50 month period. (*Note: Do not include the $25 set up fee, this would have been paid at the commencement of the loan.*)

e) Jackie bought the same lounge under the same conditions but did not pay the loan off in the 50 month period, she only paid the monthly service fee of $4.95.

i. If the interest is charged as simple interest, calculate the total amount Jackie is going to have to pay for the lounge?

Account Service fee = _____

Simple Interest = Prn
P = _____ r = _____ (as a decimal) n = _____(months)

I = P x r ÷ 12 x n
= _____ x _____ ÷ 12 x _____

Total = Principal (P) + Interest (I) + Monthly Service fee + Set up fee

= _____ + _____ + _____ + _____

= _____

ii. How much would Jackie have saved if she bought the lounge with cash instead of on terms?

f) Give two advantages of buying an item on terms:

_____
_____
_____
_____
_____

g) Give two disadvantages of buying an item on terms:

_____
_____
_____
_____
_____

COMPOUND INTEREST

Compound interest is the addition of interest to the principal sum of the investment.

The interest paid on a compound interest account is calculated on the balance of the account at the time of calculation. So the amount of interest paid changes with the account balance.

In an investment with compound interest the interest paid grows as the balance grows, unlike simple interest where the same amount of interest is paid for the duration of the investment regardless of the balance.

Comparing Simple Interest to Compound Interest

Worked Example 8

Daniel has $5000 to invest in a compound interest account for 4 years at 6% p.a.

i. Complete the table below to calculate his balance at the of the 3rd year.

Term	Principal	Interest	Principal + Interest	Balance at End of Year
1st year	$5000	5000 x 0.06 = 300	5000 + 300	$5300
2nd year	$5300	5300 x 0.06 = 318	5300 + 318	$5618
3rd year	$5618			
4th year				

Total balance at the end of the 4th year = _____

ii. How much interest did Daniel earn from the investment over the 4 years?

Interest = End of 4th Year Total – Original Investment

= _____ – _____

= _____

iii. Calculate the amount of simple interest that Daniel would have earned if he invested in a simple interest account at the same rate for 4 years.

iv. How much more money has Daniel made by investing in a compound interest account?

Exercise 4

1) Michele has $10 000 to invest in a compound interest account for 3 years at 4.5% p.a.

i. Complete the table below to calculate her final balance at the end of the 3rd year.

Term	Principal	Interest	Principal + Interest	Balance at End of year
1st year	$10 000	10 000 x 0.045 =	10 000 +	
2nd year	$10 450	10 450 x 0.045 =	_____ +	
3rd year		_____ x 0.045 =		

Final balance = _____

ii. How much interest will Michele earn in total over the 3 years?

Interest = End of 3rd Year – Original Investment

=

iii. Calculate the amount of simple interest Michele would have earned if she invested in a simple interest account at the same rate for 3 years.

iv. How much more money did Michele make by investing in a compound interest account?

2) Complete the table below for an investment of $2500 into a compound interest account for 3 years at 5% p.a.

Term	Principal	Interest	Principal + Interest	Balance at End of year
1st year				
2nd year				
3rd year				

3) *Compound interest accounts are often paid monthly so the annual interest rate is converted to a monthly rate.*
Complete the table below for an investment of $6000 into a compound interest account paying 6% per annum for 3 months.

Monthly interest rate = 6% ÷ 12 = _____% = _____ (as a decimal)

Term	Principal	Interest	Principal + Interest	Balance at End of month
1st month				
2nd month				
3rd month				

Balance at the end of the 3rd month is _____, so total interest paid is _____

Compound Interest Formula

To calculate compound interest over a long period we use a formula.

$A = P(1 + r)^n$ where A is the amount of the final balance or future value
P is the initial value invested or present value
r is the interest rate per compounding period, as a decimal
n is the number of time periods.

To answer some of these questions you will need to know how many:

Months in a year: _____ Quarters in a year: _____

Six months in a year: _____ Days in a year: _____

Worked Example 9

Calculate the final balance of an investment of $8000 for 4 years at 6% p.a. compound interest.

P = _____ r = _____ (as a decimal) n = _____

$A = P(1 + r)^n$

$A = 8000(1 + 0.06)^4$

$A = 10\ 099.81568$

$A = \$$_____ (2 dec. places)

Worked Example 10

$12 000 is invested at 4.5% p.a. compound interest for 10 years.

a) Calculate the total balance at the end of the investment period.

P = _____ r = _____ (as a decimal) n = _____

$A = P(1 + r)^n$

$A =$ _____(1 + _____)

$A = \$18\ 635.63306$

$A =$ _____ (2 dec. places)

b) How much interest was earned on the investment?

Interest = Total Balance (A) – Principal (P)

= $18 635.83 – _____

= _____

Exercise 5 **(Oxford Insight 10 Exercise 9B)**

1 Complete the following using the compound interest formula.

a Find the amount to which \$6000 grows if it is invested for 5 years at 3% p.a. compound interest.

b The total amount of interest earned over this period

2 Use the compound interest formula to calculate:

a the amount to which \$18 000 grows if it is invested for 7 years at 6% p.a. compound interest

b the amount of interest earned over this period.

3 a If I invest \$25 000 at 6.5% p.a. compound interest, how much will I have in 10 years time?

b Calculate the amount of interest earned over this period.

4 a If I invest \$5000 at 4.7% p.a. compound interest, how much will I have in 8 years time?

b Calculate the amount of interest earned over this period.

5) Jack invested $3500 for 6 years in a simple interest account paying 4.7% p.a. for 5 years. How much more interest would he have made if he had of invested in a compound interest account at the same rate for the same period? *(Hint: Calculate both the simple interest and compound interest and find the difference)*

6) Billy has $15 000 to invest. He has the option of two accounts to invest in. By showing calculations, find out which account will pay Billy the most interest.

Account 1 - Simple interest account for 6 years at 6.5% p.a.
Account 2 - Compound interest account for 6 years at 5.9% p.a.

7) Harry needs $20 000 by 2025 (7 years time). How much will he need to invest today to make sure he has the money if he is investing in a compound interest account at 4.7% p.a.?

Hint: If $A = P(1 + r)^n$ *then* $P = \frac{A}{(1+r)^n}$

A = _____ r = _____ n = _____ P = ????

Different Compounding Periods

Compound interest can be paid at different compounding periods. This means the interest is paid into the account and calculated on the balance at intervals such as monthly, quarterly or half yearly for the duration of the investment period. Therefore, the rate and the term have to be converted to represent the correct compounding period.

Consider the problem:

$100 invested at 6% p.a. for 5 years

Compound period	Annual	Monthly	Quarterly	Half Yearly
Rate	0.06	$0.06 \div 12 = 0.005$	$0.06 \div 4 = 0.015$	$0.06 \div 2 = 0.03$
Term	5	$5 \times 12 = 60$	$5 \times 4 = 20$	$5 \times 2 = 10$
$A = P(1 + r)^n$	$100(1 + 0.06)^5$	$100(1 + 0.005)^{60}$	$100(1 + 0.015)^{20}$	$100(1 + 0.03)^{10}$

So it is important to note what the compounding period is before answering the question.

Worked Example 11

*$15 000 is invested at 6% p.a. compounding **monthly** for 5 years. Calculate the balance at the end of the investment to the nearest dollar.*

Solution

P = 15000 r = 0.06 ÷12 = 0.005 n = 5 x 12 = 60

$A = 15000(1 + 0.005)^{60}$

= $20 232.75229

= _____ to the nearest dollar

Worked Example 12

*$12 000 is invested at 3.6% p.a. compounding **quarterly** for 7 years. Calculate the balance at the end of the investment to the nearest cent.*

Solution

P = _____ r = _____ ÷ 4 = _____ n = 7 x ____ = ____

$A =$ _____(1 + _____)—

= $32 303.85837

= $_____ to the nearest cent

Worked Example 13

$6000 is invested at 6% p.a. compounding ***half yearly*** *for 9 years. Calculate the interest earned on this investment. {Remember: there are 2 six month periods in a year (ie. 6 + 6 = 12 months)}*

Solution

P = _____ r = _____ ÷ 2 = _____ n = _____ x 2 = ____

A = _____(1 + _____)——

= $_____

= $_____ (2 dec. places)

Interest = Final Balance (A) – Principal (P)

= _____ – $6000

= _____

Exercise 6

1) Find the balance at the end of each of the following investments:
   i. $120 000 for 10 years at 3.6% p.a. compounding monthly

P = _____ r = _____ n = _____

   ii. $17 500 for 9 years at 4.8% p.a. compounding quarterly

P = _____ r = _____ n = _____

   iii. $80 000 for 5 years at 5.2% p.a. compounding 6 monthly

P = _____ r = _____ n = _____

2) Find the interest earned on an investment of $5400 for 8 years at 12% p.a. compounding monthly.

3) Samantha invested $45 000 for 10 years at 3.6% p.a. compounding quarterly.

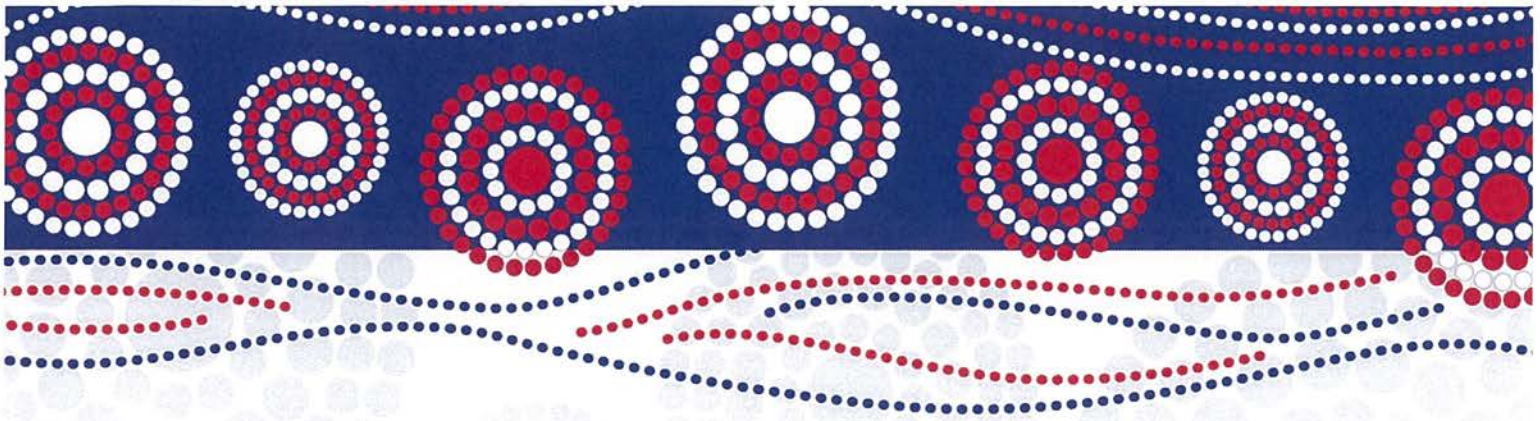
i. What was the balance of her account at the end of the investment period?

ii. How much interest did she earn on her investment?

4) Karen needs to invest $600 000 for a client. She has to make sure she gets the best return on the investment. She has three investment options she can choose from:

Option A – Invest for 6 years compounding monthly at 4.8% p.a.
Option B – Invest for 6 years compounding half yearly at 4.9% p.a.
Option C – Invest for 6 years simple interest at 5.5% p.a.

By showing calculations, find which investment option Karen should use.



5.3 TRIGONOMETRY MATHS

Gorokan High School

Mathematics Online Learning

Week 2 and 3

Year 10

5.3

Trigonometry

Name:

Gorokan High School – Mathematics

Year 10

Trigonometry

Student Instructions:
Students are to work through the specified work outlined below. The prescribed work is for the duration of Weeks 2 and 3 of online learning. Should you have any questions, please email your classroom teacher.

The questions outlined in this lesson information sheet are a guide. You should complete these questions as a minimum. If you would like to complete the higher questions to challenge your understand, please do so. The answers are attached to help you understand if you are successful in your working out. If you find you did not get the correct answer, check your working and try again until you get to the desired answer.

Exercise 7A – Trigonometric Ratio's
Read through the information and examples and complete the following questions in exercise 7A.
Questions
1) a, c, e, g
2) all
3) every second
4) a, c, e, g, i, k
5) a, c, e, g, i, k
7) all
9) all
11) all

Exercise 7B – Finding unknown angles
Read through the information and examples and complete the following questions in exercise 7B.
Questions
1) all
2) all
3) all
4) a, c, e
5) a, c, e
7) all
9) all
12) all

Exercise 7C – Applications in two-dimensions
Read through the information and examples and complete the following questions in exercise 7C.
Questions
1)
3)
5)
7)
9)
11) all

Exercise 7D – Directions and Bearing
Read through the information and examples and complete the following questions in exercise 7D.
Questions
1) all
2) all
3) all
5) all
7) all
9) all
11) all

Exercise 7E – Applications in three-dimensions

Read through the information and examples and complete the following questions in exercise 7E.

Questions

1) all
2) all
3) all
4) all
6) all
8) all
10) all
11) all

Chapter

7 Trigonometry

What you will learn

- 7A Trigonometric ratios
- 7B Finding unknown angles
- 7C Applications in two dimensions
- 7D Directions and bearings
- 7E Applications in three dimensions
- 7F Obtuse angles and exact values
- 7G The sine rule
- 7H The cosine rule
- 7I Area of a triangle
- 7J The four quadrants
- 7K Graphs of trigonometric functions

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NSW Syllabus for the Australian Curriculum

Strand: Measurement and Geometry

Substrand: RIGHT-ANGLED TRIANGLES (TRIGONOMETRY)
TRIGONOMETRY AND PYTHAGORAS' THEOREM)

Outcomes

A student applies trigonometry, given diagrams, to solve problems, including problems involving angles of elevation and depression.

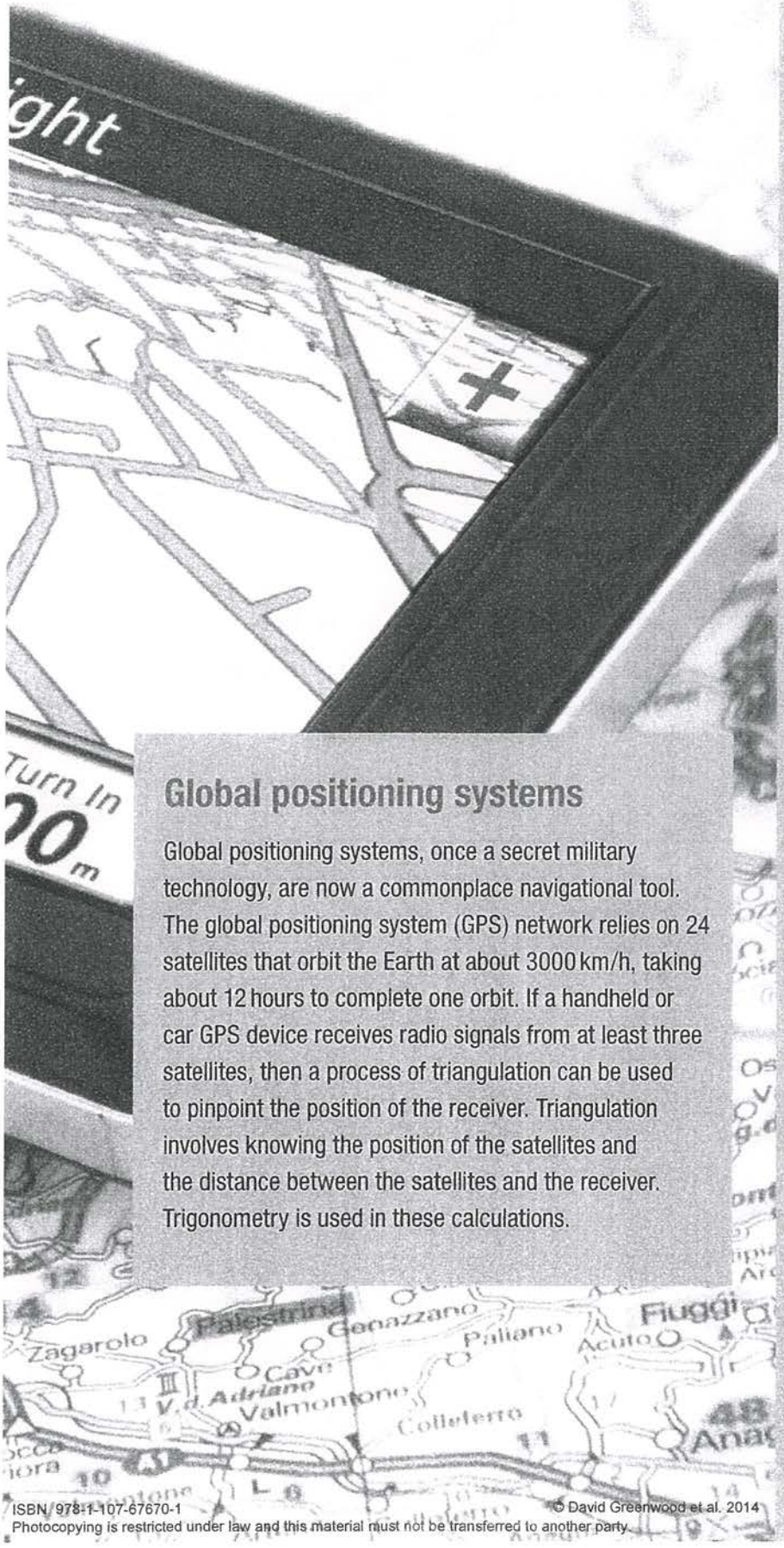
(MA5.1–10MG)

A student applies trigonometry to solve problems, including problems involving bearings.

(MA5.2–13MG)

A student applies Pythagoras' theorem, trigonometric relationships, the sine rule, the cosine rule and the area rule to solve problems, including problems involving three dimensions.

(MA5.3–15MG)



Global positioning systems

Global positioning systems, once a secret military technology, are now a commonplace navigational tool. The global positioning system (GPS) network relies on 24 satellites that orbit the Earth at about 3000 km/h, taking about 12 hours to complete one orbit. If a handheld or car GPS device receives radio signals from at least three satellites, then a process of triangulation can be used to pinpoint the position of the receiver. Triangulation involves knowing the position of the satellites and the distance between the satellites and the receiver. Trigonometry is used in these calculations.

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Cambridge University Press

1 Use a calculator to calculate the following, correct to 2 decimal places.

a $\cos 27°$ **b** $\tan 84°$ **c** $\sin 15.7°$

d $8 \sin 24°$ **e** $\dfrac{2}{\cos 32.5°}$ **f** $\dfrac{7}{\tan 42.1°}$

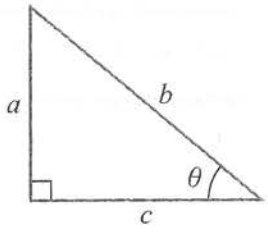
2 For these equations, solve for x, correct to 1 decimal place.

a $x = 3 \times \cos 68°$ **b** $\dfrac{x}{4} = \sin 65°$ **c** $x \tan 22° = 9$

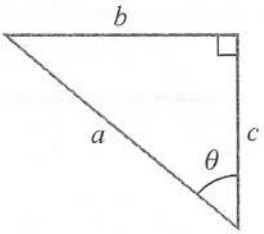
d $x \sin 73° = 5.2$ **e** $\dfrac{5}{x} = \tan 33°$ **f** $\dfrac{\sqrt{3}}{x} = \cos 52°$

3 State which of the sides labelled a, b and c are the hypotenuse (H), opposite side (O) and adjacent side (A) to the angle θ in these right-angled triangles.

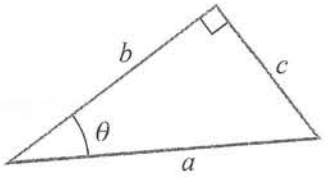
a



b



c

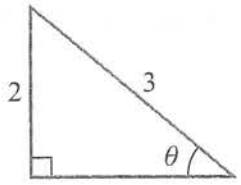


4 Complete these trigonometric ratios.

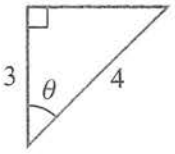
a $\sin\theta = \dfrac{\text{opposite}}{\ldots\ldots}$ **b** $\cos\theta = \dfrac{\ldots\ldots}{\text{hypotenuse}}$ **c** $\ldots\ldots = \dfrac{\text{opposite}}{\text{adjacent}}$

5 Using the three trigonometric ratios in Question **4**, write the appropriate ratio for the following right-angled triangles; for example, $\sin\theta = \dfrac{3}{4}$.

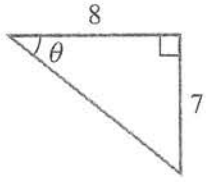
a



b



c



6 Find the value of θ in the following, correct to 1 decimal place.

a $\sin\theta = 0.7$ **b** $\tan\theta = \dfrac{1}{8}$ **c** $\cos\theta = \dfrac{3}{5}$

d $\cos\theta = \dfrac{1}{4}$ **e** $\tan\theta = 1.87$ **f** $\sin\theta = 0.42$

7 Write these as bearings (degrees clockwise from north).

a south **b** west **c** north-east **d** south-west

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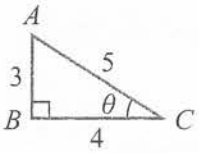
5.2A Trigonometric ratios

Stage
5.3#
5.3
5.3§
5.2
5.2◊
5.1
4

The study of trigonometry explores the relationship between the angles and side lengths of triangles. Trigonometry can be applied to simple problems, such as finding the angle of elevation of a kite, to solving complex problems in surveying and design.

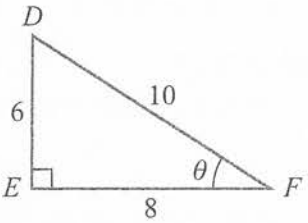
Trigonometry is built upon the three ratios sine, cosine and tangent. These ratios do not change for triangles that are similar, such as $\triangle ABC$ and $\triangle DEF$.



$\sin\theta = \frac{3}{5}$

$\cos\theta = \frac{4}{5}$

$\tan\theta = \frac{3}{4}$



$\sin\theta = \frac{6}{10} = \frac{3}{5}$

$\cos\theta = \frac{8}{10} = \frac{4}{5}$

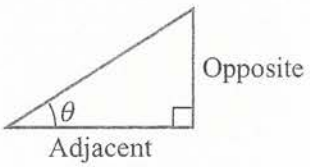
$\tan\theta = \frac{6}{8} = \frac{3}{4}$

Trigonometry is the basis for surveying.

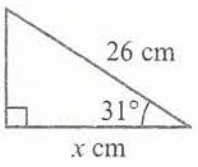
Let's start: Which ratio?

In a group or with a partner, see if you can recall some facts from Year 9 trigonometry to answer the following questions.

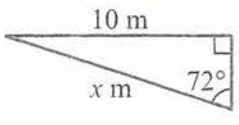
- What is the name given to the longest side of a right-angled triangle?
- $\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$ is one trigonometric ratio. What are the other two?



- Which ratio would be used to find the value of x in this triangle? Can you also find the value of x?



- Which ratio would be used to find the value of x in this triangle? Can you find also the value of x?



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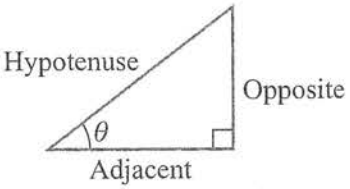
Key ideas

- Given a right-angled triangle containing an angle θ, the three trigonometric ratios are:
  - The sine ratio: $\sin\theta = \dfrac{\text{length of the opposite side}}{\text{length of the hypotenuse}}$
  - The cosine ratio: $\cos\theta = \dfrac{\text{length of the adjacent side}}{\text{length of the hypotenuse}}$
  - The tangent ratio: $\tan\theta = \dfrac{\text{length of the opposite side}}{\text{length of the adjacent side}}$

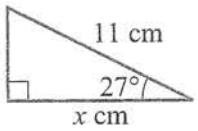


- Many people like to use SOHCAHTOA to help remember the three ratios.
- To find an unknown length on a right-angled triangle:
  - Choose a trigonometric ratio that links one known angle and a known side length with the unknown side length.
  - Solve for the unknown side length.
- There are some relationships between the ratios, such as $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$. See the Enrichment section of Exercise 7A.
- Angles are measured in degrees (°), minutes (′) and seconds (″).
  - 1 degree = 60 minutes
  - 1 minute = 60 seconds
  - For example: 24°21′54″ is 24 degrees, 21 minutes and 54 seconds.
  - On most calculators you can enter angle values in this way.

Example 1 Solving for an unknown in the numerator

Find the value of x in these right-angled triangles, correct to 2 decimal places.

a



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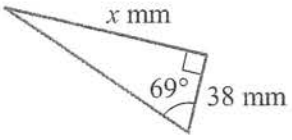

SOLUTION

a $\cos\theta = \dfrac{\text{A}}{\text{H}}$

$\cos 27° = \dfrac{x}{11}$

$\therefore x = 11 \times \cos 27°$

$= 9.80$ (to 2 decimal places)

EXPLANATION

Choose the ratio $\cos\theta = \dfrac{\text{adjacent}}{\text{hypotenuse}}$.

Multiply both sides by 11, then use a calculator.

b $\tan\theta = \dfrac{\text{O}}{\text{A}}$

$\tan 69° = \dfrac{x}{38}$

$\therefore x = 38 \times \tan 69°$

$= 98.99$ (to 2 decimal places)

The tangent ratio uses the opposite and the adjacent sides.

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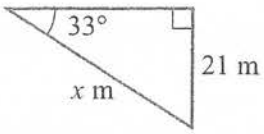
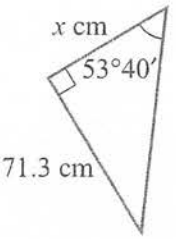
Example 2 Solving for an unknown in the denominator

Find the value of x in these right-angled triangles, rounding your answer to 2 decimal places.

a 

b 

SOLUTION

a $\sin\theta = \frac{O}{H}$

$\sin 33° = \frac{21}{x}$

$x \times \sin 33° = 21$

$x = \frac{21}{\sin 33°}$

$= 38.56$ (to 2 decimal places)

EXPLANATION

Choose the sine ratio since the adjacent side is not marked.

Multiply both sides by x to remove the fraction, then divide both sides by $\sin 33°$.

b $\tan\theta = \frac{O}{A}$

$\tan 53°40' = \frac{71.3}{x}$

$x \times \tan 53°40' = 71.3$

$x = \frac{71.3}{\tan 53°40'}$

$= 52.44$ (to 2 decimal places)

The hypotenuse is unmarked, so use the tangent ratio.

Multiply both sides by x, then solve by dividing both sides by $\tan 53°40'$.

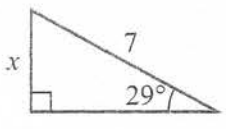
Exercise 7A

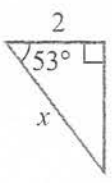
1 Use a calculator to evaluate the following, correct to 3 decimal places.

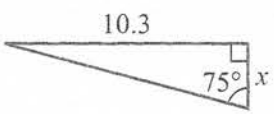
a $\cos 37°$ b $\sin 72°$ c $\tan 50°$ d $\cos 21.4°$

e $\sin 15.9°$ f $\tan 85.1°$ g $\cos 78°43'$ h $\sin 88°10'$

2 Decide which ratio (i.e. $\sin\theta = \frac{O}{H}$, $\cos\theta = \frac{A}{H}$ or $\tan\theta = \frac{O}{A}$) would be best to help find the value of x in these triangles. Do not find the value of x.

a 

b 

c 

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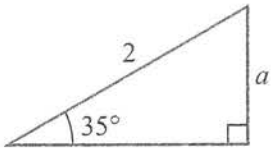
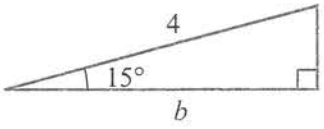
3 Solve for x in these equations, correct to 2 decimal places.

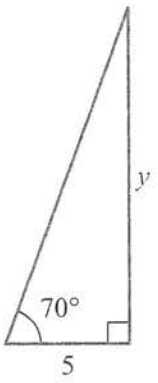
a $\frac{x}{3} = \tan 31°$ b $\frac{x}{5} = \cos 54°$ c $\frac{x}{12.7} = \sin 15.6°$

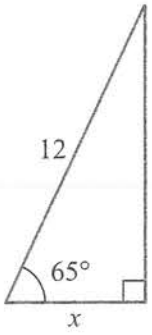
d $\sin 57° = \frac{2}{x}$ e $\cos 63.4° = \frac{10}{x}$ f $\tan 71.6° = \frac{37.5}{x}$

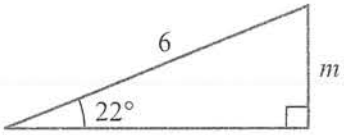
Example 1 4 Use trigonometric ratios to find the values of the pronumerals, to 2 decimal places.

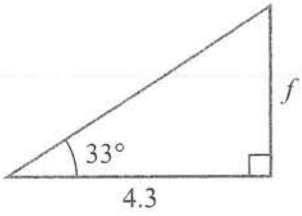
a 

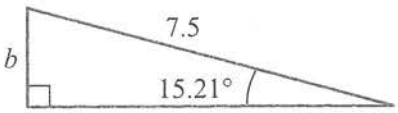
b 

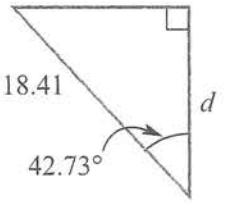
c 

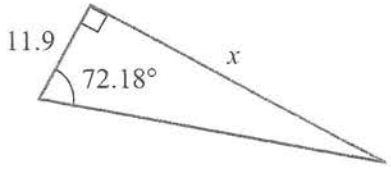
d 

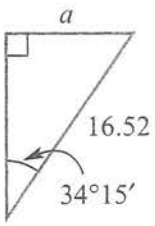
e 

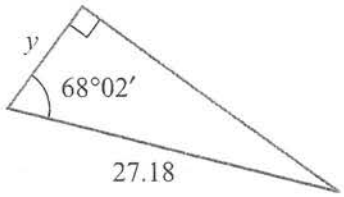
f 

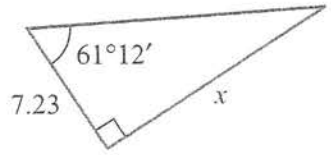
g 

h 

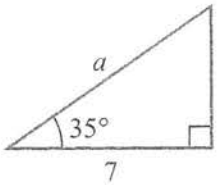
i 

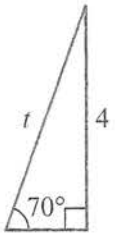
j 

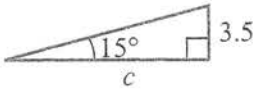
k 

l 

Example 2 5 Use trigonometric ratios to find the values of the pronumerals, to 2 decimal places, for these right-angled triangles.

a 

b 

c 

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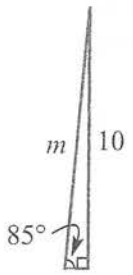

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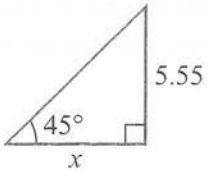

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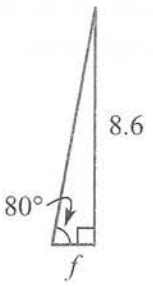

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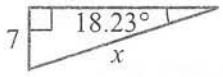

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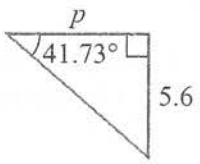

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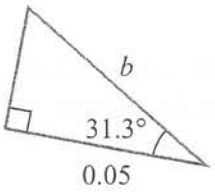

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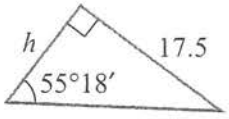

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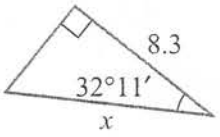

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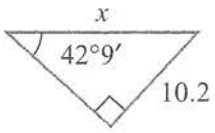
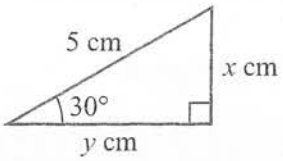


6 Find the unknown side lengths for these right-angled triangles, correct to 2 decimal places where necessary.

a



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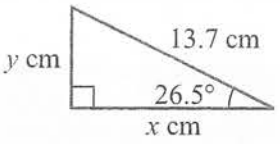

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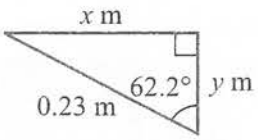
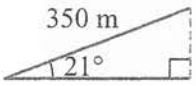


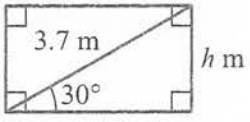
7 A 4WD climbs a 350 m straight slope at an angle of 21° to the horizontal.



a Find the vertical distance travelled, correct to the nearest metre.

b Find the horizontal distance travelled, correct to the nearest metre.

8 A diagonal wall brace of length 3.7 metres is at an angle of 30° to the horizontal. Find the height (h m) of the face of the wall, to the nearest cm.



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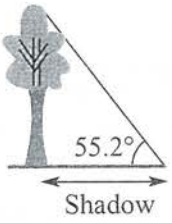
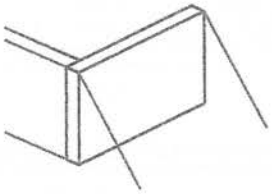
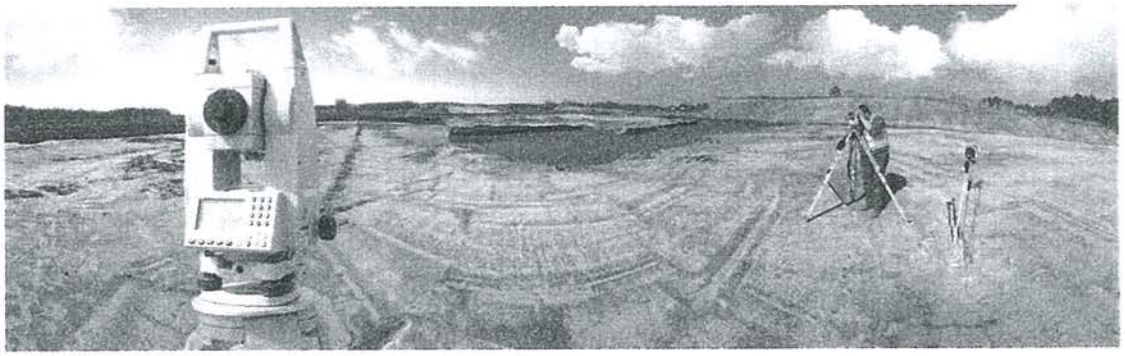
9 The angle from the horizontal of the line of sight, from the end of a tree's shadow to the top of the tree, is 55.2°. The length of the shadow is 15.5 m. Find the height of the tree, correct to 1 decimal place.



10 On a construction site, large concrete slabs of height 5.6 metres are supported at the top by steel beams positioned at an angle of 42° from the vertical. Find the length of the steel beams, to 2 decimal places.



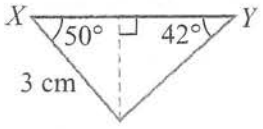
11 By measuring the diagonals, a surveyor checks the dimensions of a rectangular revegetation area of length 25 metres. If the angle of the diagonal to the side length is 28.6°, find the length of the diagonals, correct to 1 decimal place.



12 A right-angled triangular flag is made for the premiers of a school competition. The top edge of the flag is 25 cm and the second-largest angle on the flag is 71°. Find the length of the longest edge of the flag, to the nearest centimetre.

13 Find the length XY in these diagrams, correct to 1 decimal place.

a



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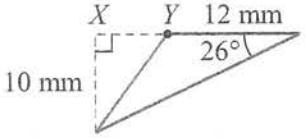

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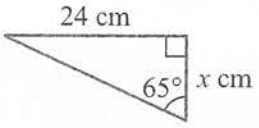
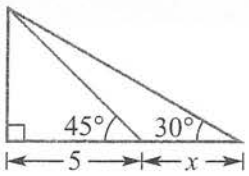
14 A student solves for x, to 2 decimal places, in the given triangle and gets 11.21, as shown. But the answer is 11.19. Explain the student's error.



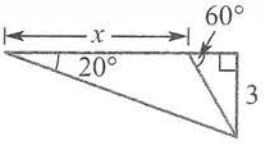
$$\tan 65° = \frac{24}{x}$$
$$x = \frac{24}{\tan 65°}$$
$$= \frac{24}{2.14}$$
$$= 11.21$$

15 Find the value of x, correct to 1 decimal place, in these triangles.

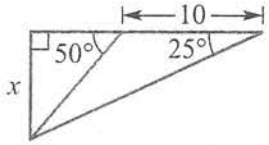
a



b

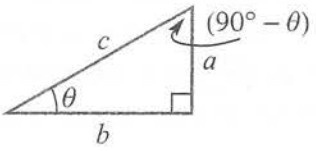


c



Enrichment: Relationships between the ratios

16 For these proofs, consider the right-angled triangle shown.



a Show that $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$ by completing these steps.

- **i** Write a in terms of c and θ.
- **ii** Write b in terms of c and θ.
- **iii** Write $\tan\theta$ in terms of a and b.
- **iv** Substitute your expressions from parts **i** and **ii** into your expression for $\tan\theta$ in part **iii**. Simplify to prove $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$.
- **v** Can you find a different way of proving the rule described above?

b Show that $(\sin\theta)^2 + (\cos\theta)^2 = 1$ by completing these steps.

- **i** Write a in terms of c and θ.
- **ii** Write b in terms of c and θ.
- **iii** State Pythagoras' theorem using a, b and c.
- **iv** Use your results from parts **i**, **ii** and **iii** to show that $(\sin\theta)^2 + (\cos\theta)^2 = 1$.

c Show that $\sin\theta = \cos(90° - \theta)$ by completing these steps.

- **i** $\sin\theta = \dfrac{a}{c}$, $\cos\theta = \dfrac{\cdots\cdots}{\cdots\cdots}$, $\sin(90° - \theta) = \ldots\ldots$, $\cos(90° - \theta) = \ldots\ldots$
- **ii** Is $\sin\theta = \cos(90° - \theta)$?
- **iii** Can you see another relationship?

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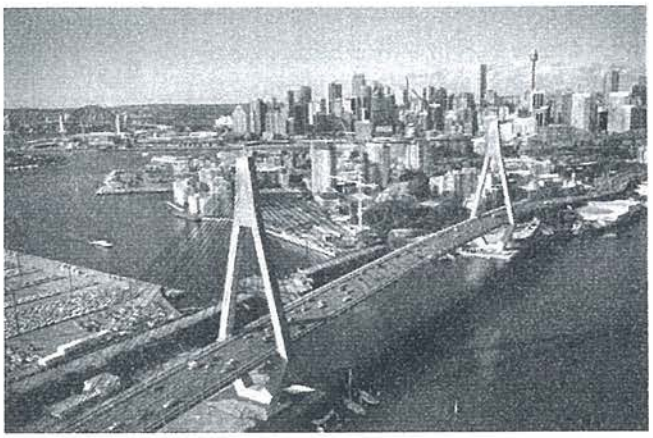
7.3 Finding unknown angles

Stage
5.3#
5.3
5.3§
5.2
5.2◊
5.1
4

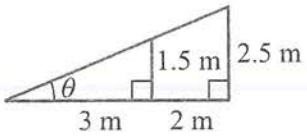
The three trigonometric ratios discussed earlier can also be used to find unknown angles in right-angled triangles if at least two side lengths are known. For example, if $\cos\theta = \frac{1}{2}$, we can use a calculator to find the size of the unknown angle.



The ANZAC Bridge in Sydney is a cable-stayed bridge in which each cable forms a triangle with the pylons and the bridge deck.

Let's start: The ramp

A ski ramp is 2.5 m high and 5 m wide with a vertical strut of 1.5 m placed as shown.

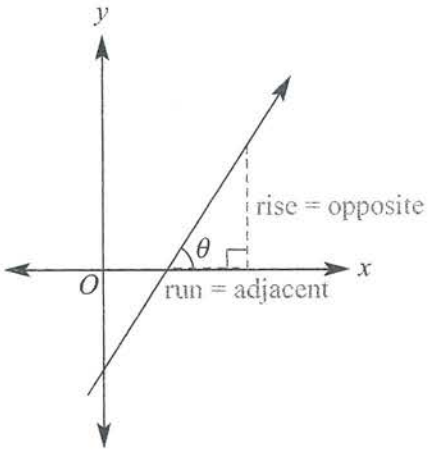


- Discuss which triangle could be used to find the angle of incline, θ. Does it matter which triangle is used?
- Which trigonometric ratio is to be used and why?
- How does $\boxed{\tan^{-1}}$ on a calculator help to calculate the value of θ?
- Discuss how you can check if your calculator is in degree mode.

Key ideas

- $\sin^{-1}$, $\cos^{-1}$ and $\tan^{-1}$ buttons on calculators are used to find angles when the trigonometric ratio is known.
  - If $\sin\theta = 0.5$ then $\theta = 30°$.
  - If $\cos\theta = 0.5$ then $\theta = 60°$.
  - If $\tan\theta = 0.5$ then $\theta = 26°34'$ (to the nearest minute).

- On the Cartesian plane, gradient (m) can be calculated using the formula $m = \tan\theta$, where θ is the angle between a line and the positive direction of the x-axis.



$$\text{Gradient} = m = \frac{\text{rise}}{\text{run}} = \frac{\text{opposite}}{\text{adjacent}} = \tan\theta$$

$\therefore m = \tan\theta$

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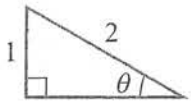
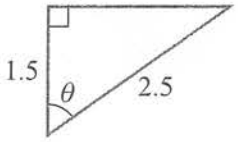
Example 3 Finding angles

Find the value of θ in the following right-angled triangles, rounding to the nearest minute in part b.

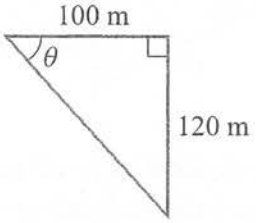
a 

b 

SOLUTION	EXPLANATION
a $\sin\theta = \frac{1}{2}$	Use $\sin\theta$, as the opposite side and the hypotenuse are given.
$\theta = 30°$	Use inverse sine on a calculator to find the angle (e.g. $\sin^{-1}\left(\frac{1}{2}\right)$).
b $\cos\theta = \frac{1.5}{2.5}$	The adjacent side and the hypotenuse are given, so use $\cos\theta$.
$\theta = 53.1301\ldots$ $\theta = 53°8'$ (nearest minute)	Use inverse cosine on a calculator to find the angle and round your answer to the nearest minute. Note: $53°7'48.3''$ rounds to $8'$ since $48.3\ldots > 30$.

Example 4 Working with simple applications

A long, straight mine tunnel is sunk into the ground. Its final depth is 120 m and the end of the tunnel is 100 m horizontally from the ground entrance. Find the angle that the tunnel makes with the horizontal (θ), correct to the nearest minute.

SOLUTION	EXPLANATION
$\tan\theta = \frac{120}{100}$ $\theta = 50.194\ldots$ $= 50°12'$ (nearest minute)	 Draw a diagram, using the information given. Use $\tan\theta$ since the opposite and adjacent are known sides.

Exercise 7B

1 Write the missing part in each sentence.
- a If $\cos\theta = 0.5$, then $\theta =$ ____.
- b If $\sin\theta = \frac{1}{2}$, then $\theta =$ ____.
- c If $\tan\theta = 1$, then $\theta =$ ____.

2 Find θ in the following, rounding your answer to 2 decimal places where necessary.
- a $\sin\theta = 0.4$
- b $\cos\theta = 0.5$
- c $\tan\theta = 0.2$
- d $\sin\theta = 0.1$
- e $\cos\theta = 0.9$
- f $\tan\theta = 1$
- g $\sin\theta = 0.25$
- h $\cos\theta = 0.85$

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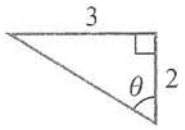
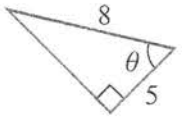
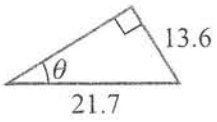
3 Decide which trigonometric ratio (i.e. sine, cosine or tangent) would be used to find θ in these triangles.

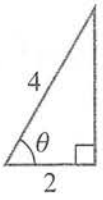
a 

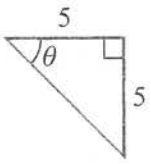
b 

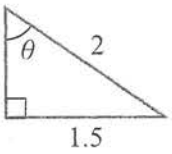
c 

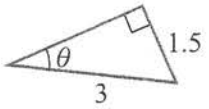
Example 3

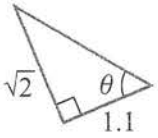
4 Find the value of θ in the following right-angled triangles, rounding your answer to the nearest minute where necessary.

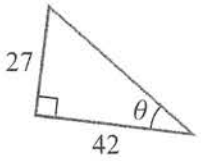
a 

b 

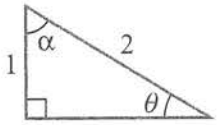
c 

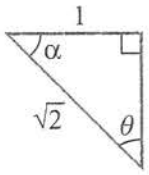
d 

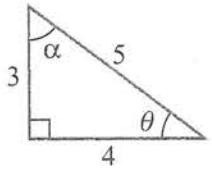
e 

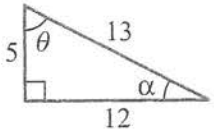
f 

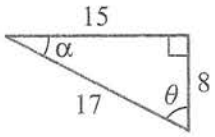
5 Find the value of α and θ, to 1 decimal place where necessary, for these special triangles.

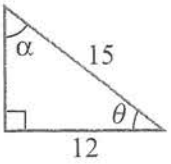
a 

b 

c 

d 

e 

f 

6 The lengths of two sides of a right-angled triangle are provided. Use this information to find the size of the two interior acute angles, and round each answer to 1 decimal place.

a hypotenuse 5 cm, opposite 3.5 cm

b hypotenuse 7.2 m, adjacent 1.9 m

c hypotenuse 0.4 mm, adjacent 0.21 mm

d opposite 2.3 km, adjacent 5.2 km

e opposite 0.32 cm, adjacent 0.04 cm

f opposite $\sqrt{5}$ cm, hypotenuse $\sqrt{11}$ cm

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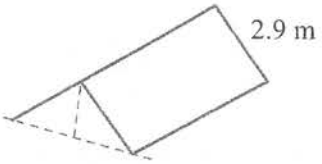
Example 4 **7** A ladder reaches 5.5 m up a wall and sits 2 m from the base of the wall. Find the angle the ladder makes with the horizontal, correct to 2 decimal places.

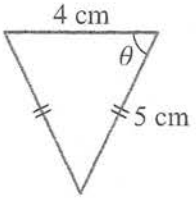
8 A tarpaulin with a simple A-frame design is set up as a shelter. The breadth of half of the tarpaulin is 2.9 metres, as shown. Find the angle to the ground that the sides of the tarpaulin make if the height at the middle of the shelter is 1.5 metres. Round your answer to the nearest 0.1 of a degree.



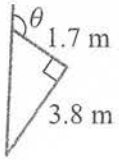
9 A diagonal cut of length 2.85 metres is to be made on a rectangular wooden slab from one corner to the other. The front of the slab measures 1.94 metres. Calculate the angle with the front edge at which the carpenter needs to begin the cut. Round your answer to 1 decimal place.

10 Find the value of θ in these diagrams, correct to 1 decimal place.

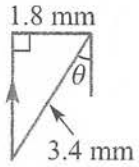
a



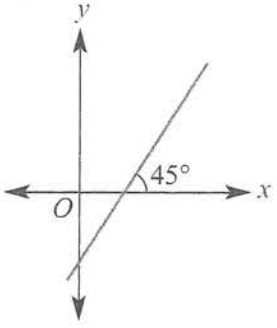
b



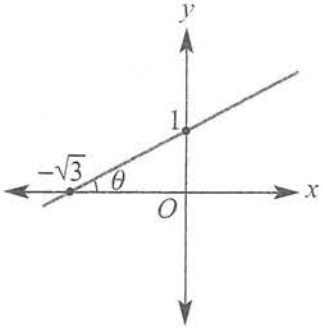
c



11 a What is the gradient of this line?
Hint: $m = \tan\theta$.



b Find the value of θ, using the formula $m = \tan\theta$.



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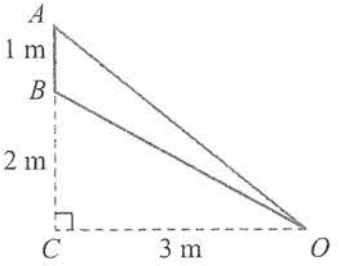
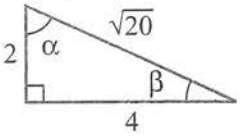
12 Consider $\triangle OAC$ and $\triangle OBC$.



a Find, correct to 1 decimal place where necessary:
i $\angle AOC$ ii $\angle BOC$

b Hence, find the angle $\angle AOB$.

13 This triangle includes the unknown angles α and β.



a Explain why only one inverse trigonometric ratio needs to be used to find the values of both α and β.

b Find α and β, correct to 1 decimal place, using your method from part a.

14 a Draw a right-angled isosceles triangle and show all the internal angles.

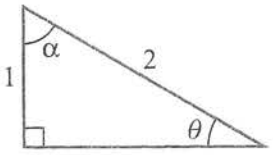
b If one of the shorter sides is of length x, show that $\tan 45° = 1$.

c Find the exact length of the hypotenuse in terms of x.

d Show that $\sin 45° = \cos 45°$.

Enrichment: A special triangle

15 Consider this special triangle.



a Find θ.

b Find α.

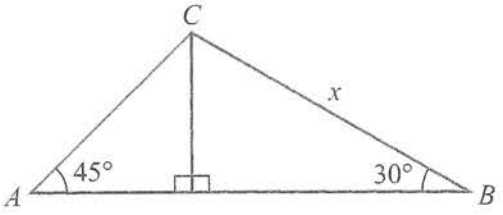
c Use Pythagoras' theorem to find the exact length of the unknown side, in surd form.

d Hence, write down the exact value for the following, in surd form.

i $\sin 30°$ ii $\cos 60°$ iii $\sin 60°$

iv $\cos 30°$ v $\tan 30°$ vi $\tan 60°$

e For the diagram below, show that $AB = \left(\frac{\sqrt{3}+1}{2}\right)x$.



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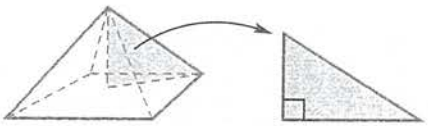
14C Applications in two dimensions

Stage
5.3#
5.3
5.3§
5.2
5.2◊
5.1
4

A key problem-solving strategy for many types of problems in mathematics is to draw a diagram. This strategy is particularly important when using trigonometry to solve worded problems that include right-angled triangles.



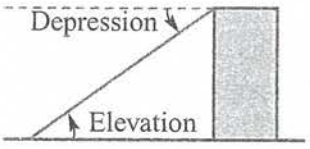
Let's start: Mountain peaks

Two mountain peaks in Victoria are Mt Stirling (1749 m) and Mt Buller (1805 m). A map shows a horizontal distance between them of 6.8 km.

- Discuss if you think there is enough information to find the angle of elevation of Mt Buller from Mt Stirling.
- What diagram could be used to summarise the information?
- Show how trigonometry can be used to find this angle of elevation.
- Discuss what is meant by the words *elevation* and *depression* in this context.

Key ideas

- The **angle of elevation** is measured *up* from the horizontal.
- The **angle of depression** is measured *down* from the horizontal.
  - On the same diagram, the angle of elevation and the angle of depression are equal. They are alternate angles in parallel lines.



- To solve more complex problems involving trigonometry:
  - Visualise and draw a right-angled triangle with the relevant information.
  - Use a trigonometric ratio to find the unknown.
  - Check that your answer is reasonable.
  - Answer the question in words.

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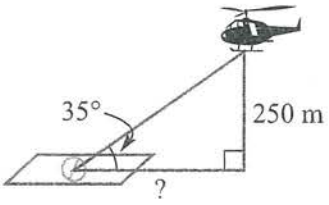
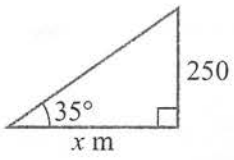
Example 5 Applying trigonometry in word problems

A helicopter is hovering at an altitude of 250 metres, and the angle of elevation from the helipad to the helicopter is 35°. Find the horizontal distance of the helicopter from the helipad, to the nearest centimetre.



SOLUTION

Let x metres be the horizontal distance from the helicopter to the helipad.



$$\tan 35° = \frac{250}{x}$$

$$\therefore x \times \tan 35° = 250$$

$$x = \frac{250}{\tan 35°}$$

$$= 357.037\ldots$$

The horizontal distance from the helicopter to the helipad is 357.04 m, to the nearest centimetre.

EXPLANATION

Use $\tan\theta = \frac{O}{A}$ since the opposite and adjacent sides are being used. Solve for x.

There are 100 cm in 1 m, so round your answer to 2 decimal places.

Answer the question in words.

Example 6 Combining trigonometry with problem solving

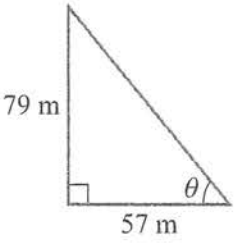
Two vertical buildings positioned 57 metres apart are 158 metres and 237 metres tall, respectively. Find the angle of elevation from the top of the shorter building to the top of the taller building, correct to the nearest minute.

SOLUTION

Let θ be the angle of elevation from the top of the shorter building to the top of the taller building.

Height difference = 237 – 158

= 79 m

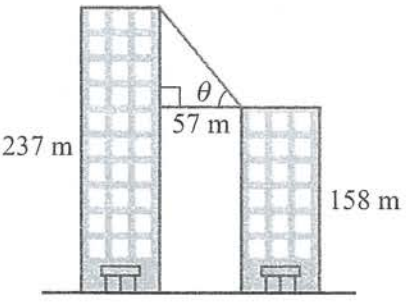


$$\tan\theta = \frac{79}{57}$$

$$\theta = 54.188\ldots$$

The angle of elevation from the top of the shorter building to the top of the taller building is 54°11′ (to the nearest minute).

EXPLANATION



Draw the relevant right-angled triangle separately.

We are given the opposite (O) and the adjacent (A) sides; hence, use tan.

Use the inverse tan function to find θ. Round your answer to the nearest minute.

Answer the question in words.

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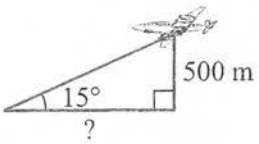
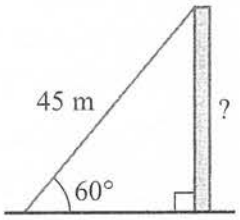
Exercise 7C

Example 5

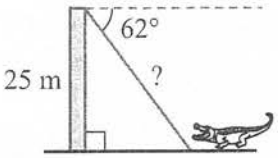
1 The altitude of an aeroplane is 500 metres, and the angle of elevation from the runway to the aeroplane is 15°. Find the horizontal distance from the aeroplane to the runway, to the nearest centimetre.



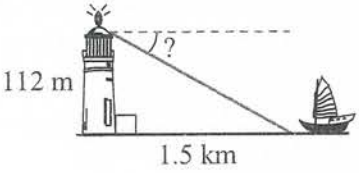
2 A cable of length 45 metres is anchored from the ground to the top of a communications mast. The angle of elevation of the cable to the top of the mast is 60°. Find the height of the communications mast, to the nearest metre.



3 The angle of depression from the top of a 25 metre tall viewing tower to a crocodile on the ground is 62°. Find the direct distance from the top of the tower to the crocodile, to the nearest centimetre.



4 Find the angle of depression from the top of a lighthouse beacon that is 112 m above sea level to a boat that is at a horizontal distance of 1.5 km from the lighthouse. Round your answer to the nearest minute.



5 The distance between two buildings is 24.5 metres. Find the height of the taller building, to the nearest metre, if the angle of elevation from the base of the shorter building to the top of the taller building is 85° and the height of the shorter building is 40 m.

6 The angle of depression from one mountain summit to another is 15.9°. If the two mountains differ in height by 430 metres, find the horizontal distance between the two summits, to the nearest centimetre.

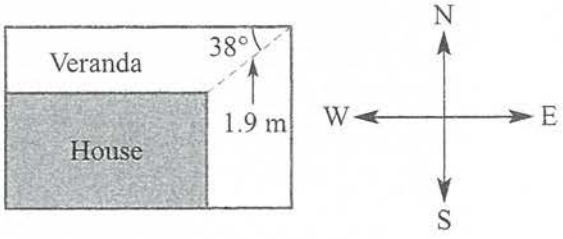
Example 6

7 Two vertical buildings positioned 91 metres apart are 136 metres and 192 metres tall, respectively. Find the angle of elevation from the top of the shorter building, to the top of the taller building, to the nearest degree.

8 An L-shaped veranda has dimensions as shown. Find the width, to the nearest centimetre, of the veranda for the following sides of the house.

a north side

b east side



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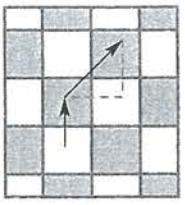
9 A knight on a chessboard is moved forward 3.6 cm from the centre of one square to another, then diagonally across to the centre of the destination square. How far did the knight move in total? Give your answer to 2 decimal places.



10 Two unidentified flying discs are detected by a receiver. The angle of elevation from the receiver to each disc is 39.48°. The discs are hovering at a direct distance of 826 m and 1.296 km from the receiver. Find the difference in height between the two unidentified flying discs, to the nearest metre.

11 Initially a ship and a submarine are stationary at sea level, positioned 1.78 km apart. The submarine then manoeuvres to position A, 45 metres directly below its starting point. In a second manoeuvre, the submarine dives a further 62 metres to position B. (Give all answers to 2 decimal places.)

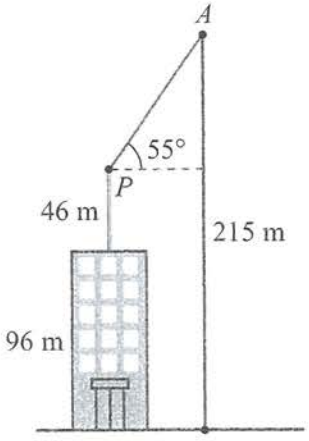
a Find the angle of elevation of the ship from the submarine when the submarine is at position A.

b Find the angle of elevation of the ship from the submarine when the submarine is at position B.

c Find the difference in the angles of elevation from the submarine to the ship when the submarine is at positions A and B.

12 A communications technician claims that when the horizontal distance between two television antennas is less than 12 metres, an interference problem will occur. The heights of two antennas above ground level are 7.5 metres and 13.9 metres, respectively, and the angle of elevation from the top of the shorter antenna to the top of the taller antenna is 29.5°. According to the technician's claim, will there be an interference problem for these two antennas?

13 The pivot point (P) of the main supporting arm (AP) of a construction crane is 46 metres above the top of a 96 metre tall office building. When the supporting arm is at an angle of 55° to the horizontal, the length of cable dropping from the point A to the ground is 215 metres. Find the length of the main supporting arm (AP), to the nearest centimetre.



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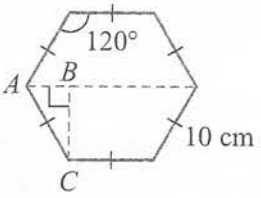
14 Consider a regular hexagon with internal angles of 120° and side lengths of 10 cm.

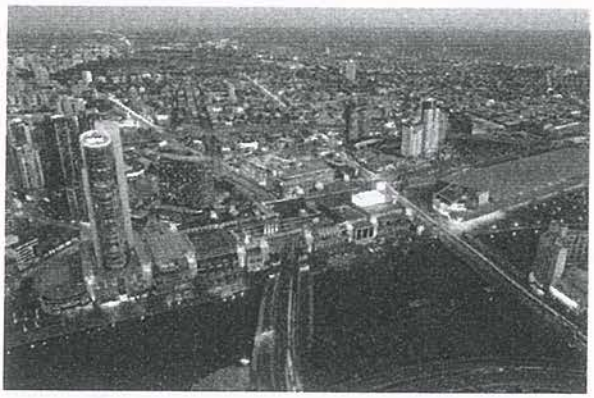


a For the given diagram find, to the nearest millimetre, the lengths:
   i BC ii AB

b Find the distance, to the nearest millimetre, between:
   i two parallel sides ii two opposite vertices

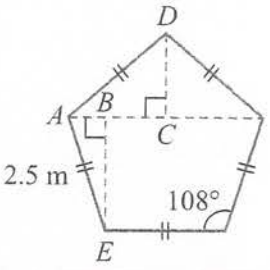
c Explore and describe how changing the side lengths of the hexagon changes the answers to part **b**.

15 An aeroplane is flying horizontally, directly towards the city of Melbourne at an altitude of 400 metres. At a given time the pilot views the city lights of Melbourne at an angle of depression of 1.5°. Two minutes later the angle of depression of the city lights is 5°. Find the speed of the aeroplane in km/h, correct to 1 decimal place.



Enrichment: Vegetable garden design

16 A vegetable garden is to be built in the shape of a regular pentagon using redgum sleepers of length 2.5 metres, as shown. It is known that the internal angles of a regular pentagon are 108°.



a Find the following angles.
   i $\angle AEB$ ii $\angle EAB$
   iii $\angle CAD$ iv $\angle ADC$

b Find these lengths, to 2 decimal places.
   i AB ii BE
   iii AC iv CD

c Find the distance between a vertex on the border of the vegetable garden and the centre of its opposite side, to 2 decimal places.

d Find the distance between any two non-adjacent vertices on the border of the vegetable garden, to 2 decimal places.

e Show that when the length of the redgum sleepers is x metres, the distance between a vertex and the centre of its opposite side of the vegetable garden will be $1.54x$ metres, using 2 decimal places.

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Directions and bearings

Stage
5.3#
5.3
5.3§
5.2
5.2◊
5.1
4

Bearings are used to communicate direction, and therefore are important in navigation. Ship and aeroplane pilots, bushwalkers and military personnel all use bearings to navigate and communicate direction.

Accurate navigation is vital to the military.

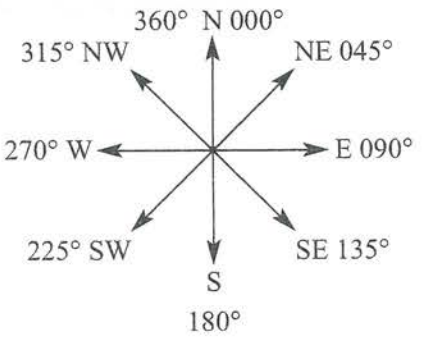
Let's start: Navigating a square

A mining surveyor starts walking from base camp to map out an area for soil testing. She starts by walking 2 km on a bearing of 020° and wishes to map out an area that is approximately square.

- Draw a diagram showing the first leg of the walk and the direction of north.
- If the surveyor turns right for the next leg, what will be the bearing for this section?
- List the direction (as a bearing) and the distance for all four legs of the walk. Remember that the mapped area must be a square.

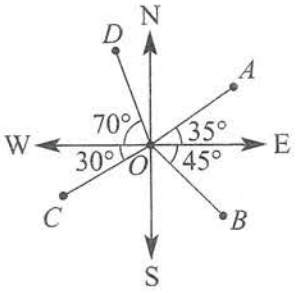
Key ideas

- **Bearings** are measured clockwise from due north. Some angles and directions are shown in this diagram; for example, NE means north-east.
  - Bearings are usually written using three digits.
  - Opposite directions differ by 180°.



Example 7 Stating a direction

Give the bearing for each point from the origin, O, in this diagram.



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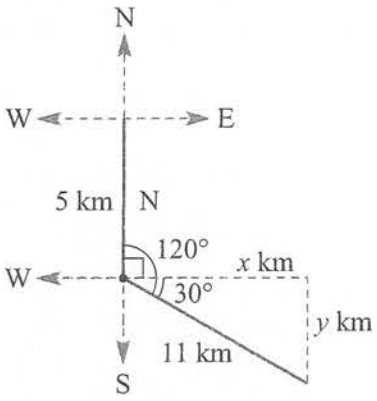
SOLUTION	EXPLANATION
The bearing of A is $90° - 35° = 055°$.	East is 090°, so subtract 35° from 90°.
The bearing of B is $90° + 45° = 135°$.	B is 90° plus the additional 45° in a clockwise direction.
The bearing of C is $270° - 30° = 240°$.	West is 270°, so subtract 30° from 270°.
The bearing of D is $270° + 70° = 340°$.	Alternatively, subtract 20° from 360°.

Example 8 Using bearings with trigonometry

A ship travels south for 5 km, then on a bearing of 120° for 11 km.

a Find how far east the ship is from its starting point, correct to 2 decimal places.

b Find how far south the ship is from its starting point.

SOLUTION	EXPLANATION
a 	Draw a clear diagram labelling all relevant angles and lengths. Draw a compass at each change of direction. Clearly show a right-angled triangle, which will help to solve the problem.
$\cos 30° = \frac{x}{11}$ $x = 11 \times \cos 30°$ $= 9.53$ (to 2 decimal places)	As x is adjacent to 30° and the hypotenuse has length 11 km, use cos.
The ship is 9.53 km east of its initial position.	Answer in words.
b $\sin 30° = \frac{y}{11}$	Use sine for opposite and hypotenuse.
$y = 11 \times \sin 30°$ $= 5.5$	Multiply both sides by 11.
Distance south $= 5.5 + 5 = 10.5$ km	Find total distance south by adding the initial 5 km.
The ship is 10.5 km south of its initial position.	Answer in words.

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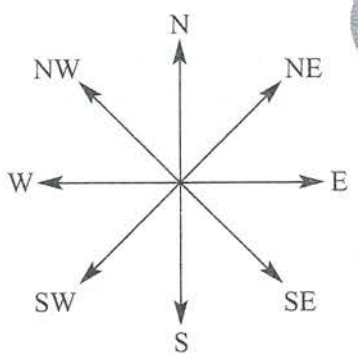
Exercise 7D

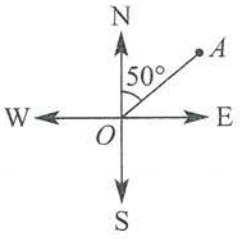
1 Give the bearing for each of these directions.

a N b NE
c E d SE
e S f SW
g W h NW

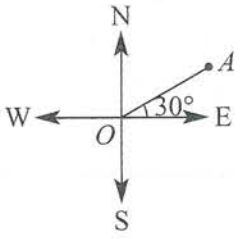


Example 7 2 For each diagram, give the bearing from O to A.

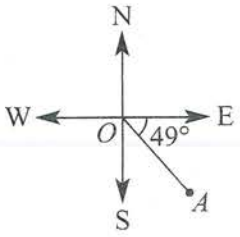
a



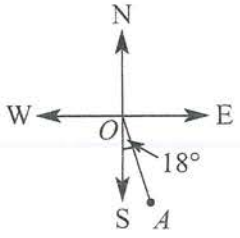
b



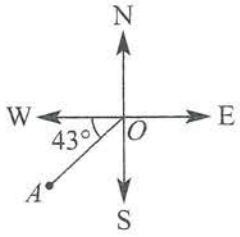
c



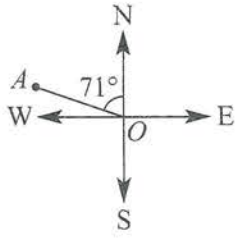
d



e



f



3 Write down the bearing that is the opposite direction to the following.

a 020° b 262° c 155° d 344°

4 a Using the internet, find a diagram that shows the sixteen points of a mariner's compass.

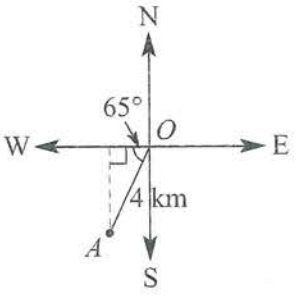
b Write down the bearing for these directions.

i NNE ii NNW iii SSE iv WSW

5 For this simple map, find the following, correct to 1 decimal place.

a How far west is point A from O?

b How far south is point A from O?



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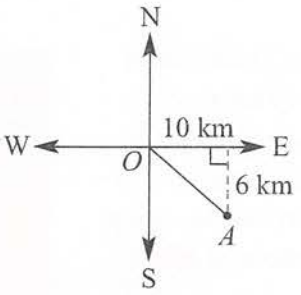
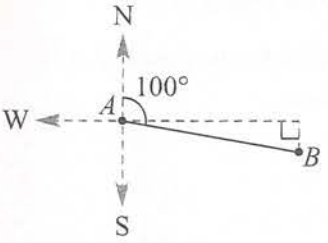
6 Find the bearing, correct to the nearest degree, of:
- a point A from O
- b point O from A



Example 8a

7 A ship travels due south for 3 km, then on a bearing of 130° for 5 km.
- a Find how far east the ship is from its starting point, correct to 2 decimal places.
- b Find how far south the ship is from its starting point, correct to 2 decimal places.

8 Two points, A and B, positioned 15 cm apart, are such that B is on a bearing of 100° from A.
- a Find how far east point B is from A, correct to 2 decimal places.
- b Find how far south point B is from A, correct to the nearest millimetre.



9 An aeroplane flies 138 km in a southerly direction from a military air base to a drop-off point. The drop-off point is 83 km west of the air base. Find the bearing, correct to the nearest degree, of:
- a the drop-off point from the air base
- b the air base from the drop-off point

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Example 8b

10 From a resting place, a bushwalker hikes due north for 1.5 km to a waterhole and then on a bearing of 315° for 2 km to base camp.

a Find how far west the base camp is from the waterhole, to the nearest metre.

b Find how far north the base camp is from the waterhole, to the nearest metre.

c Find how far north the base camp is from the initial resting place, to the nearest metre.

11 On a map, point C is 4.3 km due east of point B, whereas point B is 2.7 km on a bearing of 143° from point A. Give your answer to 2 decimal places for the following.

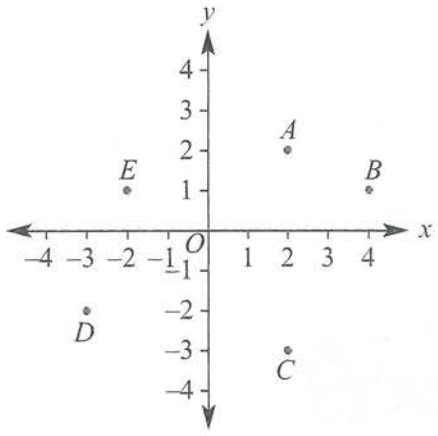
a Find how far east point B is from A.

b Find how far east point C is from A.

c Find how far south point C is from A.

12 A military desert tank manoeuvres 13.5 km from point A on a bearing of 042° to point B. From point B, how far due south must the tank travel to be at a point due east of point A. Give the answer correct to the nearest metre.

13 Consider the points O, A, B, C, D and E on this Cartesian plane. Round the answers to 1 decimal place.



a Find the bearing of:

i A from O ii D from O iii B from C iv E from C

b Find the bearing from:

i O to E ii A to B iii D to C iv B to D

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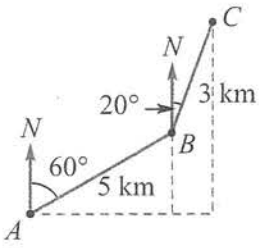
14 The overall direction and distance of a journey can be calculated by considering two (or more) smaller parts (or legs). Find the bearing of C from A and the length AC in this journey by answering these parts.



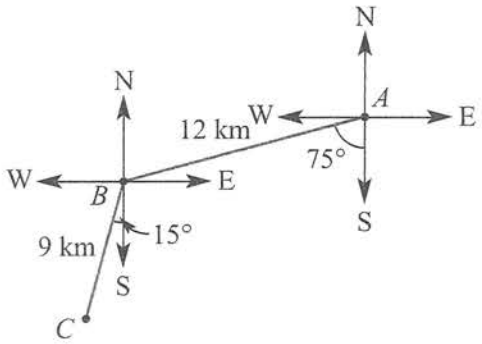
a Find, correct to 2 decimal places where necessary, how far north:
- i point B is from A
- ii point C is from B
- iii point C is from A

b Find, correct to 2 decimal places, how far east:
- i point B is from A
- ii point C is from B
- iii point C is from A

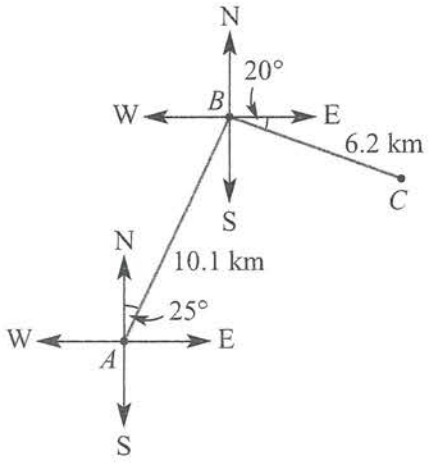
c Now use your answers above to find the following, correct to 1 decimal place:
- i the bearing of C from A
- ii the distance from A to C (Hint: Use Pythagoras' theorem.)

15 Use the technique outlined in Question **14** to find the distance AC and the bearing of C from A in these diagrams. Give your answers correct to 1 decimal place.

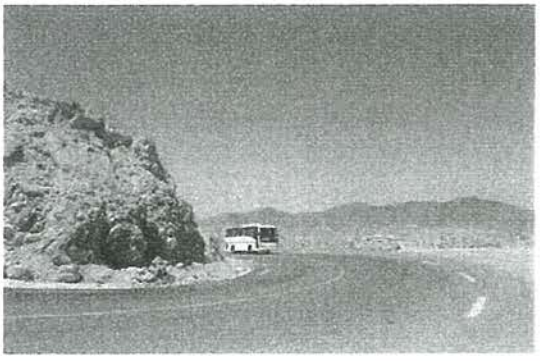
a



b



16 Tour groups A and B view a rock feature from different positions on a road heading east–west. Group A views the rock at a distance of 235 m on a bearing of 155° while group B views the rock feature on a bearing of 162° at a different point on the road. Find the following, rounding all answers to 2 decimal places.



a Find how far south the rock feature is from the road.

b Find how far east the rock feature is from:
- i group A
- ii group B

c Find the distance between group A and group B.

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Navigation challenges

17 A light aeroplane is flown from a farm airstrip to a city runway 135 km away. The city runway is due north from the farm airstrip. To avoid a storm, the pilot flies the aeroplane on a bearing of 310° for 50 km, and then due north for 45 km. The pilot then heads directly to the city runway. Round your answers to 2 decimal places in the following.

a Find how far west the aeroplane diverged from the direct line between the farm airstrip and the city runway.

b Find how far south the aeroplane was from the city runway before heading directly to the city runway on the final leg of the flight.

c Find the bearing the aeroplane was flying on when it flew on the final leg of the flight.

18 A racing yacht sails from the start position to a floating marker on a bearing of 205.2° for 2.82 km, then to a finishing line on a bearing of 205.9° for 1.99 km. For each of the following, round your answers to 2 decimal places.

a Find how far south the finishing line is from the start position.

b Find how far west the finishing line is from the start position.

c Use Pythagoras' theorem to find the distance between the finishing line and the start position.

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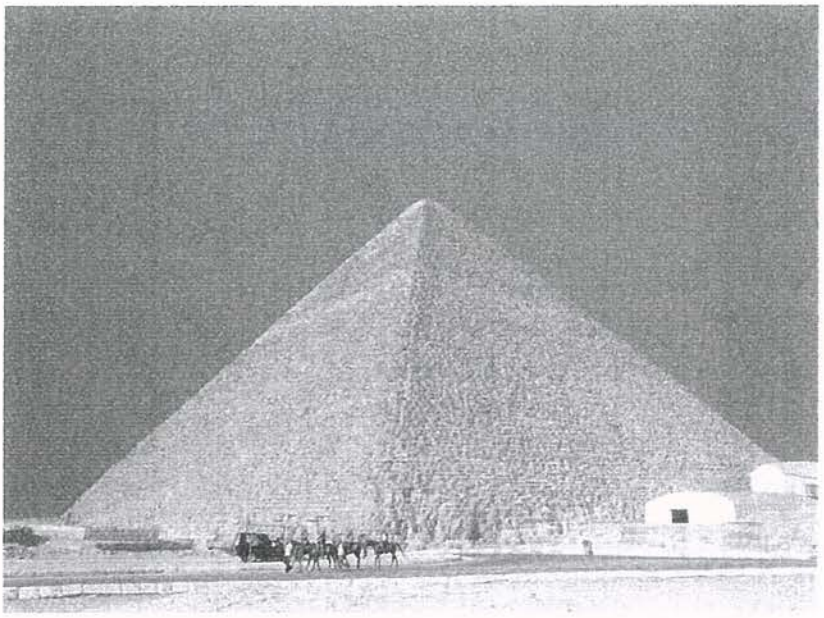
9.4 Applications in three dimensions

Stage
5.3#
5.3
5.3§
5.2
5.2◊
5.1
4

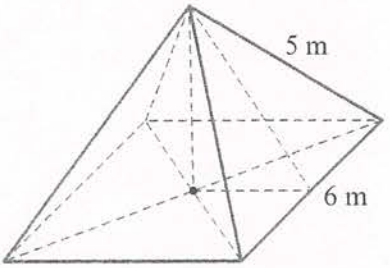
Although a right-angled triangle is a two-dimensional shape, it can also be used to solve problems in three dimensions. Being able to visualise right-angled triangles included in three-dimensional diagrams is an important part of the process of finding angles and lengths associated with three-dimensional objects.



Let's start: How many right-angled triangles?

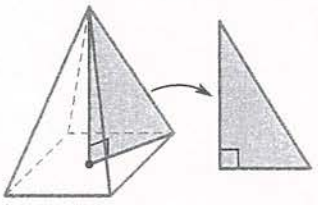
A right square pyramid has the apex above the centre of the base. In this example, the base length is 6 m and slant height is 5 m. Other important lines are dashed.

- Using the given dashed lines and the edges of the pyramid, how many different right-angled triangles can you draw?
- Is it possible to determine the exact side lengths of all your right-angled triangles?
- Is it possible to determine all the angles inside all your right-angled triangles?



Key ideas

- Using trigonometry to solve problems in three dimensions involves:
  - visualising and drawing any relevant two-dimensional triangles
  - using trigonometric ratios to find unknowns
  - relating answers from two-dimensional diagrams to the original three-dimensional object.



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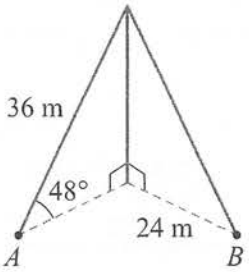
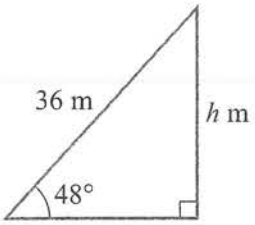
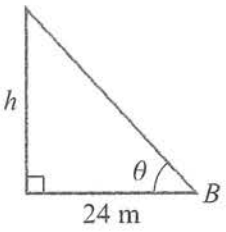
Example 9 Applying trigonometry in 3D

A vertical mast is supported at the top by two cables reaching from two points, A and B.
The cable reaching from point A is 36 metres long and is at an angle of 48° to the horizontal.
Point B is 24 metres from the base of the mast.



a Find the height of the mast, correct to 3 decimal places.
b Find the angle to the horizontal of the cable reaching from point B, to 2 decimal places.

SOLUTION	EXPLANATION
a Let h be the height of the mast, in metres.	First, draw the right-angled triangle, showing the information given.
	
$\sin 48° = \frac{h}{36}$	The opposite (O) and hypotenuse (H) are given, so use sine.
$h = 36 \times \sin 48°$ $= 26.7532\ldots$	Multiply both sides by 36.
The height of the mast is 26.753 m (to 3 decimal places).	Answer the question in words.
b 	Draw the second triangle, including the answer from part **a**.
$\tan\theta = \frac{26.7532\ldots}{24}$	Use the inverse tan function to find the angle. Use the more precise answer from part **a** (i.e. $26.7532\ldots$) that is stored in your calculator.
$= 48.1050\ldots$	
The cable reaching from point B is at an angle of 48.11° to the horizontal (to 2 decimal places).	Answer the question in words, rounding your answer appropriately.

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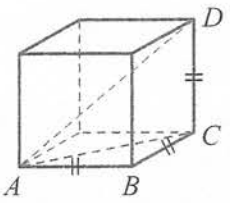
Exercise 7E

1 The cube shown here has side lengths of 2 m.



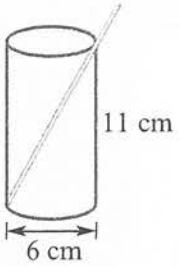
a Draw the right-angled triangle $\triangle ABC$ and find and label all the side lengths. Pythagoras' theorem can be used. Answer using exact values (e.g. $\sqrt{5}$).

b Draw the right-angled triangle $\triangle ACD$ and find and label all the side lengths. Pythagoras' theorem can be used. Answer using exact values.

c Use trigonometry to find $\angle DAC$, correct to 1 decimal place.

d Find $\angle CAB$.

2 Find the angle of elevation that this red drinking straw makes with the base of the can, which has diameter 6 cm and height 11 cm. Round your answer to 1 decimal place.



Example 9

3 A vertical mast is supported at the top by two cables reaching from two points, A and B. The cable reaching from point A is 43 metres long and is at an angle of 61° to the horizontal. Point B is 37 metres from the base of the mast.

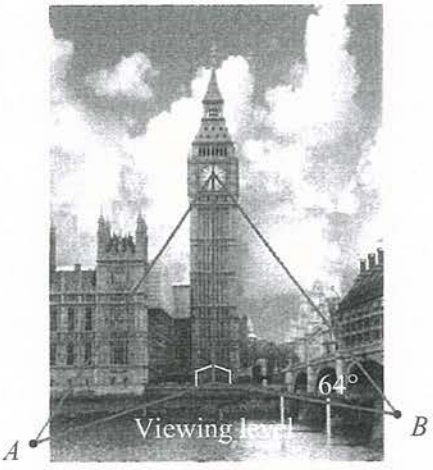
a Find the height of the mast, correct to 3 decimal places.

b Find the angle to the horizontal of the cable reaching from point B, to 2 decimal places.

4 Viewing points A and B are at a horizontal distance of 36 metres and 28 metres, respectively, from a clock tower. The viewing angle to the clockface at point B is 64°.

a Find the height of the clockface above the viewing level, to 3 decimal places.

b Find the viewing angle to the clockface at point A, to 2 decimal places.



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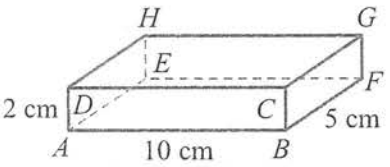
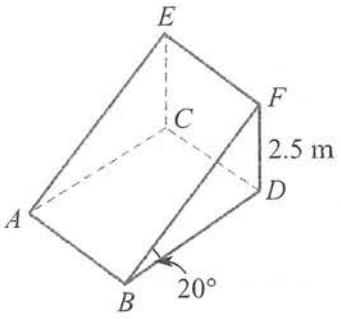
5 A rectangular prism, $ABCDEFGH$, is 5 cm wide, 10 cm long and 2 cm high.



a By drawing the triangle ABF find, to 2 decimal places:
   i $\angle BAF$ ii AF

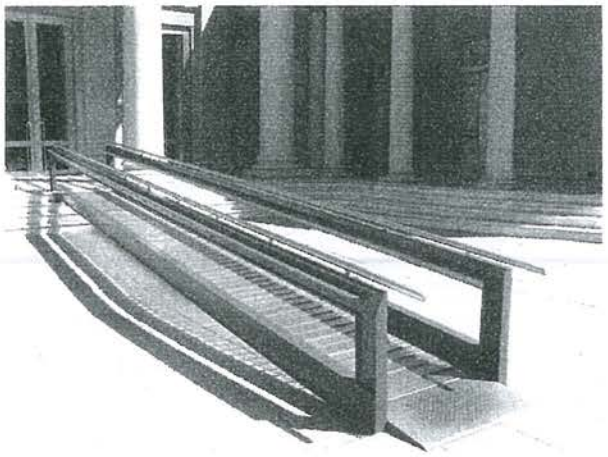
b By drawing the triangle AGF, find $\angle GAF$, to 2 decimal places.

6 A ramp, $ABCDEF$, rests at an angle of 20° to the horizontal and the highest point on the ramp is 2.5 metres above the ground, as shown. Give your answers to 2 decimal places in the following questions.

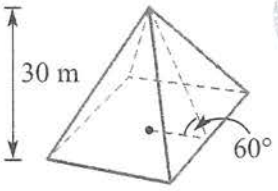


a Find the length of the ramp BF.

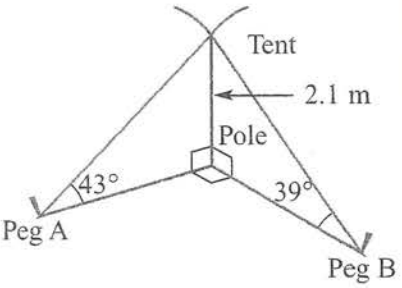
b Find the length of the horizontal BD.



7 The triangular faces of a right square pyramid are at an angle of 60° to the base. The height of the pyramid is 30 m. Find the perimeter of the base of the pyramid, correct to 1 decimal place.



8 A tent pole measuring 2.1 metres high is secured by ropes in two directions. The ropes are held by pegs A and B at angles of 43° and 39°, respectively, from the horizontal. The line from the base of the pole to peg A is at right angles to the line from the base of the pole to peg B. Round your answers to 2 decimal places in these questions.



a Find the distance from the base of the tent pole to:
   i peg A ii peg B

b Find the angle at peg B formed by peg A, peg B and the base of the pole.

c Find the distance between peg A and peg B.

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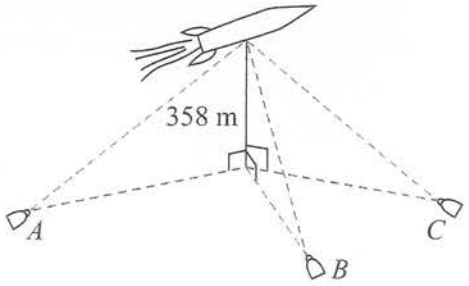
9 The communities of Wood Town and Green Village live in a valley. Communication between the two communities is enhanced by a repeater station on the summit of a nearby mountain. It is known that the angles of depression from the repeater station to Wood Town and Green Village are 44.6° and 58.2°, respectively. Also, the horizontal distances from the repeater to Wood Town and Green Village are 1.35 km and 1.04 km, respectively.

a Find the vertical height, to the nearest metre, between the repeater station and:
   i Wood Town ii Green Village

b Find the difference in height between the two communities, to the nearest metre.

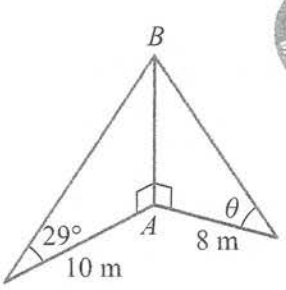
10 Three cameras operated at ground level view a rocket being launched into space.
At 5 seconds immediately after launch, the rocket is 358 m above ground level and the three cameras, A, B and C, are positioned at an angle of 28°, 32° and 36°, respectively, to the horizontal.
At the 5 second mark, find:



a which camera is closest to the rocket

b the distance between the rocket and the closest camera, to the nearest centimetre

11 It is important to use a high degree of accuracy for calculations that involve multiple parts.
For this 3D diagram, complete these steps.



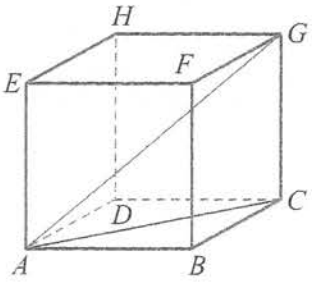
a Find AB, correct to 1 decimal place.

b Use your answer from part a to find θ, correct to 1 decimal place.

c Now recalculate θ using a more accurate value for AB. Round θ to 1 decimal place.

d What is the difference between the answers for parts b and c?

12 For a cube $ABCDEFGH$ with side lengths 1 unit, as shown, use trigonometry to find the following, correct to 2 decimal places where necessary. Be careful that errors do not accumulate.



a $\angle BAC$ b AC

c $\angle CAG$ d AG

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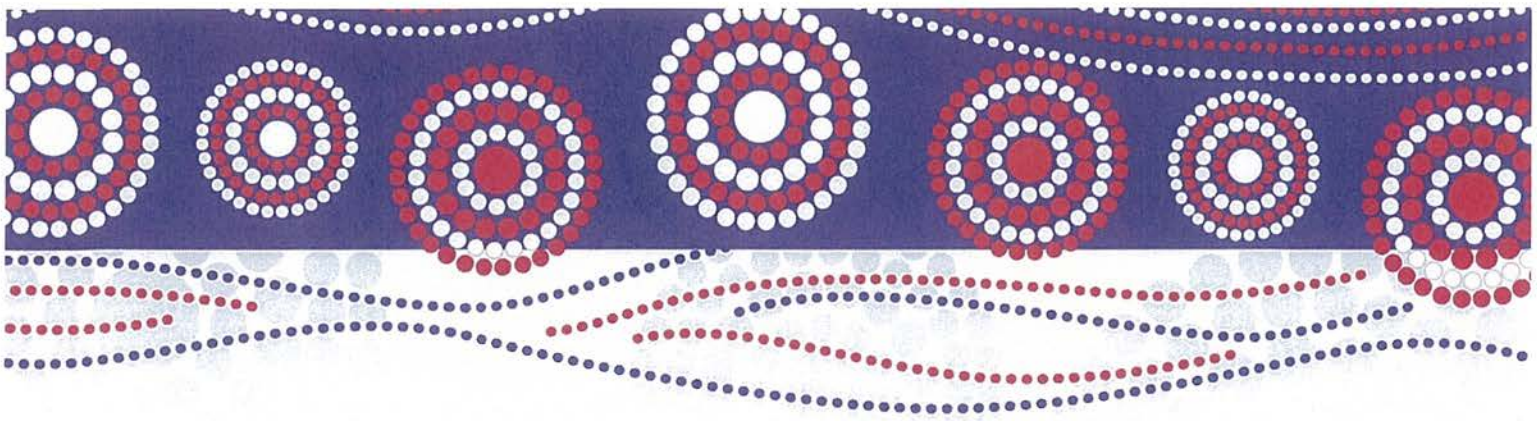


SCIENCE

Lessons 1 and 2

Passing on genetic traits - reproduction

Remember in the previous set of work we looked at our observable genetic traits.

Genetic traits are determined by our genes. Genes are the code for all the processes that occur in our bodies.

How are genes passed down from parents to their children? Why do we have some features from our mother and some from our father?

Humans produce offspring by a type of reproduction called *sexual reproduction.* So do many other animals and plants.

During sexual reproduction a sex cell from the male called a sperm, and a sex cell from a female called an ovum, must join for fertilisation to occur and for a baby to grow. Ovum means one egg, ova means more than one egg.

Sex cells are different from all other body cells. Sex cells in humans have 23 chromosomes.

How are sex cells different from other body cells?

Did you answer other body cells have 23 ***pairs*** *of chromosomes (or 46 chromosomes altogether)?*

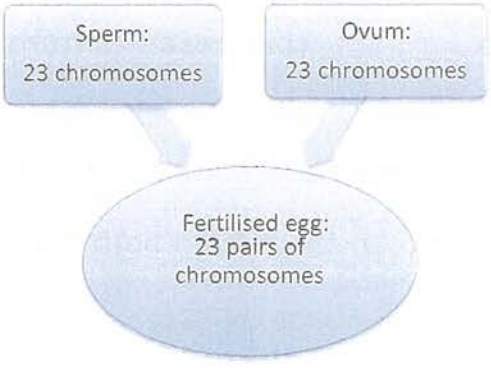


Figure 1

When an egg and a sperm join, the new cell that forms has received half the chromosomes needed from the mother and half from the father. This is why most children may look something like each parent – DNA has been passed on to them from both parents.

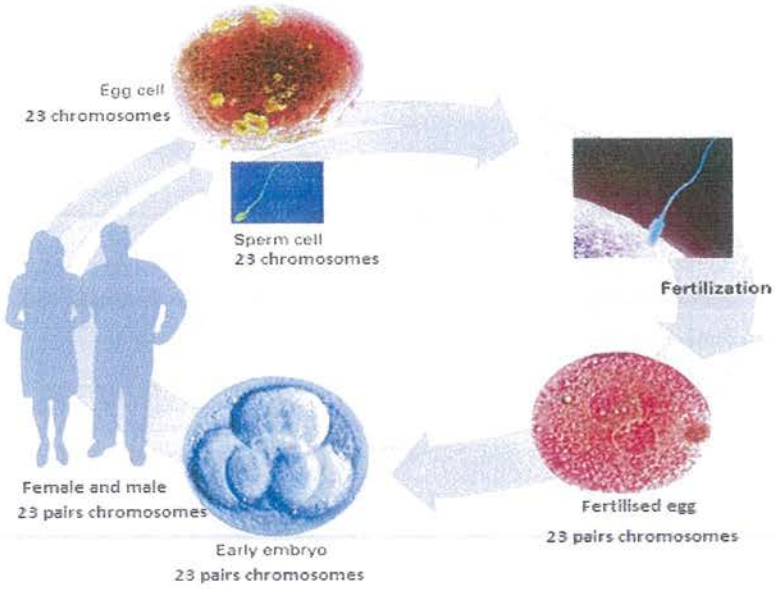


Figure 2

Activity 1 - Fertilisation and genes

Complete the following sentences by using the words in the box below.

23	genes	children	ovum	Fertilisation	23 pairs

F_____ occurs when a sperm cell enters an _____ (egg). When the egg and sperm join, a new cell is formed. The new cell has _____ of chromosomes.

The new cell has received _____ chromosomes from the mother and 23 chromosomes from the father.

This is why _____ may look something like each parent – _____ have been passed onto them from both parents.

Check your response by going to the Suggested answers section

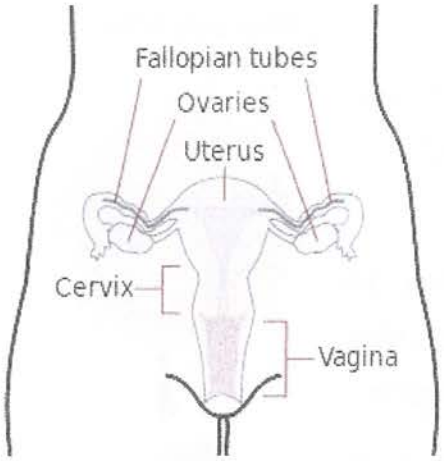


Figure 3

In the female reproductive system, the ova (or eggs) are released from the ovaries. The egg travels in a fallopian tube to the uterus. If the egg hasn't been fertilised it travels out of the body through the vagina during menstruation.

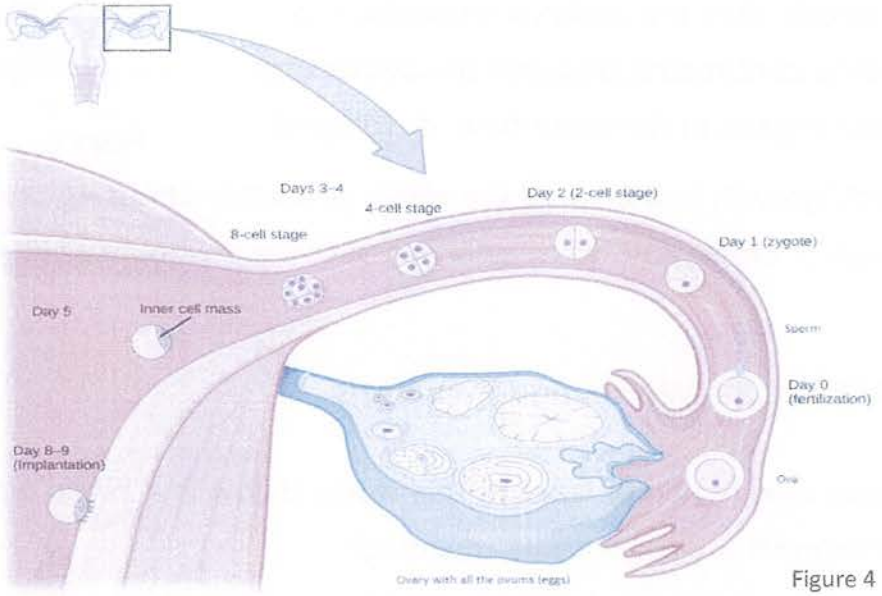


Figure 4

The diagram above shows what happens when an egg has been fertilised by a sperm in the fallopian tube. The fertilised egg is called a *zygote*.

The zygote starts to divide and quickly grows in size and then it is called an embryo.

About 8 to 9 days after fertilisation the embryo implants on the uterus wall and eventually after about 40 weeks a baby will be born. The amazing thing is that all the information to turn the zygote into a baby is stored in the genes passed on from the mother and father.

The early embryo

Stem cells in the early embryo

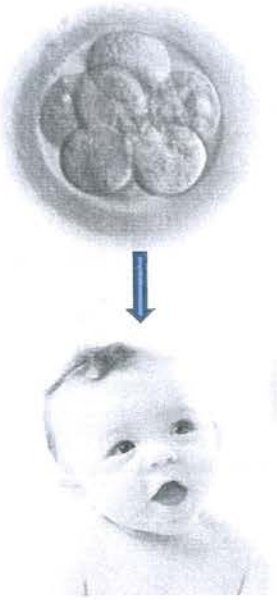


Figure 5

The early embryo is between 3 and 7 days old. It has not implanted on the uterus wall. It is a group of similar cells.

This group of similar cells are quite amazing. They are called embryonic stem cells and they turn into all the cells in the body - heart, brain, nerve, blood, muscle.

These embryonic stem cells begin to change into body cells once the embryo implants on the uterus wall.

About three weeks after the embryo implants, it is only about half a centimetre long and the beginnings of all the major organs in the body have developed.

After this point, growth and change are rapid, and after about 40 weeks the small group of embryonic stem cells has become a whole baby.

Activity 2 – Words and meanings

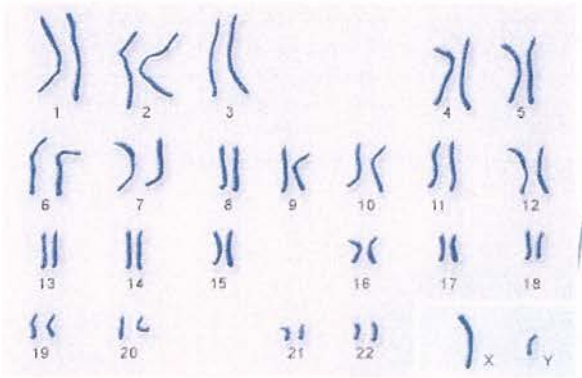
There are many new words to learn in this work. Below is a list of words. Use a line to connect a word with its meaning.

Word	Meaning
Zygote	Cells in the early embryo which develop into all other body cells
Embryo	Early stage of development of a baby
Uterus	Female sex cells or eggs
Embryonic stem cells	Fertilised egg
Ova	Name of the female organ where a baby grows

Check your response by going to the Suggested answers section

Boy or girl?

Remember that we looked at the diagram below in Part 1. It shows the 23 pairs of human chromosomes that have been taken from a body cell. One of each pair comes from the mother and the other one comes from the father.



There is one special pair of chromosomes. These are the chromosomes that carry all the information that determine whether we are male or female. One is called the X chromosome, the other is called the Y chromosome.

Figure 6

There are two possible combinations. They are known as XX and XY.

If a Y chromosome is present the baby will be a boy.

The combination in the diagram above of X and Y is a male. Female babies have the combination of two X chromosomes – XX.

The cells of a girl baby contain 22 pairs of chromosomes plus an XX.

The cells of a boy baby contain 22 pairs of chromosomes plus an XY.

Interesting facts about human reproduction

Here are just a few interesting facts about reproduction. There are many more! There are many sites on the internet that give a lot more details on conception, pregnancy and birth.

- Females are born with all the eggs they will have. No more eggs are produced during her life.
- Sexually mature males continually produce billions of sperm.

- Of the billions of sperm produced that try to fertilise an egg, only one can succeed.
- During her reproductive years, about once every month a female releases an egg from the ovary and her body prepares for pregnancy. The uterus is supplied with extra blood, ready to pass on oxygen and food to the growing baby.
- Identical twins are formed when for some reason the early embryo splits into two entirely separate groups of cells. So identical twins begin with one egg and one sperm and identical genetic information.

Figure 7

- Non-identical twins are formed when for some reason two eggs are released from the ovary and each one is fertilised by a different sperm. So there are two eggs and two sperm and each has quite different genetic information.

Figure 8

Summary

Offspring inherit characteristics from both parents in sexual reproduction.

Sexual reproduction is a type of reproduction involving both male and female sex cells.

Male sex cells are called sperm cells.

Female sex cells are called ova or eggs.

The union of a sperm and an ovum is called fertilisation.

A fertilised egg is called a zygote.

When the zygote divides and becomes more than one cell it is called an embryo.

The cells of an early embryo are called embryonic stem cells.

Embryonic stem cells are amazing cells that can become any other cell in the body.

Complete the exercises for Lessons 1 and 2 in the Send-in exercises.

Lesson 3

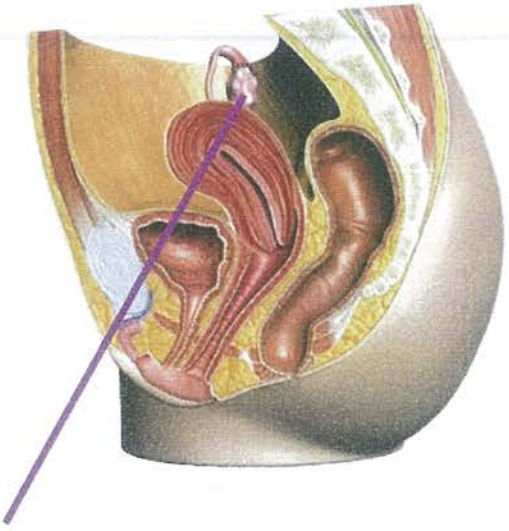
Producing sex cells

Sex cells are made in parts of the reproductive system.

Where are sex cells made in males and females?

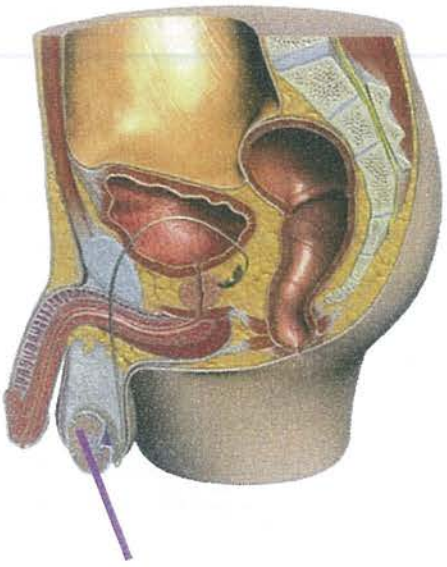
Most body systems in males and females are similar. The **reproductive system**, however, is not the same. The parts and the way they function are different in a male and in a female.

Female Reproductive System



Ovary produces eggs (or ova)

Male Reproductive System



Testis produce sperm

Figure 9

Male reproductive system

Our reproductive systems are controlled by hormones. Hormones are like chemical messengers which travel in the blood. These chemicals are in very small quantities. Hormones are made by glands.

The hormones which cause the changes in a boy's body at puberty and control the male reproductive system are called **male hormones.** **Testosterone** is the main male hormone. The **testes** produce this hormone. The hormone is carried in the blood to all parts of the body.

These hormones bring about the masculine characteristics that develop in a boy at puberty. Puberty is the stage when a person's body slowly changes from a child's body to an adult's body. This can happen to a boy when he is about 11 to 13 years old, but some start earlier and some start later.

During puberty, more hormones, especially **testosterone,** travel around the body through the bloodstream. This increased level of male hormone brings about the changes in a boy's body. Changes that occur for boys include:

- growth of pubic hair.
- penis and testes grow larger compared with other body parts.
- body becomes more muscular and shoulders get broader.
- whole body becomes more hairy – especially on face and chest.
- the testes begin to make sperm. Sperm are special male reproductive cells (known as sex cells).
- the voice box increases in size and the voice begins to deepen. This is when a boy's voice is 'breaking'.

Male reproductive system

Below are two diagrams showing the male reproductive system as a side view.

One diagram also shows some other internal body parts such as the spinal column and the bowel in more detail.

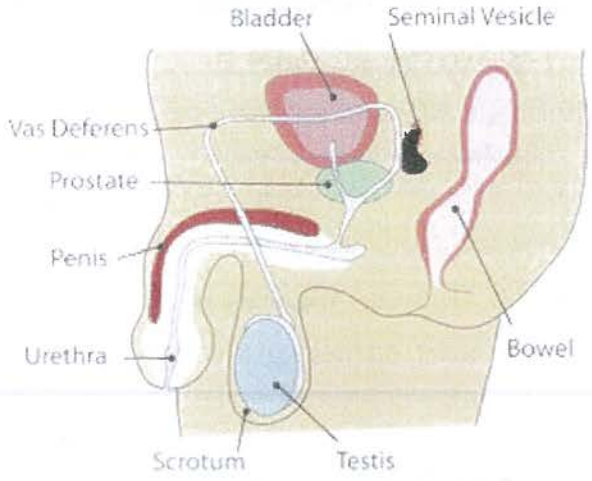


Diagram A

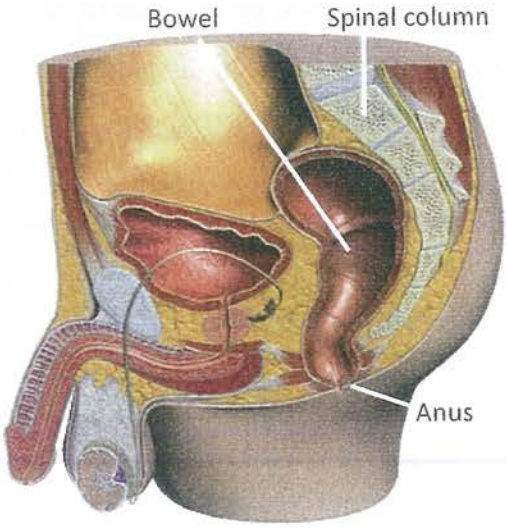


Diagram B

The main parts of the male reproductive system are:

- two testes - held and protected by a bag of skin called the scrotum. They are outside the body.
- the vas deferens - a thin tube that connects each testis to other parts of the reproductive system.
- seminal vesicles - each vas deferens goes to a seminal vesicle. On diagram A above the seminal vesicle is tiny and black.
- prostate gland - this lies between the seminal vesicles and the penis. It is almost as large as the testes.
- penis - lies between the testes outside the body. The urethra is a thin tube in the penis that opens to the outside.

Activity 3 – Identifying parts of the male reproductive system

On the previous page, label Diagram B with the following parts of the male reproductive system. Use a ruler to carefully draw a line from the label to the part.

testis	scrotum	seminal vesicle
penis	vas deferens	prostate gland

Check your response by going to the Suggested answers section

Function of parts of the male reproductive system

Each of the parts you have identified and labelled has a special role to play in producing a new human being.

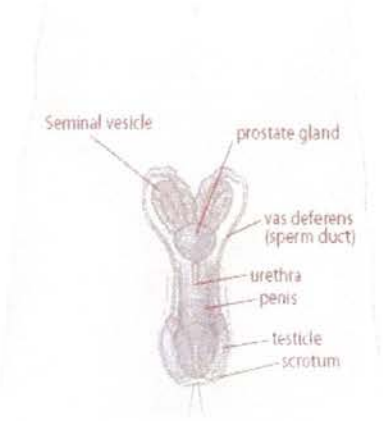


Figure 10

The scrotum holds, and to some extent protects, the testes.

The testes produce the hormone testosterone and also the sperm.

The sperm is the male sex cell. It has 23 chromosomes.

The figure opposite shows a picture of sperm cells as seen under the microscope. Each sperm has a long tail that is used for swimming, similar to a tadpole. The head contains the chromosomes.

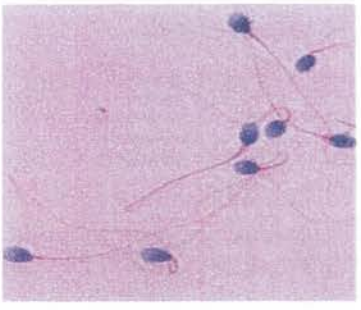


Figure 11

The only function of the sperm is to transport the man's genetic information on the chromosomes through the female reproductive tract and then to the egg.

Once the sperm reaches the egg in the fallopian tube, it penetrates the egg and fertilises it, creating a zygote. (Of the 150 million or so sperm

that are released, only a few dozen complete the journey and only one of them will fertilise the egg.)

The seminal vesicles and the prostate gland both produce different parts that make up semen. Semen is the fluid in which the sperm swims. Semen also keeps the sperm alive for a few hours on its journey towards the egg.

The penis transfers the semen out of the body in a tube called the urethra.

Activity 4 - Summarising parts and functions of the male reproductive system

Summarise this information by completing the table below.

Function of parts of the male reproductive system	
Part	**Function**
Testes	
	A sack-like bag that hold the testes.
	A thin tube that transfers sperm to the seminal vesicle
	Produce part of the fluid, semen, that sperm swim in
Prostate gland	
	Transfers semen out of the body in the urethra

Check your response by going to the Suggested answers section

The penis and urine

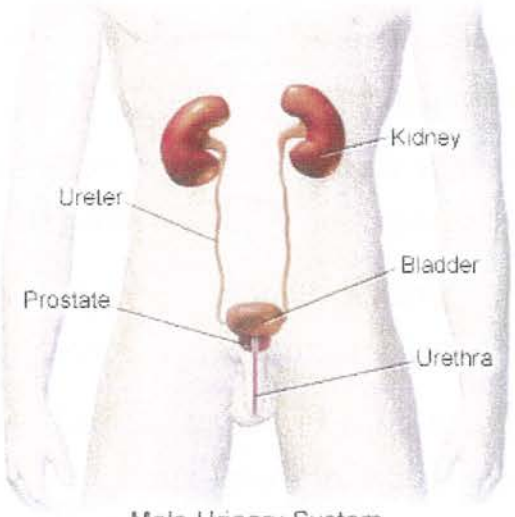
The penis has another function that is not connected with reproduction.

The penis also transfers urine out of the body.

The penis, urethra and prostate gland are also parts of the urinary system in males.

Urine is made in the kidneys. It passes from the kidneys down into the bladder where it is stored for a short time.

In the urinary system the prostate gland helps control the flow of urine out of the body. Older men often have 'prostate problems' which means they have unwanted changes in the number of times they pass urine.



Male Urinary System

Figure 12

Urine is passed out of the body in the urethra, the same tube that transfers semen out of the body

In the diagram you can see where urine is stored in the bladder and how it passes out of the body via a tube called the urethra in the penis.

Complete the exercises for Lesson 3 in the Send-in exercises.

Lesson 4

Producing sex cells- female reproductive system

A girl's body usually starts to change when she is about nine or ten years old. Some girls start to change earlier and some later. The changes take place over a number of years. The time when the changes are occurring is called puberty.

Puberty starts when a girl begins to produce larger amounts of female hormones, especially **oestrogen** and also **progesterone**.

This tends to happen when girls reach a certain weight. Most girls start puberty once they weigh more than 45kg.

During puberty, larger amounts of the female hormones, oestrogen and progesterone, travel around the body through the bloodstream and bring about the change from a girl's body to a woman's body.

Some of the changes that girls experience as they go through puberty are that:

- pubic hair grows
- breasts grow and develop
- hips grow wider
- the whole body becomes rounder
- periods begin when an egg is released from the ovary

Activity 5 - Hormones and puberty

Answer the following questions by referring to the information about males and females on the previous pages or by referring to the glossary at the front of this part.

1. What is a hormone?

   _____

2. What is the name of the main male hormone that stimulates the testes to produce sperm?

   _____

3. Name the two main female hormones that bring on puberty in a girl.

   _____

4. Name one change at puberty that is the same in both boys and girls.

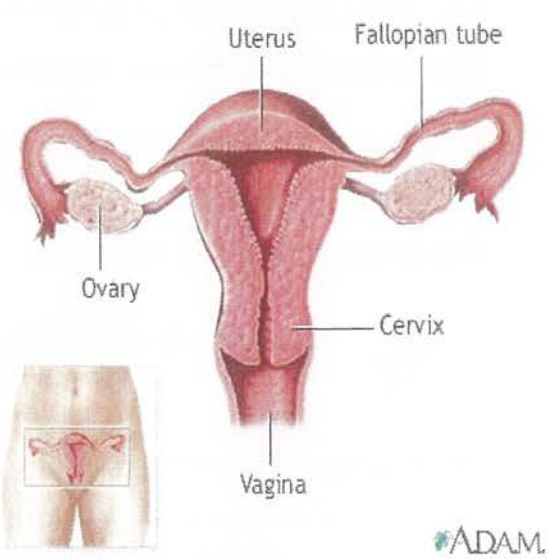
   _____

Check your response by going to the Suggested answers section

Female reproductive system

Parts of the female reproductive organs are:

- two ovaries that are oval shaped.
- two fallopian tubes that connect the ovaries with the uterus.
- the uterus (also called the womb). It is very muscular.
- the cervix which is the neck of the uterus and connects the uterus to the vagina. It is also very muscular.
- The vagina which opens to the outside of the body.



Below are two diagrams which show a side view of the female reproductive system.

Diagram B also shows some other internal body parts such as the spinal column and the rectum in more detail.

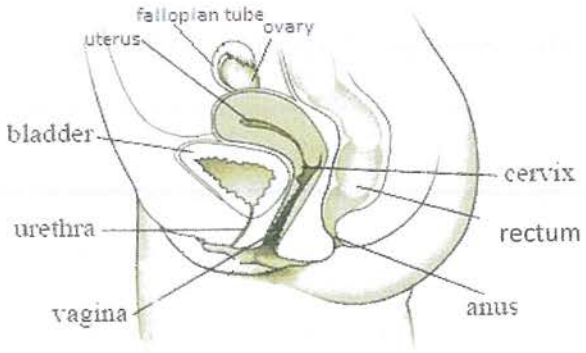


Diagram A

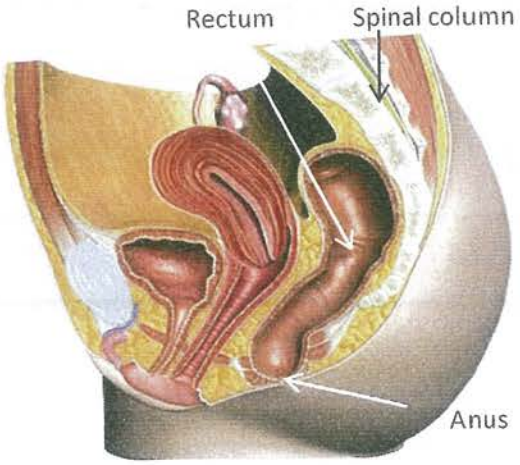


Diagram B

Can you locate the parts of the female reproductive system on diagram B? Look for the ovary, fallopian tube, uterus, cervix and vagina.

Now look for the urethra and the bladder, which are parts of the urinary system.

The urethra is quite separate from the reproductive system in females. The urethra has its own opening to the outside.

A female has three openings to the outside – the urethra, the vagina and the anus. How does this compare to males? Males have two openings – the urethra and the anus.

Activity 6 – Identifying female reproductive organs.

Label Diagram B with the following parts.

ovary	fallopian tube	uterus	cervix	vagina

Check your response by going to the Suggested answers section

Function of parts of the female reproductive organs

As with the male reproductive organs, each of the female organs has a special role to play in producing a new human being.

1. The two ovaries store unripened eggs and produce the female hormones, oestrogen and progesterone.

   A female is born with all her eggs in her ovaries. Females do not keep making eggs. This is quite unlike males, who once they have reached puberty continuously make sperm.

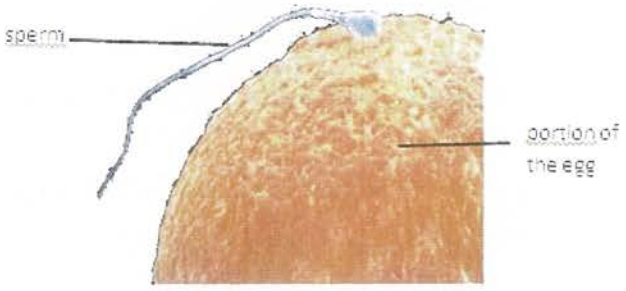
   

   Figure 14

   The eggs, however, are unripened. Hormones (not oestrogen and progesterone) stimulate an egg to ripen once a month. When the ovary releases an ovum (egg), it is known as ovulation.

   The egg, compared to a sperm, is very large. The egg has 23 chromosomes but it also has food supplies to feed the growing fertilised egg or zygote.

2. The two fallopian tubes connect the ovaries with the uterus.

   Fertilisation occurs in the fallopian tubes.

3. The uterus is where the baby grows. Another name for the uterus is womb.

   The uterus is very muscular and can expand to accommodate the growing baby. Also, when it is time for the baby to be born, the uterus can contract which helps push the baby out.

   Each month when an egg is released from the ovary, the uterus is prepared for a fertilised egg to implant by having extra blood supplies. If an egg doesn't implant, this extra blood is lost. This blood loss is called a period or menstruation.

4. The cervix keeps the baby in the uterus.

   It is strong and muscular because it needs to support the growing baby. During the birth the cervix has to open to allow the baby out.

5. The vagina has a number of roles in reproduction. It is:

   - the pathway that a baby takes out of the body during childbirth. It is also called the birth canal.
   - where the penis is inserted during intercourse so that the sperm can reach the egg.
   - the pathway by which the excess blood from the uterus leaves the body if the egg is not fertilised.

Activity 7 - Identifying parts and functions of female reproductive organs

Match the names of the parts below with their function by writing the part with against its function.

vagina	fallopian tubes	uterus	ovaries

Name(s)	Function
	Site of egg production; glands which produce female hormones such as oestrogen and progesterone.
	Tubes through which an egg moves following ovulation; site of egg fertilisation if sperm are present in the reproductive tract.
	Muscular organ in which a fertilised egg will implant and grow to produce a baby.
	Canal in which semen is deposited during intercourse; canal through which a baby is born.

Check your response by going to the Suggested answers section.

The menstrual cycle

When a female reaches puberty, an egg (ovum) is stimulated by hormones to mature. The mature egg is released from the ovary during ovulation and it is possible for a female to have a baby.

From then on, the whole reproductive system goes through a regular, repeating cycle called the menstrual cycle. The menstrual cycle takes about 28 days. For some females it is longer, for others it is shorter and for others it can take many years for a regular pattern to happen.

For those in a regular pattern, this means every 28 days the body prepares for an egg to be fertilised and a baby to develop.

Every 28 days an egg (ovum) matures and is released from an ovary. This is called ovulation.

The egg moves along the fallopian tube (oviduct) towards the uterus. As it does, the lining of the uterus starts to thicken and increase in blood supply.

If the egg is fertilised, this lining is needed to nourish the developing embryo.

If the egg is not fertilised, it dies and passes out of the uterus. The extra blood supply in the uterus lining then breaks up and flows out of the vagina.

This shedding of the blood and extra lining is called menstruation. The bleeding usually lasts for 5 to 7 days and it is often called a period.

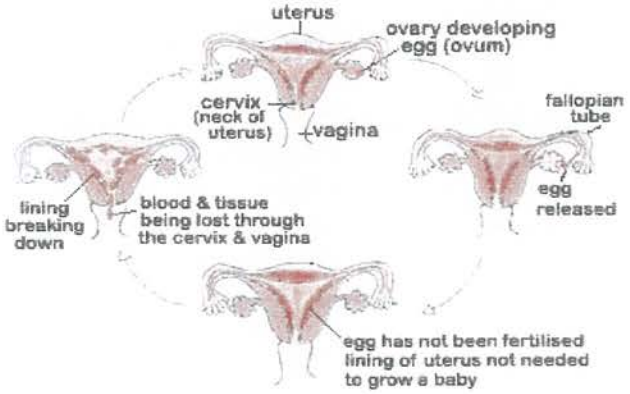


Figure 15

Year 10

History

World War II

Match the concepts to their definitions

	Australian Council of Trade Unions.
Siege	
	People from a foreign country who do not have citizenship in the country where they are living.
Munitions	
	Government control over what the public can read, view or hear.
Aliens	
	A system of compulsory service in a nation's armed forces.
Geneva Convention	
	Term used by Australian soldiers for people of Papua who helped them during the war.
ACTU	
	An international agreement on the rules for wartime treatment of prisoners of war and the wounded.
Lend-Lease	
	An Act passed by the United States Congress on 11 March 1941 to sell, transfer, lend or lease armaments to the Allies without the United States being directly involved in the war.
Conscription	
	Weaponry, ammunition and other materials used in fighting war.
Total War	
	People taken prisoner during a war and held against their will while the conflict continues.
Censorship	
	A system involving the exchange of coupons for goods and foods that were in short supply during the war, to ensure everyone could obtain a share.
Rationing	
	The surrounding and blockading of a place.
Fuzzy-Wuzzy Angels	
	A war in which everyone in a country is involved by either fighting or helping those who are fighting.
Prisoners of War	

CHRONOLOGY OF WORLD WAR TWO AND AUSTRALIA'S INVOLVEMENT

1st September 1939 - Germany invades Poland.

3rd September 1939 - Britain and Australia declare war on Germany.

15th September 1939 - Australia begins recruiting troops to send to Egypt.

August - September 1940 - Battle of Britain. German bombers repeatedly attack Britain in an attempt to destroy property and morale prior to invasion. Britain manages to hang on

7th February 1941 - Australia and allies defeat the Italians in North Africa.

19th February 1941 - Darwin bombed by Japanese, 243 killed.

April 1941 - Australians evacuated from Greece, some captured by the Germans.

April - September 1941 - Australians besieged at Tobruk in North Africa. Their toughness earns them the nickname "The Rats of Tobruk".

7th December 1941 - Japan attacks Pearl Harbor and Malaya. US aircraft carriers out on manoeuvres and escape attack to later play a crucial role in defeating the Japanese navy at the Battle of Midway Island.

15th February 1942 - Singapore falls to Japan. Many Australians captured and imprisoned under horrendous conditions by the Japanese.

7th – 8th May 1942 - Battle of the Coral Sea. American and Australian navy defeats the Japanese.

31st May 1942 - Japanese midget submarines attack Sydney Harbour. 19 sailors aboard the Kuttabul killed.

June 1942 - Newcastle and Bondi shelled by Japanese.

6th September 1942 - Australians drive Japanese out of Milne Bay in Papua-New Guinea.

17th September 1942 - Japanese advance along Kokoda Trail halted by raw Australian troops, referred to as "chocos" by regular soldiers who thought they would melt in the heat of battle.

23rd October 1942 - Battle of El Alamein begins. Germans finally driven out of North Africa.

February 1943 - Conscription Act passed by Commonwealth parliament.

1943 - Australian soldiers withdrawn from war with Germany.

25th November 1943 - Australian 9th Division takes Sattleberg in New Guinea.

30th April 1945 - Adolf Hitler killed himself by gunshot on 30 April 1945 in Berlin.

October 1944 - August 1945 - Australian troops in action on islands north of New Guinea.

8th August 1945 - US drops A-bomb on Hiroshima. Nagasaki bombed shortly after.

2nd September 1945 - Japan signs surrender.

World War II - 1939 – 1945

Causes of WWII

- World War 1 - The Treaty of Versailles
- Appeasement
- Rise of Totalitarianism

World War 1 - The Treaty of Versailles

Armed Forces: Lost majority of Naval Ships. Army reduced to 100,000 men. No Air Force.

Pay Reparations: Found guilty of causing World War l and charged with paying other countries costs.

Pride: Must publicly accept sole guilt for causing World War l.

Appeasement

Appeasement is the policy of making concessions to dictatorial powers in order to avoid conflict. The legacy of World War l in France and Britain generated a strong public and political desire to achieve 'Peace at any price', as neither country was militarily ready for War.

In March 1939, when Germany seized the remainder of Czechoslovakia, it was clear that appeasement had failed. A misguided belief in 'Peace in our Time' was replaced by a reluctant acceptance of the inevitability of war.

Totalitarianism

World War II was caused in part by the rise of totalitarian governments. Germany, Italy, and Japan all had totalitarian governments and sought to undo past wrongs taking nationalism to an extreme. These countries eventually formed the Axis Power alliance.

Aims of Totalitarianism:

- Restoring pride in their country.
- Build up their militaries.
- Germany wanted revenge for the Versailles Treaty.
- Italy felt it didn't get enough land from the Versailles Treaty.
- Japan felt it was treated unfairly at the Washington Naval Conference because they could have fewer warships than Great Britain or the US could have.


Loyalty
Why might Australians feel obliged to go to war?
Patriotism

Australia and World War ll

Why did Australia go to War again?

Britain declared war on the 3rd September 1939, with Australia declaring War the very same day. Our Prime Minister at the time was Robert Gordon Menzies said, "Britain has declared War … and as a result Australia is at War …"


'AM SURE RIGHT WILL PREVAIL'-CHAMBERLAIN
Extra The Telegraph-Journal Extra
BRITAIN DECLARES WAR ON GERMANY
PRIME MINISTER ACTS AS ULTIMATUM EXPIRES; FRANCE TO ENTER STRUGGLE AUTOMATICALLY
Empire Support Gives 'Profound Encouragement'
Bulletin

The Announcement of War was not Supported by all. Many believed it didn't concern us. Also, many remembered the horrors of the First World War and did not want to relive it.

So why did we go to War?

- Australia was a conservative government with strong traditionalist ties to our British heritage, and Menzies was considered a strongly pro-British Minister.
- Kinship, as many Australian still had relatives living in Britain.
- Tradition, our Anglo-Saxon heritage / way of life as well our political system.
- Migrants, as many of our migrants had up to this point in time come from Britain or her other colonies.
- Trade, as most of our trade (exports and imports) was with Britain.
- Investment, as most of the loan money that a new country like Australia needed came from our traditional 'Motherland'.
- Defence, Britain was our 'protector'. We have a large coast and only a small population so Australia has always placed a great deal of importance in having a large and powerful friend.

Calling for volunteers

In 1939, volunteers were called to form the Second Australian Imperial Force which headed for Europe and the Middle East in 1940. Prior to WWII there was no conscription in Australia. Conscription was necessary in WW2 because Australia only had a permanent Army of approx. 3500 men and we were directly threatened with attack. Australia also had the Citizen Military Force of approx. 80 000, however it was available only for home defence.

Australia and World War II Conscription

Territories	Resentment	American	Hostilities
North	1945	Unmarried	1943
Australian	Commonwealth	Citizen	Equator

In 1939, at the start of WWII all _____ men aged 21 were to be called up for three months' Militia training. These men could only serve in Australia or its _____. Conscription was effectively introduced in mid-1942, when all men 18-35, and single men aged 35-45, were required to join the Citizens Military Forces (CMF).

By _____, Australia had been bombed and 20,000 Australians were prisoners of war. The _____ Government changed the Defense Act to extend the definition of areas to which conscripted servicemen could be sent, to now include all areas south of the _____ in South East Asia. This included all major war zones in the Pacific area. In effect, Australian conscripts could now for the first time be sent overseas to fight in the same areas as volunteers. The changes caused some public _____ and public protests.

Cabinet approved the Defense _____ Military Forces Act 1943, which provided for the use of Australian conscripts in the South West Pacific Area during the period of war. The Act also provided that this approval would lapse within six months of Australia's ceasing to be involved in _____. But as the Allies began to defeat the Japanese, the war front spread _____, and there was a demand that Australian troops be able to go to the new areas which were outside the definition of 'home'. _____ conscripts were fighting in these areas so it seemed unfair that _____ conscripts should not also be compelled to fight there.

Compulsory military service ended in _____.

Why did Australia need to bring in conscription during WWII

More soldiers needed

12

Why Australians fought in WW2

When Britain declared war on Nazi Germany after the invasion of Poland in 1939, Australia immediately joined in. Many of the same reasons for joining WW1 were still true for WW2 but there was not the enthusiasm of the first war. After war was declared, 40,000 Army Reserves, then known as "militia" were called up for service, and a further 20,000 volunteers joined the Second AIF. At one point in 1942, 476,000 men were in the Army, or 6% of all Australians.

Source 1

Source 2

- Britishness was still a large factor for Australians wanting to help Britain. The White Australia Policy meant that most migrants to Australia still came from Britain. A sense of still belonging to the old British Empire continued, at least at the start of the war.
- Adventure and excitement was something war offered. Most people were too poor to travel, and joining, just as it did it 1914, meant opportunities to see the world.
- Unemployment, after the Great Depression beginning in 1929, was still high. Getting a job with the military was an option for many men.
- The threat from Japan. With the expanding Japanese Empire coming closer and closer to Australia, many people felt threatened. Propaganda was particularly racist and tried to horrify the public into action.
- The British offered Australia protection through its base at Singapore. Many thought helping the British against the Nazis was only fair, at least until the Japanese threat came closer.
- The 1940 Fall of France to the Nazis in only 6 weeks in shocked Australians. A surge in volunteers was due to the French defeat, almost 50,000 in June 1940.
- A fear of being seen as a coward, especially in front of women.

What's the Big Idea?

Australians fought for many reasons

- Britishness
- Adventure
- Employment
- Japanese threat
- British protection
- Fall of France

Source 3

3 September 1939, Prime Minister Menzies announced the beginning of Australia's involvement in the Second World War

Fellow Australians, it is my melancholy duty to inform you officially that, in consequence of the persistence of Germany in her invasion of Poland, Great Britain has declared war upon her, and that, as a result, Australia is also at war.

Complete the understanding questions 1-8 and source questions 1-3.

12 Why Australians fought in WW2

Source 4

We are, then, committed, heart and soul, to total warfare. How far, you may ask me, have we progressed along that road? I may answer you this way. Out of every ten men in Australia four are wholly engaged in war as members of the fighting forces or making the munition and equipment to fight with. The other six, besides feeding and clothing the whole ten and their families, have to produce the food and wool and metals which Britain needs for her very existence.

- John Curtin, 14 March 1942

Understanding

1. Define the words in bold.
2. When did Australia join WW2?
3. What was different compared to the First World War?
4. Why was there still a strong sense of Britishness?
5. How did the Great Depression affect enlistment?
6. What was the new threat that faced Australia?
7. What happened to France that encouraged enlistment?
8. What's the big idea on the sheet?

Source Questions

1. How are sources 1 and 2 trying to encourage people to help with the war effort?
2. What word in source 3 tells us the Prime Minister is not enthusiastic about war?
3. What does source 4 tell us about how involved Australians became during the first 3 years of the war?

Creativity

1. Design a poster to encourage enlistment in WW2. It can be anti-Nazi or anti-Japanese aggression, but avoid racism.

Research and extension

1. Visit the link below.
2. Who is the speaker?
3. Who was the original audience for this speech?
4. List some emotive words he uses.
5. Why was this speech not on television?
6. How would a speech like this be delivered differently today?

https://www.youtube.com/watch?v=FZedhB6Olvk

The Holocaust

The Holocaust was the mass murder of some 6 million European Jews by the German Nazi regime in the concentration camps of occupied Poland during the Second World War. To the Nazi leader Adolf Hitler, Jews were an inferior race and threat to German racial purity and community. These Camps were built specifically to house infrastructure such as Gas Chambers used for the systematic killing of millions. These Camps also saw Jewish Prisoners subject to extreme work conditions, inhumane medical / scientific experimentations and torture.

Auschwitz Concentration Camp

Auschwitz opened in 1940 and was the largest of the Nazi concentration camps. Auschwitz housed a network of camps where Jewish people and other perceived enemies of the Nazi state were exterminated, often in gas chambers or used as slave labour. Some prisoners were also subjected to barbaric medical experiments led by Josef Mengele. During World War II more than 1 million people lost their lives at Auschwitz.

Living Conditions in Concentration Camps

Prisoners often lived in old brick or wooden barracks, with leaky roofs, and the fouling of straw mattresses by prisoners made difficult living conditions worse. The barracks were often swarmed with various sorts of vermin, and had a constant shortage of water for washing.

Malnutrition in Concentration Camps

After several weeks on such starvation rations in the camp, most prisoners began to experience organ deterioration that led to extreme physical exhaustion that ended in death. A minimum working day of eleven hours was enforced in all Concentration Camps. The pace of the work in conjunction with the starvation rations of food, constant beatings and abuse exacerbated the death rate.

The End of World War Two

Bombing	Germany	Japanese	Coral Sea
Russians	Canadian	Allies	Atomic
Pacific	Europe	Australian	Hitler
Mediterranean	Surrender	British	Reality

The War in Europe

As the war dragged into 1944 the _____ were making plans for the full-scale invasion of Europe. To do this they had devised 2 plans: Operation Overlord and Operation Anvil. Anvil involved landings on the _____ coast of France and then the advance northward to Germany. Overlord was to be the main thrust and it was a planned attack on the 5 beaches of the French Normandy coast. The _____, U.S. and _____ troops would then fan out west, north and directly into Germany. But first they had to breech Hitler's 'Atlantic Wall' defence.

When the allied troops were safely ashore at Normandy the next phase began. This was the 'Breakout' from the beaches and the push to _____. Meanwhile the Soviet (Russian) army had begun 'Operation Bagration' in 1943 and were already advancing towards Germany from the east.

By May 1945 _____ had shot himself and those of his high command who remained alive were captured. Most were happier to be caught by the U.S./British as they feared the _____ greatly. After the war many were put on trial for a new crime which was invented in the last months of the war: "Crimes against Peace" or "Crimes against Humanity".

The War in the Pacific

Though the war in _____ had ended the Pacific War continued. The Japanese had been halted in New Guinea and at the Battles of Midway and the _____. Now the process to roll them back to Japan by island hopping began. The U.S.A.'s forces were the main troops used. Even though the _____ leaders wanted a more involved role for our men the American leader, General Macarthur, kept the "glory" for his men. These landings on heavily defended islands (the Solomons, the Marianas, The Philippines, Iwo Jima and Okinawa) where the _____ were prepared to die rather than surrender, cost many American lives. Eventually the Americans were close enough to Japan to begin _____ raids and ultimately to use the _____ bomb on 2 Japanese cities (Hiroshima, Nagasaki) which had not been bombed before. Even then the Japanese government was reluctant to _____. The Russians had entered the

war with Japan on 8th August 1945 in the hope of capturing some important territories on their eastern borders. This brought the _____ of their situation home to the Japanese and they surrendered on the 15th August. The war in the _____ was over.

Questions:

1. Describe 'Operation Overlord', who was involved and what it aimed to achieve?

_____

_____

_____

2. Describe 'Operation Anvil' who was involved and what it aimed to achieve?

_____

_____

_____

3. What untimely led to the end of the Second World War in Europe?

_____

_____

_____

4. Which nation took control of the War in the Pacific? Why?

_____

_____

_____

5. What action ultimately saw the surrender of the Japanese bring about the end of the Second World War?

_____

_____

_____

6. Do you think the Second World War could have been prevented? Explain your answer.

_____

_____

_____

_____

Prisoners of War

More than 30,000 Australians became prisoners of war (POWs) between 1940 and 1945. The Germans and Italians captured Australians during the Mediterranean and Middle East campaigns, and also at sea in the Atlantic, Indian and Pacific Oceans. Of the 8,000 Australians taken prisoner by the Germans and Italians, 265 died during their captivity.

During the Pacific war, the Japanese captured 22,000 Australians: soldiers, sailors, airmen and members of the army nursing service, as well as some civilians. They were imprisoned in camps. At the end of the war only 13,872 of the POWs were recovered, one-third of the prisoners had died.

Prisoners of War

In 1941 the _____ attacked South East-Asia taking many Allied prisoners of war. The Japanese military code promoted the idea that a fight to the _____ was of the highest honour and to surrender was to bring _____ to themselves and their family, hence why the Japanese chose to die by _____ rather than be taken prisoner. This is why the Japanese were so overwhelmed with the number of _____ soldiers that allowed themselves to be taken prisoner. A total of 130000 Allied soldiers were taken _____, including 22000 Australian's.

The majority of the Allied prisoners were held in _____ Changi Prison, otherwise they would have been sent to camps in Japan, Burma, Manchuria or Formosa. The conditions of these camps were _____ with many Allied soldiers suffering and even dying from from poor hygiene and medical care, _____, medical experimentations, brutality and forced _____ labour on the Thai-Burma Railway. Most Allied prisoners were living of a basic diet of corn, rice and soy beans hardly enough to sustain them.

These acts by the Japanese were in strict violation of the _____ Convention. For a long time this was a big reason for the _____ between Australia and Japan with many still to this day unable to forgive the Japanese for their treatment of the Allied prisoners.

prisoner	terrible	death
suicide	Japanese	starvation
Geneva	manual	tension
dishonour	Allied	Singapore's

Defending Australia – Kokoda Track

Supplies	Owen Stanley Range	Reinforce	Sanananda
Casualties	Japanese	January	Imita Ridge
Advancement	Australian	Mountain	Mainland
American	August	Kokoda	South-East Asia

In the lead up to the _____ offensive at the Kokoda track in Papua New Guinea Australian forces set about preventing the _____ from soaking the jungle of Papua New Guinea and dangerous _____ slopes with Japanese troops. On the 2nd and 3rd or March during the battle of Bismarck 8 Japanese troop transports and 4 Japanese destroyers were attacked and sunk by _____ and Australian planes. Thus only 850 Japanese troops were able to land and _____ the Japanese forces in Papua New Guinea.

For Australia the first step in holding off the Japanese _____ was to be in Papua New Guinea as of July 1942. The aims of the Japanese was to occupy and hold their position in _____. In July 1942 Australian troops engaged the Japanese to uphold the _____, a steep and rugged series of mountains crossed only by a few foot tracks, the _____ Track was one of these.

By the end of July the Australian troops were vastly outnumbered, it wasn't until late _____ that reinforcements arrived to support the struggling Australians. By mid-September the Australians had dug in at _____. They were ordered to hold their position and defend it all costs. Due to the lack of _____ the Japanese were forced retreat where the Australian finally experienced their first victory over the Japanese at Milne Bay.

In the months leading up to the Japanese surrender on _____ 22nd in Papua New Guinea, Australia saw victories over the Japanese at Buna, Gona and _____. The tropical diseases, as well as the fighting, had taken a heavy toll on both armies, with Australian _____reaching approximately 6000. The Japanese defeat in Papua New Guinea ended the threat to _____ Australia.

Papua New Guinea and the Kokoda Track

Why was the Kokoda Track so important for Australian Soldiers to defend during WWII?

In 1942, the Australian Territories of Papua and New Guinea were, in law if not in public sentiment, as much a part of Australia as the Northern Territory. It is then quite true to say that Australian soil was invaded by Japan in 1942. The centrepiece of this invasion was an attempt to capture Port Moresby via the Kokoda track. From Port Moresby the Japanese could, if they desired, launch an invasion of the east coast of mainland Australia. Without it, they could not.

Extract From: King, J. (2011). Great battles in Australian history (pp. 317). Crows Nest, NSW. Allen & Unwin.

- "Physically the pathetically young warriors of the 39th [Battalion] were in poor shape. Worn out by strenuous fighting and exhausting movement and weakened by lack of food, sleep and shelter, many had literally come to a standstill. Practically everyday torrential rain fell all through the afternoon and night, cascading into their cheerless weapon-pits and soaking the clothes they wore – the only ones they had". **Lieutenant Colonel Ralph Honner, commanding officer, 39th Battalion.**

Extract From: Department of Veterans' Affairs. (2012). Kokoda: Exploring the second World War campaign in Papua New Guinea (pp. 48). Retrieved from http://www.dva.gov.au/commems_oawg/commemorations/education/Documents/Kokodafullrd.pdf

- The dangers of jungle warfare were not only related to the enemy. In New Guinea, both the Australians and the Japanese lost more men to sickness than to battle. The two main problems were malaria and dysentery. Soldiers also suffered from dengue fever, and scrub typhus.

Australian Nurses in New Guinea and the Islands

- "Stretcher after stretcher of filthy bloodstained bodies; the extent of their wounds was unforgettable". **Sister Dorothy Gellie.**
- "A typical working day for an air-evac sister began at 3 am with breakfast at 3.30 am and take off at first light". **Sister Nancy Read.**

Extract From: Department of Veterans' Affairs. (2012). Kokoda: Exploring the Second World War campaign in Papua New Guinea (pp. 44-45). Retrieved from http://www.dva.gov.au/commems_oawg/commemorations/education/Documents/Kokodafullrd.pdf

The men fighting on the Kokoda track faced thick jungle where the enemy was often not seen until he was a few metres away. The tactics of infantry fighting are built upon fire and movement. When attacking, one group moves towards the enemy while the other fires to keep enemy heads down. They would direct a large volume of fire towards the enemy while another company manoeuvred towards them. Steep slopes, few tracks, thick jungle and deep treacherous streams hindered communication. The landscape was mountainous with frequent mist and heavy rain, these problems are compounded as all movement is greatly slowed and visibility further restricted.

Activities

1. Read the extract *Great battles in Australian history.* Why were the young warriors in poor shape?

_____

_____

_____

2.Read the extract *Department of Veterans' Affairs.* What diseases caused sickness in soldiers?

_____

_____

_____

The Role of Women in World War II

Women played a more active role in the Second World War, due to conscription, taking on positions in the workforce to fill the void of men who had gone to War.

Approximately 80,000 women enlisted in the armed forces in the Second World War. With approximately only 5% serving overseas. The Second World War saw female nurses allowed to enter the battle zones, unlike previously in the First World War where they were restricted to the hospitals.

Without the contribution of Women during the Second World War, Australia would not have managed to keep its essential industries running and provide the much-needed munition and supplies to the men overseas on the fighting on the frontline. But despite their great contribution throughout the war, women were expected to give up their working positions and return to their normal lives before the war when the soldiers returned home as the war ended.

Activity

If you were a woman during this period of time would you have enlisted in the Armed Forces? Why or Why not?

_____

_____

_____

_____

_____

Australian women during World War II

During World War II, Australia had about _____ women in the armed services. This created a huge labour shortage hence why women then became involved in industries like _____, transport and factories.

Women were becoming more involved in _____ and office work, and by 1939 it was the accepted thing for a girl leaving school to find a job.

During the war, women were most commonly employed in:

1. Manufacturing industries making food, _____ and machines.
2. Shops and retail.
3. Government offices and _____ like buses or trains.
4. Banks
5. Insurance.
6. Munitions production.
7. Ships and aeroplanes manufacturing.

Women also became involved in many _____ organisations that provided services to the _____ men or helped to train women to take over roles normally performed by men. Some of these organisations were:

- The Australian Comforts _____, which coordinated other organisations like the RSL and the YMCA, and provided _____and entertainment for soldiers returning home.
- The Women's Voluntary National Register, which trained women to enter the _____.
- The Women's Australian _____ Services, which trained women who wanted to join the services or the Land _____.

Manufacturing	Workforce	Fund	Retail
National	Clothing	80 000	Accommodation
Transport	Army	Voluntary	Fighting

How were the Aboriginal and Torres Strait Islanders of Australia drawn into World War II?

Disharmony	Units	Enlist	Aboriginal
Military	Citizens	Forms	3000
Salvaged	European	Sydney	Servicemen
Descent	150	Air Force	Overseas
Serve	Officers	Country	Royal

Some material in official records suggest that some _____ Australians were nervous about the possible loyalty of Aborigines in the northern parts of the country.

The Australian Army and the _____ Australian Navy both excluded persons not substantially of European origin or _____ from enlisting in the War until the threat of Japanese invasion necessitated the recruitment of Aboriginal and Torres Strait Islanders. The Royal Australian _____ (RAAF) was more lenient, accepting Aboriginal and Torres Strait Islanders early.

Despite the early ban on their enlistment, a number of _____ volunteers either claimed another nationality or just renounced their Aboriginality. Some recruiting _____ either through indifference or confusion allowed Indigenous Australians to slip through. Outstanding soldiers such as Reg Saunders and Charles Mene slipped through and demonstrated that fears of _____ between black and white personnel were unfounded.

In mid-1941, changes in attitude towards Indigenous Australians enabled numerous Aborigines to _____ in some of the smaller units of the services where they were able to integrate and sometimes to become NCOs (commanding white soldiers). In these smaller _____ the Indigenous Australians were able to leave the prejudices of their civilian world behind them and be accepted as Australian _____. The Torres Strait Light Infantry battalion was one example of the Indigenous contribution.

On 2 April 1942, Professor Adolphus Elkin, Professor of Anthropology at the University of _____ wrote to the Prime Minister about the military authorities' refusal to accept a number of mixed blood Aboriginal men for _____ service. He felt that the government should take every opportunity to give the Aborigines a chance of helping

their _____ either in the fighting services or in auxiliaries to these services or in factories.

It is estimated that approximately _____ Indigenous Australians served in the regular armed forces and possibly up to _____ in irregular units. Even now it is impossible to estimate how many Indigenous men and women enlisted to _____ in World War II. Australian Defence Force enlistment _____ did not allow for Aboriginals to declare their heritage until 1980 and so we can only guess how many thousands volunteered for both home and _____ service. Some 3000 others were employed as labourers performing vital tasks for the military. They _____ crashed aircraft, located unexploded bombs, built roads and airfields and assisted in the delivery of civilian and military supplies.

Although they were not classed or treated as Australian _____, many Aboriginal and Torres Strait Islander servicemen and women fought and died for Australia during World War II.

Questions:

1. Approximately how many Indigenous Australians are estimated to have served Australia in the Second World War?

_____

2. Why was the Australian Army and Navy against taking enlistments from Indigenous Australians? (Describe how the context of the time may have influenced this).

_____

_____

3. What would Indigenous Australians often do to be allowed to enlist in the Armed Forces?

_____

_____

4. What were some of the task performed by Indigenous Australians if they were employed by the Armed Forces?

_____

_____

_____

The Bombing of Darwin

Darwin's ports and airfield facilities were continually being developed, particularly after the outbreak of the second World War. The outbreak of war in the Pacific resulted in the rapid enlargement of the military presence in Darwin and it was used as a base from which to deploy forces. On 19 February 1942 Darwin itself was bombed.

Subsequent raids in April, June, July and November 1942 and March 1943. Most of the raids occurred in daylight but there were some small-scale night attacks. In succeeding months air attacks were made on many towns in northern Australia. In total there were 97 air attacks on northern Australia.

Thorough Methods Best

This Paper is Needed for Our War Effort—Save It!

The Argus.

MELBOURNE, FRIDAY, FEBRUARY 20, 1942. 8 PAGES. PRICE 2d.

DARWIN HEAVILY BOMBED IN 2 RAIDS

ATTACKS BY 93 PLANES: 4 SHOT DOWN

DAMAGE "CONSIDERABLE": CASUALTIES UNKNOWN

DARWIN WAS HEAVILY BOMBED BY 93 JAPANESE PLANES IN TWO RAIDS YESTERDAY.

Mr. Curtin, Prime Minister, announced last night that the first attack was made by 72 twin-engined bombers, accompanied by fighters. The second was by 21 twin-engined bombers.

"It is known for certain that 4 enemy aircraft were brought down," he said.

"Damage to property has been considerable, but reports so far to hand do not give precise particulars as to loss of life."

In a communique announcing the first raid, Mr. Drakeford, Air Minister, said that preliminary reports indicated that the attack was concentrated on the townships. Shipping in the harbour was also bombed.

There were some casualties and damage to service installations. The raid lasted about one hour.

MOBILISATION OF ALL LABOUR AND PROPERTY

Mr. Curtin Explains New Regulations

SYDNEY, Thursday.—Regulations giving the Federal Government power for complete mobilisation of the services and property of the Australian people were gazetted today in accordance with the declaration made by the Prime Minister when he opened the Liberty Loan campaign on Tuesday.

PRESSURE ON MR. CHURCHILL

LONDON, Thursday.

Activity

Half	Bombing	Allies	Invasion
Pearl Harbour	Servicemen	Japanese	Adelaide
Australia	Military	Singapore	Shipping

On 19 February 1942 mainland Australia came under attack for the first time when _____ forces mounted two air raids on Darwin. The two attacks, which were planned and led by the commander responsible for the attack on _____ ten weeks earlier, involved 54 land-based bombers and approximately 188 attack aircraft which were launched from four Japanese aircraft-carriers in the Timor Sea. In the first attack, which began just before 10am, heavy bombers pattern-bombed the harbour and town; dive bombers escorted by Zero fighters then attacked _____ in the

harbour, the military and civil aerodromes, and the hospital at Berrimah. The attack ceased after about 40 minutes. The second attack, which began an hour later, involved high altitude _____ of the Royal Australian Air Force base at Parap. This lasted for 20–25 minutes. The two raids killed at least 243 people and between 300 and 400 were wounded. Twenty _____ aircraft were destroyed, 8 ships at anchor in the harbour were sunk, and most civil and military facilities in Darwin were destroyed.

Contrary to widespread belief at the time, the attacks were not a precursor to an _____. The Japanese were preparing to invade Timor, and anticipated that a disruptive air attack would hinder Darwin's potential as a base from which the _____ could launch a counter-offensive, and at the same time would damage Australian morale. With _____ having fallen to the Japanese only days earlier, and concerned at the effect of the bombing on national morale, the government announced that only 17 people had been killed.

The air attacks on Darwin continued until November 1943, by which time the Japanese had bombed Darwin 64 times. During the war other towns in northern _____ were also the targets of Japanese air attack, with bombs being dropped on Townsville, Katherine, Wyndham, Derby, Broome and Port Hedland.

In the hours following the air raids on 19 February, believing that an invasion was imminent, Darwin's population began to stream southwards heading for _____ River and the train south. Approximately _____ Darwin's civilian population ultimately fled. The panic in the town was repeated at the RAAF base, where _____ deserted their stations in great numbers. Three days after the attack 278 servicemen were still missing.

GEOGRAPHY

Year 10 Geography
Term 3, 2021

Syllabus Dot Point - Investigate the role and importance of natural environments.

Task 1 - Please refer to the following document when asked to complete an activity from the Environmental Change and Management Booklet

Environmental Change and Management Booklet: page 4

Read through introduction and glossary of terms.

Complete **'How do environments function'**

Watch '4 spheres of the Earth: https://www.youtube.com/watch?v=m4TnPv_b6WU

Syllabus Dot Point - Identification of the function of natural environments in supporting life, eg, maintaining biodiversity.

Task 2

Environmental Change and Management Booklet: page 5
The Earth's spheres

Students note take from **'Environments'** PPT.

- Watch the video clips (Suzuki/CSIRO) about the importance of biodiversity & list key issues raised.
https://www.youtube.com/watch?v=N5ssjM2Fjuc (David Suzuki)

https://www.youtube.com/watch?v=7tgNamjTRkk(CSIRO)

Task 3

Environmental Change and Management Booklet: page 7-12 (1-2 lessons)

Read 'Processes that form and transform environments' and answer the accompanying questions.

Lithospheric processes

Biospheric processes

Atmospheric and Hydrological processes

Task 4

Complete **'Measuring Biodiversity'** PPT.

Explore the benefits of healthy biodiversity by completing the **'measuring biodiversity work booklet'** activity.

The Simpson Index is a difficult concept. DO YOU GET IT? Post your answers to your google classroom.

Task 5

Investigate Coastal Environments: Go to Google Earth: https://earth.google.com/web/

Type in Terrigal Beach. Examine the northern part of the beach where there is a high density of houses close to the ocean. Create a mind map: What advantages would there be for the owners in having houses so close to the ocean? Would these houses be worth a lot of money? Why? What threats might exist to these houses?

Now do the same search for Terrigal Lagoon. Write 2 short paragraphs discussing the following:

Why would it be nice to live so close to the Lagoon? What might be some of the negative aspects of living close by? What threats do humans pose to this environment?

Complete **'Coastal Processes'** PPT.

Task 6 - Extension Activity

Mini research and ICT activity: Choose one example of a biological resource such as medicinal resources, food, pharmaceutical drugs, breeding stocks, wood products. Explain how this example has benefited humans, focusing on Australia. Use an online presentation platform (e.g. Sway) to present the information visually. Include a maximum of 10 slides.

Syllabus Dot Point - Investigate human-induced environmental changes across a range of scales, for example, brief examination of types, and extent, of environmental change.

Environmental Change and Management Booklet: Page 13-14

Read 'Why do environments change? Complete the accompanying activities.

Watch: 5 Human Impacts on the Environment: Crash Course Ecology #10
https://www.youtube.com/watch?v=5eTCZ9L834s

Wriye down 3 interesting facts from the youtube clip,

Year 10 Geography

Environmental Change and Management

Student Name:

_____

Introduction

In the twenty-first century, Australia and the world face many environmental challenges which people have a variety of viewpoints about. Challenges range from a local scale, such as degradation of a nearby creek, through to a global scale, such as the threat of global warming. Comparing and evaluating management responses in different places can help us achieve more sustainable management of our environments.

Key inquiry questions

1. How do ***environments*** function?
2. How do people's worldviews affect their attitudes to and use of ***environments?***
3. What are the causes and consequences of ***change*** in ***environments*** and how can this ***change*** be managed?
4. Why is an understanding of ***environmental*** processes and ***interconnections*** essential for ***sustainable*** management of ***environments?***

Across the world there are many environmental changes that have been caused by humans, such as pollution, land degradation and impacts on aquatic environments. People have different points of view, or worldviews, on many of these changes. Climate change is a major environmental change as it affects all aspects of the environment, such as our land; inland water resources; and coastal, marine and urban environments. It is vital that we respond intelligently to, and effectively manage, all future environmental changes.

Your Work!

By having this booklet, you are responsible for completing the set tasks. Once you have completed the tasks, tick them off below. After this unit, you need to hand this booklet in for marking.

- Task 1 – The Earth's Spheres
- Task 2 – Sketch
- Task 3 – Lithospheric Processes
- Task 4 – Biospheric Processes
- Task 5 – Hydrological and Atmospheric Processes
- Task 6 – Environmental Change
- Task 7 – Causes and Consequences of Change in Environments
- Task 8 – Poster
- Task 9 – The Real Cost of your Mobile Phone
- Task 10 – Worldviews and uses of environments
- Task 11 – What is your worldview?
- Task 12 – Letter to the Environment Minister
- Task 13 – Cloze passage
- Task 14 – Environmental Sustainability
- Task 15 – Aboriginal and Torre Strait Islander People's Management of the Land
- Task 16 – The Amazon Rainforest: An Overview
- Task 17 – Newspaper Article
- Task 18 – WebQuest: Responses to Deforestation in the Amazon Rainforest

Glossary

Biocapacity: the capacity of a biome or ecosystem to generate a renewable and ongoing supply of resources and to process or absorb its wastes.

Carbon Credits: term for a tradable certificate representing the right of a company to emit one metric tonne of carbon dioxide into the atmosphere.

Climate Change: any change in climate over time, whether due to natural processes or human activities.

Condensation: when water in the atmosphere cools and changes from a gaseous state into a

liquid state. This occurs when the water vapour clusters around a solid particle (such as dust).

Emissions Trading Scheme: a market-based, government-controlled system used to control greenhouse gas as a cap on emissions. Firms are allocated a set permit or carbon credit and they cannot exceed that cap. If they require extra credits, they must buy permits from other firms that have lesser needs or a surplus.

Enhanced Greenhouse Effect: the observable trend of rising world atmospheric temperatures over the past century, particularly during the last couple of decades.

Evaporation: when water contained in water bodies is heated by the Sun and the liquid changes into a gaseous state and rises into the atmosphere.

Evapotranspiration: the process including evaporation from water storage areas as well as evaporation from trees.

Fossil Fuels: carbon-based fuels formed over millions of years, which include coal, petroleum and natural gas. They are called non-renewable fuels as reserves are being depleted at a faster rate than the process of formation.

Geographic Processes the physical forces that form and transform our world.

Geothermal (Power): describes power that is generated from molten magma at the Earth's core and stored in hot rocks under the surface. It is cost-effective, reliable, sustainable and environmentally friendly.

Global Warming: increased ability of the Earth's atmosphere to trap heat.

Infiltration: water that is absorbed into the ground, flows downward and collects above an impermeable layer or rock.

Kyoto Protocol: an internationally agreed set of rules developed by the United Nations aiming to reduce climate change through the stabilisation of greenhouse gas emissions into the atmosphere.

Precipitation: water droplets or ice crystals become too heavy to be suspended in the air and fall to Earth as rain, snow, sleet or hail.

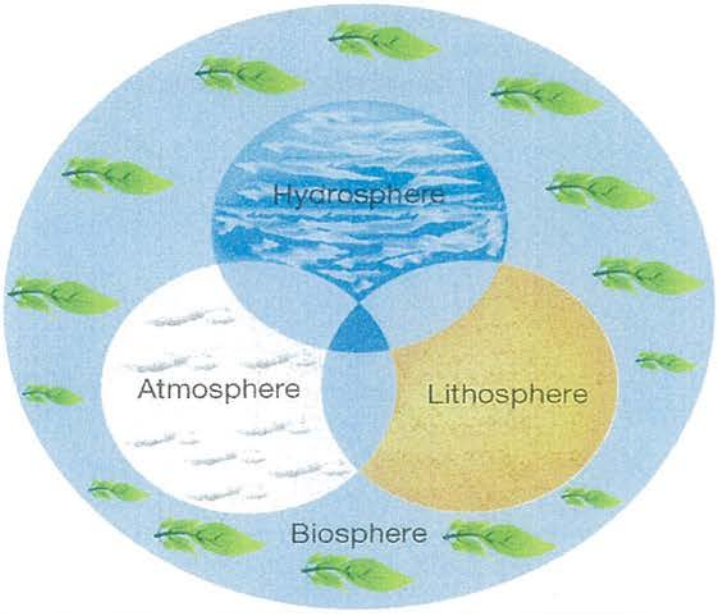
Runoff water that is unable to be absorbed into the ground, flows over its surface and collects in nearby waterways or reaches stormwater drains

Transpiration: when water contained in plants is heated and changes from a liquid into a gaseous state and rises into the atmosphere.

How do Environments Function?

Read through the following information and then complete the tasks that follow.

The four spheres of the environment are the atmosphere, lithosphere, hydrosphere and biosphere. The atmosphere is the layer of gases enveloping the Earth. The lithosphere is all the rocks, soils and crust on the Earth's surface. The hydrosphere is all the water on Earth including in the oceans, lakes, rivers and glaciers. The biosphere is all living things on Earth, such as plants and animals. Places and environments are formed and transformed by a range of natural geographic processes and influences related to each sphere.



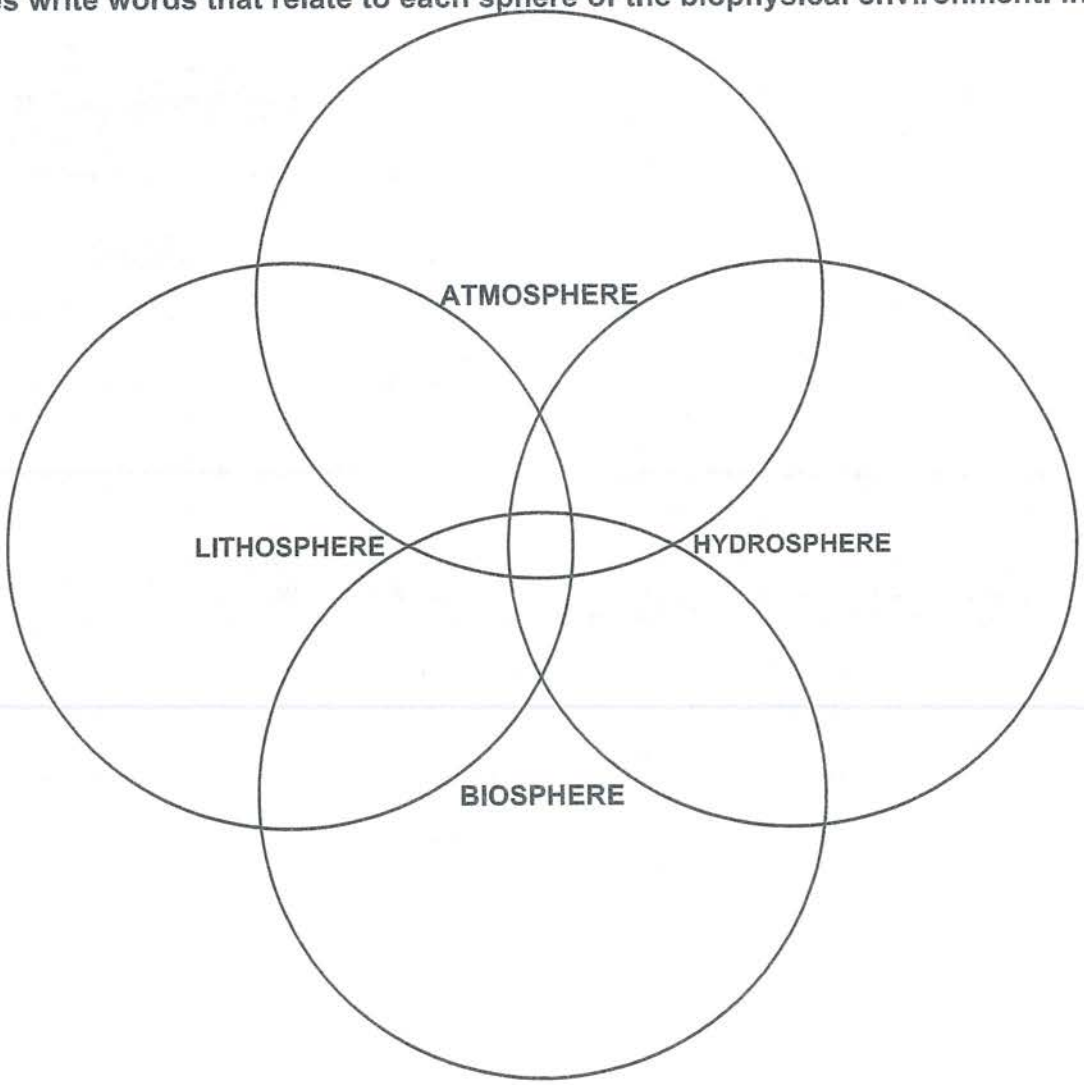
The table below looks at the geographical processes that form and transform environments. **Using the internet, investigate ONE of the natural geographical processes listed in the table above. Describe the process and explain the role of each sphere in that process.**

Biospheric processes	Lithospheric processes	Hydrospheric processes	Atmospheric processes
Carbon cycle			
Oxygen cycle	Erosion	Precipitation	Carbon cycle
Food chains	Weathering	Infiltration	Absorption (light)
Photosynthesis	Nitrogen and phosphorous cycle	Runoff	Reflection (light)
Evolution	Tectonic processes	Evaporation	Scattering (light)
Extinction		Transpiration	Aeolian (winds)
Migration		Condensation	Transportation
		Transportation	Deposition
		Deposition	

TASK 1: The Earth's Spheres

Below is a Venn diagram. A Venn diagram uses circles that interlock to show how different things are connected.

1. In the circles write words that relate to each sphere of the biophysical environment. In the



spaces where the circles interlock, provide examples of how the spheres interact.

2. Choose an example of two or more spheres interacting. Explain this process in your own words.

TASK 2: Sketch

In the box below, construct a diagram of a natural environment. Label key features of the environment and, in brackets, state whether each feature is part of the hydrosphere, lithosphere, atmosphere or biosphere.

Read through the information and complete the tasks that follow.

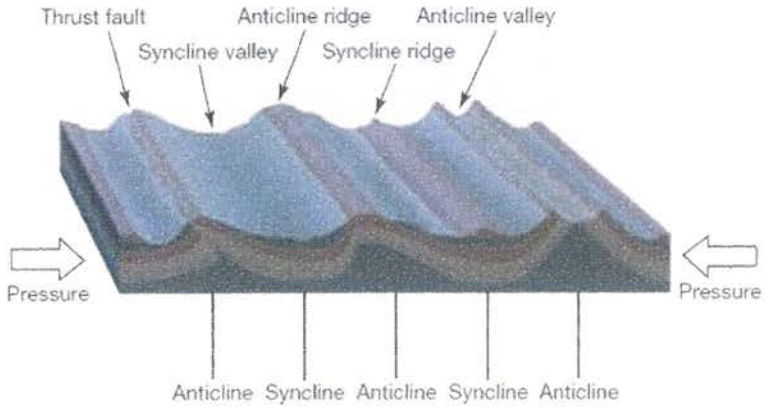
Lithospheric Processes

Erosion: Erosion is the wearing away of earth by wind, water or ice. Moving water and rain carry away soil and rock fragments. Waves crash against shorelines and move sand. Wind can carry lighter sediments, such as dust, sand and ash, away from their source. In dry areas with high winds these materials can also blast against rocks, intensifying erosion. Moving glaciers can also carry away sediments and large rocks. As they move they rub against the ground, further eroding soils and breaking boulders.

Weathering: Weathering is the physical and chemical disintegration of rocks and minerals. It occurs through physical processes such as water freezing and expanding, seeds germinating and cracking rocks, and when rocks are exposed and expand. Chemical weathering occurs when minerals react with oxygen and form oxides, acids dissolve minerals in rocks or when rocks expand as their minerals combine with water.

Tectonic processes: The Earth's crust is divided into tectonic plates which float around on top of the semi-molten rock of the mantle. Where plates have collided huge mountain ranges have been formed. Along plate boundaries, volcanoes and earthquakes are common. Fold mountains, like the Himalayas, form when the Earth's plates crunch into each other, and layers of the crust are pushed up into loops and bumps. Fault mountains are made when part of the crust is forced up or collapses between two cracks in a plate. These cracks are called faults.

Earthquakes occur as a result of movement between sections of the Earth's crust. They commonly occur along fault lines and along plate boundaries. Sections of tectonic plates can be forced upwards exposing new sections. Volcanoes involve the process of molten rock from the mantle being forced up onto the Earth's surface, building continents.



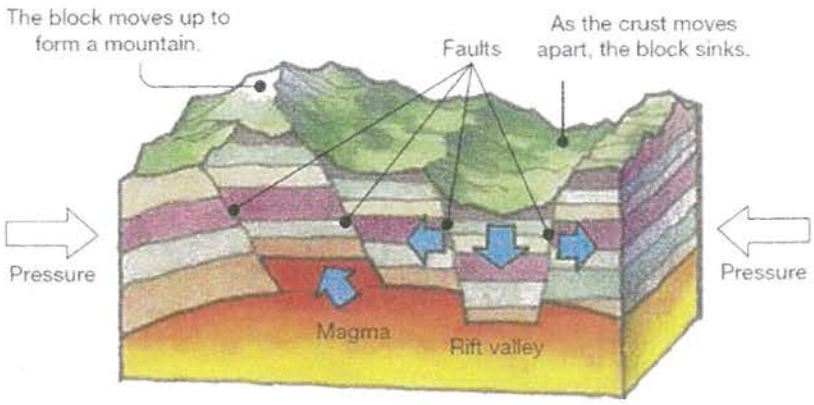


Figure 2 (right): Fault mountains are created by pressure pushing the Earth's plates from both sides.

The nitrogen and phosphorous cycle:
Living things need nitrogen for growth. The basic nitrogen cycle begins when green plants take in chemicals such as nitrogen and phosphorous from the soil. Plants use these chemicals to build proteins for growth. When plants die, decomposers,

such a bacteria and fungi, break down the proteins into ammonium compounds. Animals also eat the plants and animal waste and dead animal carcasses are broken down into ammonium compounds. Bacteria in the soil converts the ammonium back into nitrates.

TASK 3: Lithospheric Processes

1. **Describe the difference between erosion and weathering.** _____

_____

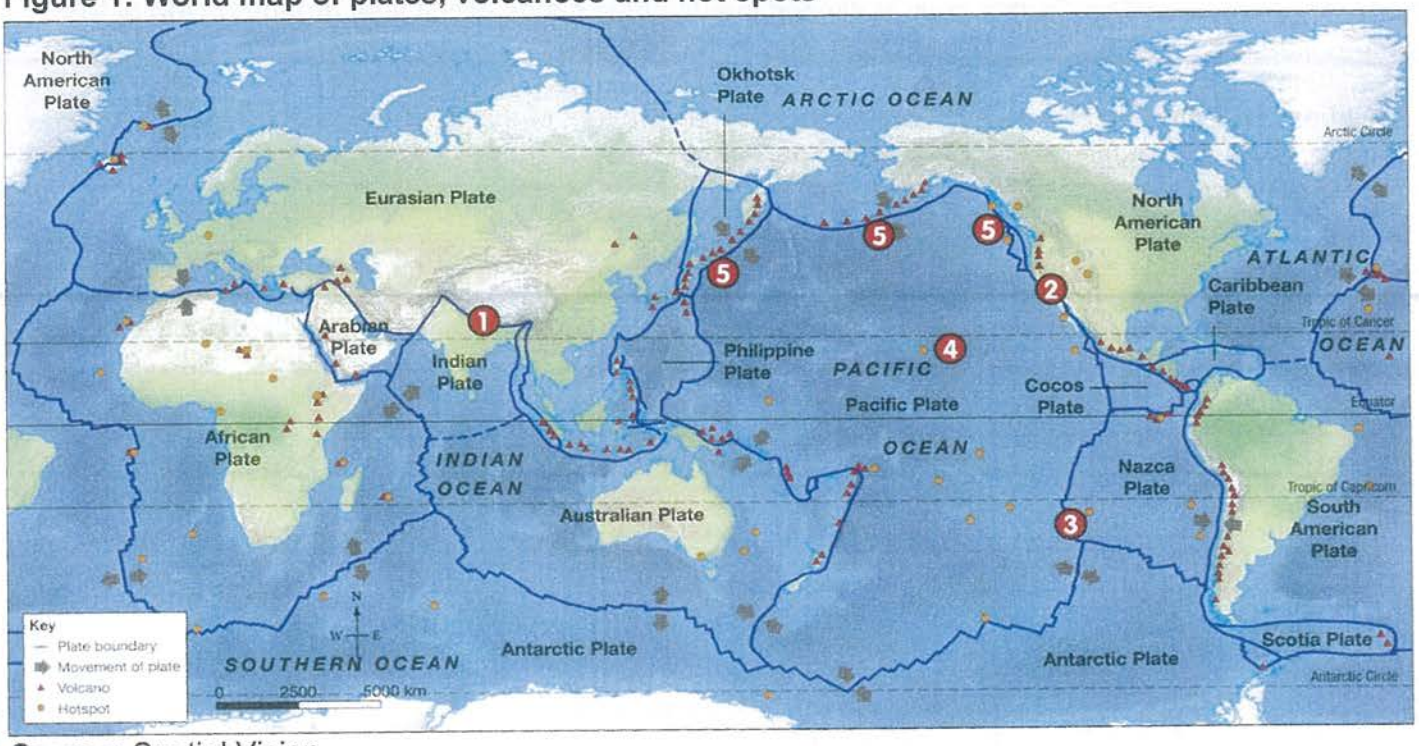
_____

_____

_____

The world map below shows the boundaries of the tectonic plates. These are plates that sit on top the earth's mantle and are able to very slowly move around the earth. The continents and oceans sit on top of these plates. When the plates collide or move apart different landforms are created. Refer to the figure 1 map below and answer the questions that follow.

Figure 1: World map of plates, volcanoes and hot spots



Source: Spatial Vision

2. **Describe where volcanoes are found globally.**

_____

_____

_____

_____

_____

3. **What is the connection between where volcanoes are found and the boundaries of tectonic plates?** _____

_____

_____

_____

4. **Write two sentences describing how the movement of tectonic plates creates volcanic landforms.** _____

_____

_____

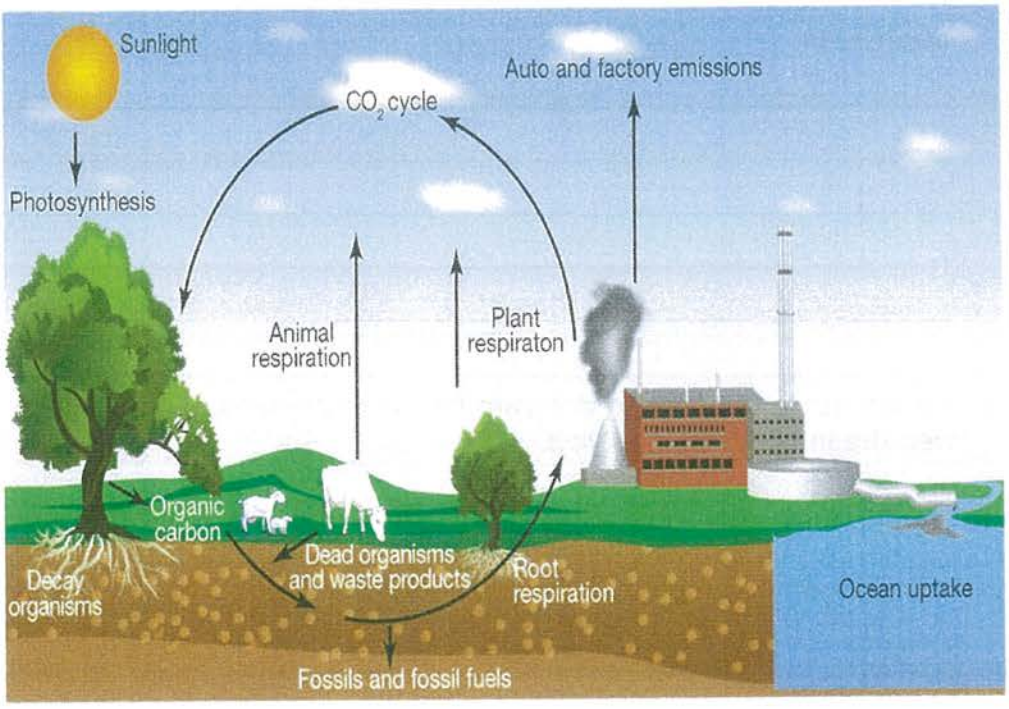
_____

_____

_____

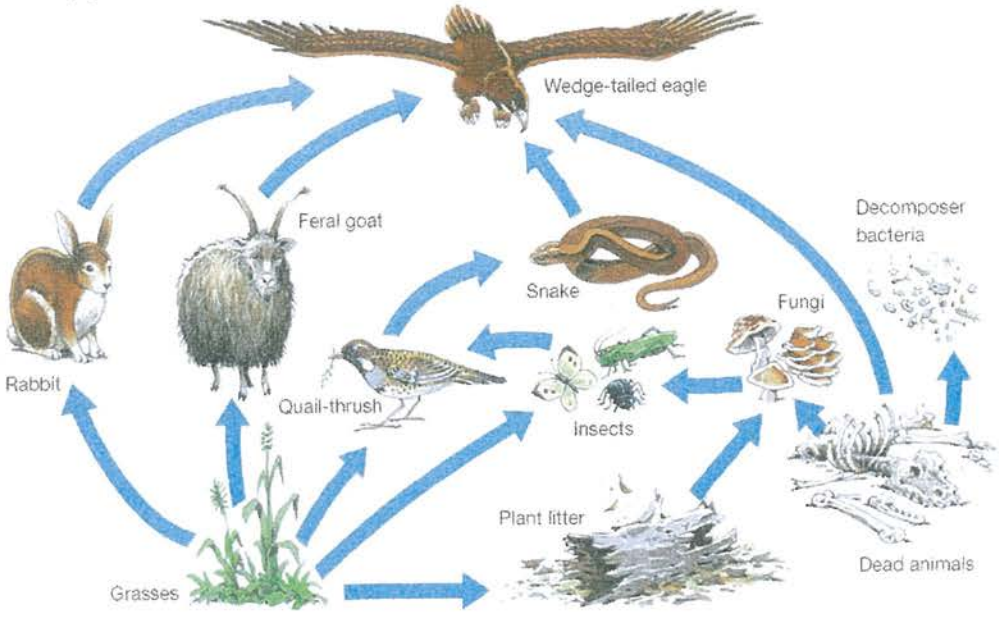
5. **Construct an annotated diagram below of the nitrogen and phosphorous cycle. You may use the internet to help you.**

The carbon cycle: Carbon is one of the most basic elements that make up all living things. It is a process that involves all the spheres. The carbon cycle is the process where carbon is transferred through the environment. Carbon dioxide exists in the air, and is used by plants to photosynthesise and make food. Animals eat plants and obtain carbon and then use carbon from plants for energy and growth. Animals produce waste and decompose when they die. Decomposers, such as bacteria and fungi, feed on the dead matter and release carbon dioxide into the air as they respire.



The oxygen cycle: The oxygen cycle begins with the oxygen that exists in the air. Animals obtain oxygen by breathing and plants produce oxygen and release it through their pores.

Food chains: A food chain is a series of organisms, each eating or decomposing the preceding one. Food webs are a more complicated branching diagram which shows the feeding relationships of all living things in an ecosystem or particular area. In nearly all ecosystems the source of energy is the Sun (hydrothermal vents provide energy in some rare ecosystems). Every food chain begins with a producer organism, a plant that can photosynthesise. Consumers are organisms that eat other organisms. Decomposers breakdown dead organisms. Energy is transferred from one animal to another through food chains and food webs, and flows in the direction of the arrows on the diagram. Some energy is lost at each step in the food chain as heat.



Photosynthesis: Plants make food in their leaves, which contain a special green pigment, or colouring, called chlorophyll. The chlorophyll uses energy absorbed from sunlight to convert carbon dioxide from the air, and water from the ground, into a sugary form called glucose.

Evolution: Evolution is the long-term process where species have changed and developed from earlier forms of species to become more suited to particular environments. Survival of the fittest means that organisms that are most suited to a particular environment (colour, shape, etc.) are more likely to live a long life and reproduce. Organisms which are not suited to a particular environment are more likely to

be killed, be eaten or starve, and are less likely to reproduce. In this way organisms with the most suitable genes pass them on to future generations. Each successive generation contains a greater number of individuals with suitable genes. As time goes on the species becomes more and more specialised.

Population fluctuations and movements: Changes in the size and distribution of plant and animal species impacts greatly on the functioning of environments. Changes to climate, natural hazards and human interactions are some of the factors which impact on population numbers.

Many species of animals migrate from place to place. Some migrations are seasonal, where animals move looking for the best food sources, to avoid extreme heat or cold and to find suitable breeding grounds. The migrations of some species don't follow any particular patterns, while others simply move on when they have exhausted the food source. Animals that live in mountainous regions move to higher or lower regions to avoid snowfalls. If an environment becomes inhospitable, organisms may permanently migrate from an area.

Extinction is a process where all individuals of a species have died. This is a natural process that occurs when a species can't adapt to the changes in an environment. Humans have greatly accelerated the number of extinctions through modifications of ecosystems.

TASK 4: Biospheric Processes

1. **Describe the difference between a food chain and a food web.** _____

_____

_____

_____

2. **Explain the process of evolution.**

_____

_____

_____

_____

_____

_____

3. **Explain how the migration of a species might transform an environment.** _____

_____

_____

_____

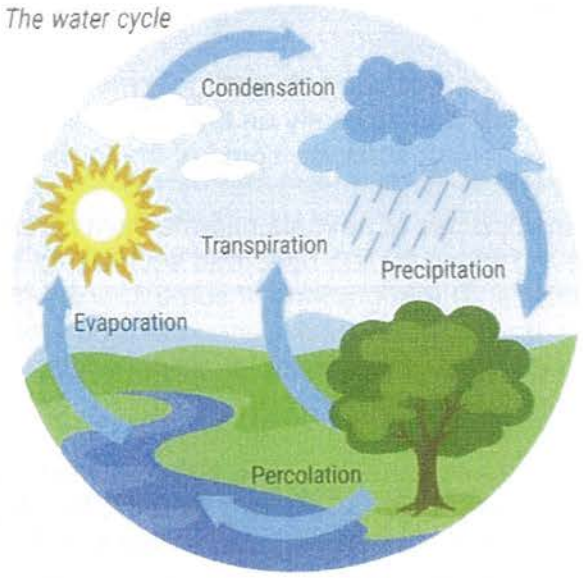
_____

_____

4. **Find an image of a food chain and draw it below. Ensure it's one that has a producer, decomposer, consumer and the sun. Ensure it is annotated.**

Atmospheric and Hydrological Processes

The water cycle: The water cycle relates to all four of the spheres, but specifically connects the hydrosphere and atmosphere. The water cycle is the continuous movement of water which begins in water storage areas such as the oceans, lakes and rivers. Water then evaporates from water storage areas into the air, or transpires from trees. In the atmosphere the water vapour begins to form clouds and when it condenses it falls to the ground as precipitation. Some water will run over the surface of the ground, collecting in low areas, or joining rivers, lakes and oceans. Some water will soak into the ground and join groundwater. The processes associated with the water cycle are precipitation, infiltration, runoff, evaporation, transpiration, evapotranspiration and condensation.



Heating and cooling: Solar radiation is the heat that is received from the sun's rays. The atmosphere plays an important role in distributing this heat around the planet. In some locations there is more heat received from the sun than is reflected by the Earth. These locations are mainly in the tropics. In contrast, in polar regions and at high altitudes, less heat is received from the sun than is reflected by the Earth. The atmosphere scatters the sun's rays helping to distribute heat, but most excess of heat that results in the tropics is transferred to the poles and high altitudes by air movements. The atmosphere absorbs some incoming radiation which helps to balance temperatures overnight when no direct radiation is received. Some radiation is reflected which helps to regulate temperatures in areas of extreme heat.

TASK 5: Hydrological and Atmospheric Processes

1. **Describe how the water cycle links the hydrosphere and the atmosphere.** _____

2. **Describe the role of the biosphere and lithosphere in the water cycle.** _____

3. **Describe how the atmosphere distributes heat around the globe.** _____

4. **Using the internet, investigate the water cycle and explain the role it plays in forming and transforming environments.** _____

Why do Environments Change?

Read through the following information and use this, as well as your own knowledge, to complete the tasks that follow.

Large-scale agriculture has changed environments through the clearing of land to introduce a monoculture of crops, the introduction of livestock and subsequent overgrazing, the removal of native species, ongoing activities such as ploughing and the use of pesticides, insecticides and fertilisers to maximise harvests.

Urbanisation and urban growth have resulted in the replacement of natural environments with roads, buildings and manicured parklands. In many places waterways have been straightened or covered and riverbanks have been cemented.

Industrial land uses have resulted in the leaking of toxic substances, while mining has changed vast areas of land and left sinkholes, contaminated surface water, chemical leakage, mine dumps and tailing dams.

Over a longer period of time, human-induced environmental change can have long-term and sometimes irreversible impacts. Consequences can include salinisation and soil waterlogging, compaction and erosion, pollution, habitat loss, species loss, introduction of exotic species and reduced biodiversity.

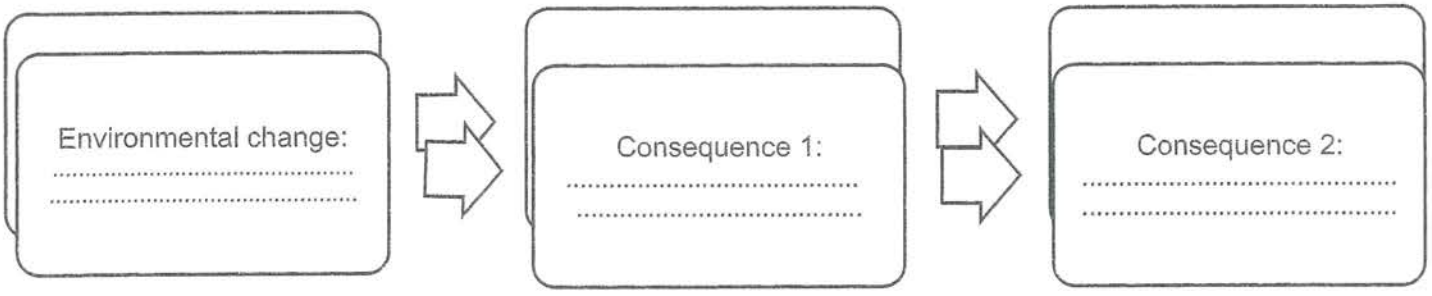
TASK 6: Environmental Change

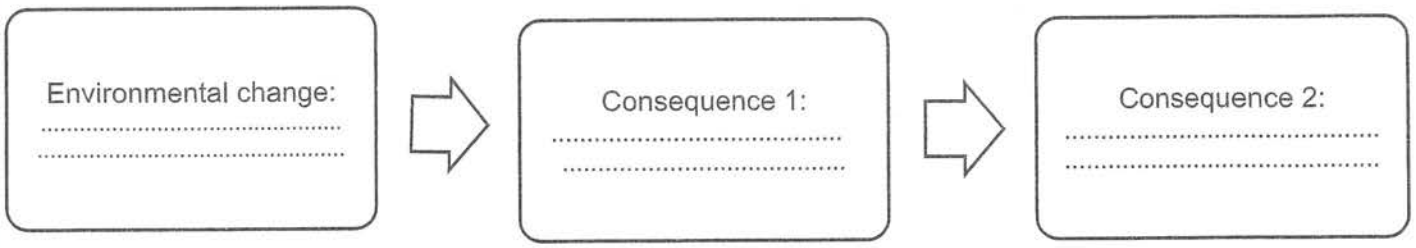
1. **In the table below, provide examples of natural and human changes to environments.**

Natural changes	Human changes

2.

Complete the flowcharts below showing the consequences of environmental change.





3. Case Study: Displacement of communities in Mualadzi, Mozambique.

Communities are often displaced and forced to resettle in new areas when large-scale mining operations develop. This can often occur without consultation and can impact on livelihoods, access to food and water and isolation for the communities affected.

Using the case study, answer the following question: *evaluate* (judge) the impact of mining for communities such as Mualadzi and the environment.

Causes and Consequences of Change in Environments

TASK 7: Causes and Consequences of Change in Environments

Use the reader provided to complete the table below. You need to describe the impact and explain the causes for each one. Then, rank the human impacts starting with the worst at number one, following a justification of why you have ranked them this way. You may do this individually, pairs or in groups.

Human Impact	Description	Cause and Consequence	Rank
Loss of Biodiversity			
Climate change			
Pollution			
Land degradation			
Deforestation			
River damming			
Pollutants in our			

water			

Based on your ranking of human impacts, justify the reasons for your order. _____

_____

_____

_____

_____

_____

_____

TASK 8: Poster

Choose your highest-ranking impact and create a poster below about this issue.

Case Study: The Real Cost of your Mobile Phone

Read through the following information and then complete the questions that follow

When exploring the ways in which the environment is changing, it is important to look not only at the effects of these changes but also their causes. For example, when investigating declines in fish populations, geographers look for causes such as increases in world population, pollution levels and changing consumption patterns. Similarly, when looking at the environmental changes brought about by industry and mining around the world, geographers need to explore a range of possible causes. One of the main factors driving the growth in mining and production is increased demand for electronic consumer goods such as mobile phones. Current estimates put the number of mobile phone subscribers around the world at about seven billion. This number has increased significantly over the past decade. The raw materials used in the production of mobile phones come from different locations around the world. Dramatic increases in demand for these materials have created serious environmental problems in a number of locations.

Figure 1: This bird has died from eating plastic, which it mistook for brightly coloured fish. Thousands of sea birds and other marine animals die each year in this way.

Plastics

Plastics are a by-product of refining oil. Oil is usually found in the Earth's crust and is accessed by drilling into the crust, either on land or on the seabed. There are significant environmental risks associated with mining and using oil. These range from the potential for oil spills at the mine site to the greenhouse gases produced when oil is used for fuel. Many plastics are hard to dispose of and take thousands of years to break down. Since the 1950s, more than a billion tonnes of plastic have been discarded around the world.

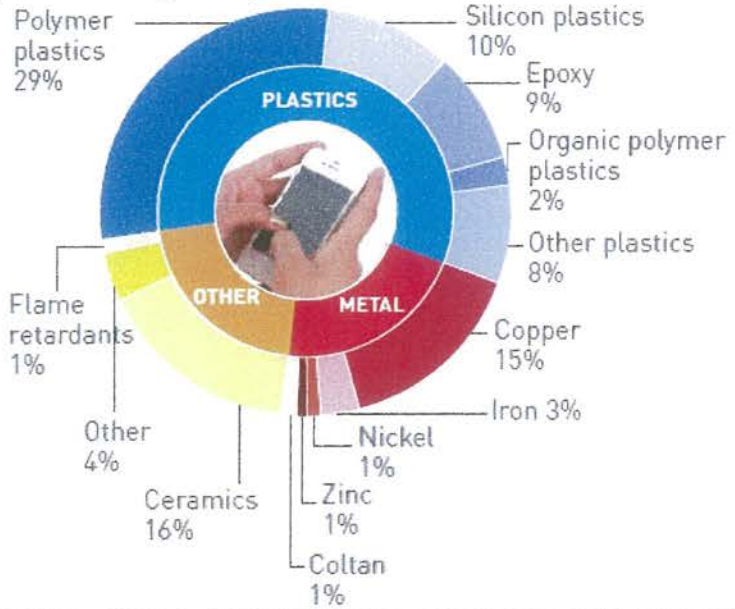
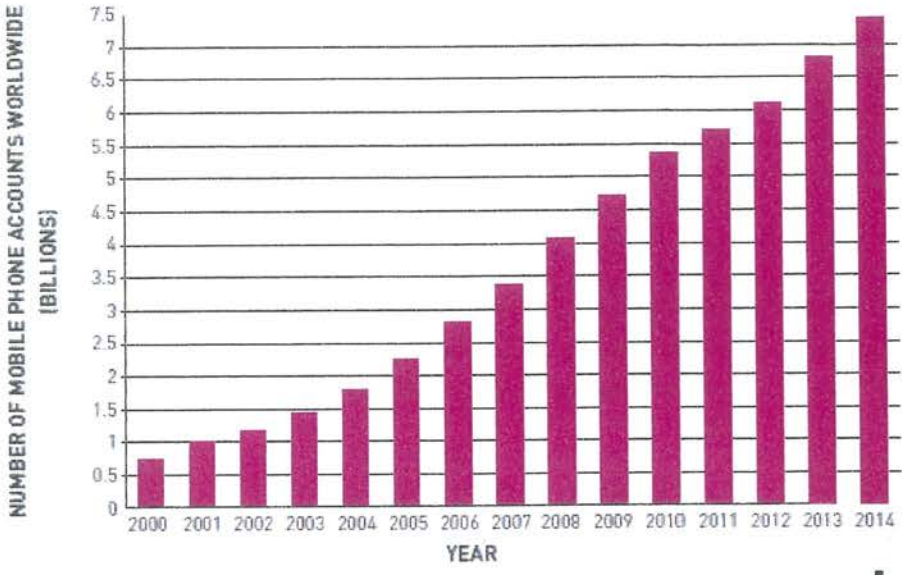


Figure 2: The raw components of a mobile phone

Metals

Copper

Because copper conducts electrical signals, it is used a great deal in electronic devices. Copper is mined in many places around the world. Chile's Escondida copper mine is the world's largest. The mine is essentially two giant pits dug into the desert floor. Waste rock is left in piles called tailings and copper is



transported in pipes 180 kilometres to the coast. Like many large mines, Escondida is located in the desert. This creates problems for the mining operators who need water for their mining operation and their workers. A desalination plant is being built on the coast to provide this water. The water will be piped to the mine.

Coltan

Coltan is a mineral ore, high in iron, that is used in mobile phones as well as videogame players and some computers. Australia is the world's largest supplier of coltan. The Democratic Republic of the Congo (DRC) in Africa is another large supplier. To reach the coltan in the DRC, miners have stripped away rainforest, including the rainforest in national parks. The roads they have cut through the rainforest to reach the mines are also used by local people to hunt wild animals for food. One of the animals hunted by locals for meat in the rainforest is the gorilla. The western lowland gorilla is now a critically endangered animal and has all but vanished from the rainforests of the DRC.

Figure 3: Growth in the number of mobile phones

Figure 4: A coltan mine in the DRC. As well as causing environmental change there is also evidence that profits from coltan mining are being used by armies in the region to fund long-running and bloody conflicts.

TASK 9: The Reasl Cost of your Mobile Phone

1. How does the production and use of plastic change the environment? _____

_____

_____

_____

_____

_____

_____

2. What is coltan? Explain how the mining of coltan changed the environment in the Democratic Republic of the Congo?

_____

Figure 5: The Escondida copper mine in the Chilean desert

3. Look at Figure 3:

a) Describe the global trend in mobile phone use over the period shown. _____

b) Conduct research to determine the five countries that have experienced the largest growth over this period. Why do you think this might be the case? _____

4. The bird in Figure 1 was found on the Midway Islands. Research or use an atlas to locate these islands and explain where you think the plastic that caused the death of this and many other birds originated.

5. Select another popular consumer item of your choice and research the environmental changes brought about by its production and use. Think about items that people use everyday (e.g. Chromebook, gaming console, iPad). _____

How do People's Worldviews Affect the Use of Environments?

TASK 10: Worldviews and uses of environments

Complete the table below to define each environmental worldview and suggest how a person who held that worldview would react to the scenario provided. You can research the definitions of each worldview

Scenario:
A very large coal mine is proposed for the Queensland coast near the Great Barrier Reef. It will create jobs, and boost the economy, but risks extensive damage to the coral reefs nearby. Different people and groups will have different opinions about this proposal.

Environmental worldview	Definition	How do you think someone with this worldview would react to the scenario provided?
Egocentric		
Anthropocentric		
Stewardship		
Biocentric		

Ecocentric	_____ _____ _____ _____	_____ _____ _____ _____ _____

In order to evaluate the different ways in which people view the world, American environmental social researchers have developed a set of 15 statements called the New Ecological Paradigm (NEP) scale. People are asked to read each of the statements and decide whether they agree or disagree with them on a scale from 1 to 5, where 1 is 'strongly disagree' and 5 is 'strongly agree'. This allows researchers to compare the worldviews of different groups of people within and between countries. Below is the list.

1. We are approaching the limit of the number of people the Earth can support.
2. Humans have the right to modify the natural environment to suit their needs.
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will ensure that we do not make the Earth unliveable.
5. Humans are seriously abusing the environment.
6. The Earth has plenty of natural resources if we just learn how to develop them.
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our special abilities, humans are still subject to the laws of nature.
10. The so-called 'ecological crisis' facing humankind has been greatly exaggerated.
11. The Earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.
15. If things continue on their present course, we will soon experience a major ecological catastrophe.

TASK 11: What is your worldview?

Using the 15 statements, complete the table below. Record the numbers of the statements you agree with in one column and the numbers of the statements you disagree with in another. (If you agreed with all or most of the seven even numbered statements, researchers would classify you as having a human-centred worldview. If you agreed with all or most of the odd-numbered statements, they would classify you as having an Earth-centred worldview.)

Statement	Agree	Disagree
1. We are approaching the limit of the number of people the Earth can support.		
2. Humans have the right to modify the natural environment to suit their needs.		
3. When humans interfere with nature it often produces disastrous consequences.		
4. Human ingenuity will ensure that we do not make the Earth unliveable.		
5. Humans are seriously abusing the environment.		
6. The Earth has plenty of natural resources if we just learn how to develop them.		
7. Plants and animals have as much right as humans to exist.		
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.		
9. Despite our special abilities, humans are still subject to the laws of nature.		
10. The so-called 'ecological crisis' facing humankind has been greatly exaggerated.		

11. The Earth is like a spaceship with very limited room and resources.		
12. Humans were meant to rule over the rest of nature.		
13. The balance of nature is very delicate and easily upset.		
14. Humans will eventually learn enough about how nature works to be able to control it.		
15. If things continue on their present course, we will soon experience a major ecological catastrophe.		

1. **Describe your worldview based on your responses to this test. Did you find your results surprising?** _____

_____

_____

_____

_____

2. **Find a classmate with a similar worldview to you and discuss with them their views of Miranda Gibson's anti-logging protest. Note down their views in the space below.**

3. **Find a classmate with a very different worldview to yours and find out what they think about the anti-logging protest. Note down their views in the space below.**

TASK 12: Letter to the Environment Minister

Look at the cartoon image below. Investigate and outline four current issues from each of the following scales – local, regional, national and global – that are affecting your environment, which could be represented. Write a letter to Sussan Ley, the Australian Minister for the Environment, addressing your concerns at each scale.

What is Environmental Sustainability?

TASK 13: Cloze Passage

Complete the cloze passage by using the words from the word bank

Virtually all human _____ affect the _____ environment in some way, but humans can _____ these impacts by using the Earth's resources _____. The concept of _____ relates to the ongoing capacity of the _____ to support the lives of all living things into the _____. The sustainable use of resources such as _____ _____, forests and oceans is about carefully _____ these resources so that they meet the needs of today without _____ the ability of future _____ to do the same – put simply, it is about using the Earth's resources at levels that allow the _____ to replace or replenish them naturally. This is a particularly important _____ when we consider our use of the natural resources that supply us with

_____ and _____, such as forests, rivers, the oceans and farmland. If resources are used sustainably, the _____ of the environment is _____ and the resources will continue to _____ for future generations.

WORD BANK

maintained	environment	fossil fuels	natural	future
reduce	concept	quality	activities	generations
water	compromising	sustainably	planet	sustainability
food	provide	conserving		

Read through the following information and complete the tasks that follow.

The way in which we think about our environment has changed dramatically over the last few decades. Once seen as a bottomless pit of resources providing everything we need, it is now viewed as a fragile system threatened by human actions. The ecosystem services it provides (such as clean air, plant pollination and fertile soil) have long been ignored or taken for granted. This is partly because, unlike products we can touch such as food, water and timber, humans have been unable to put a monetary value on these ecosystem services. However, as the environment becomes degraded, the true value of these services is beginning to be recognised.

Over the past 50 years humans have changed ecosystems more rapidly and extensively than in any comparable period of time in human history, largely to meet growing demands for food, fresh water, timber, fibre and fuel. This has resulted in substantial and largely irreversible losses in the diversity of life on Earth and the degradation and unsustainable use of an estimated 60 per cent of ecosystem services (UN Millennium Ecosystem Assessment, 2005) including fresh water, fisheries, air and water purification and the regulation of regional and local climate, natural hazards and pests.

The four S's of ecosystem services

Ecosystem services can be classified according to the products they provide and the functions they perform. There are four main classifications: sources, sinks, services and spirituality.

Sources – also called provisioning services, are those natural products that can be used or converted by humans for our use. For example, mineral deposits such as coal, which we turn into fuel, iron ore, which we use in manufacturing, timber from natural forests, and food sources – from plant crops to deep-sea fish.

Sinks – also called regulating services, are those processes in the natural environment that absorb our waste. For example, micro-organisms in oceans break down oil spills. In a similar way, bacteria in the soil break down human waste.

Services – also called supporting services, are things that are done for us by the natural environment that don't produce consumable resources. For example, wetlands filter water and slow floodwaters. Forests absorb carbon dioxide and produce oxygen.

Spirituality – The environment also has a spiritual function for many people. For some, this is a deep connection to the land formed over many generations. For example, the connection that Indigenous Australians have with their tribal lands. For others, it is the experience of spending time in the natural environment and the sense of wellbeing that this brings. For example, people taking part in activities such as surfing and bushwalking often feel a deep connection with the environment. This can also be referred to as cultural services.

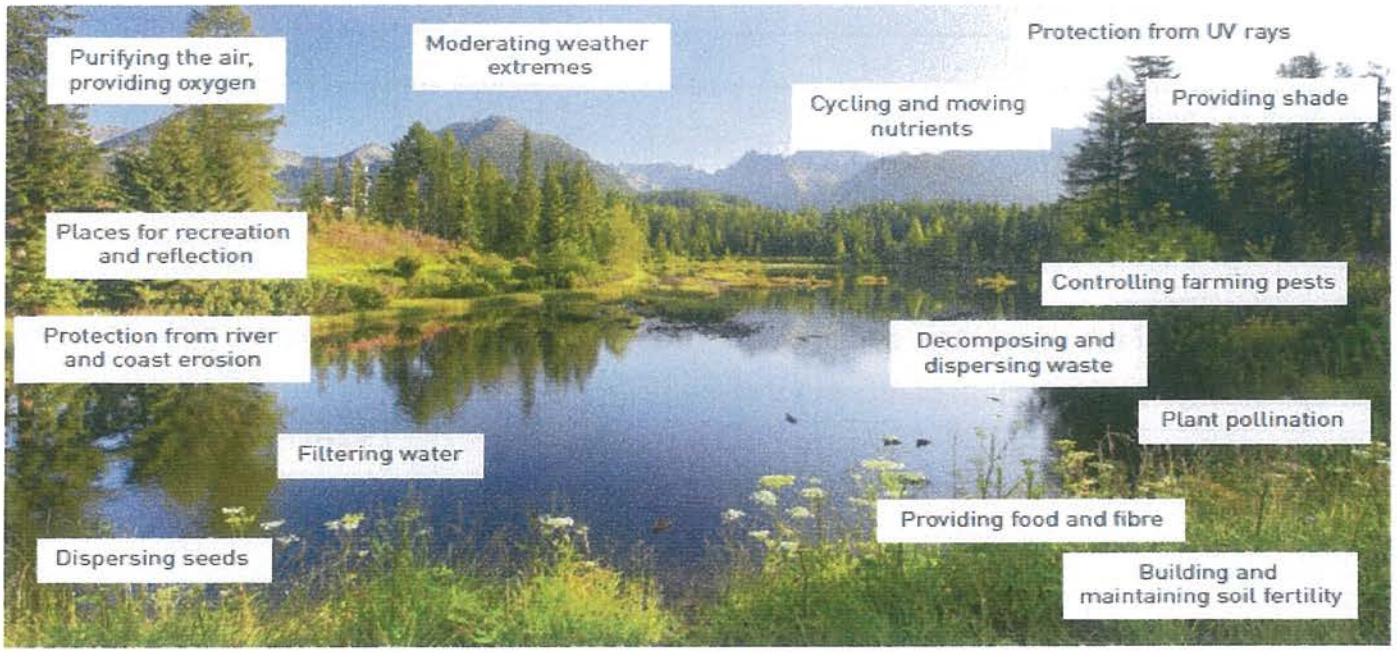


Figure 1: Some of the ecosystem services provided by the environment

TASK 14 – Environmental Sustainability

1. **Explain the significance of source, sink, service and spiritual functions of the environment.**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. **'For every source there is a sink'. Do you agree with this statement? Provide reasons for your response.** _____

_____

_____

_____

_____

_____

3. **Which of the ecosystem services shown in Figure 1 do you consider to be the most valuable to humans? Justify your choice.**

_____

4. Classify each of the ecosystem services shown in the figure above as source, sink, service or spirituality. Can you think of one more example of each?

Source	Sink	Spirituality	Services

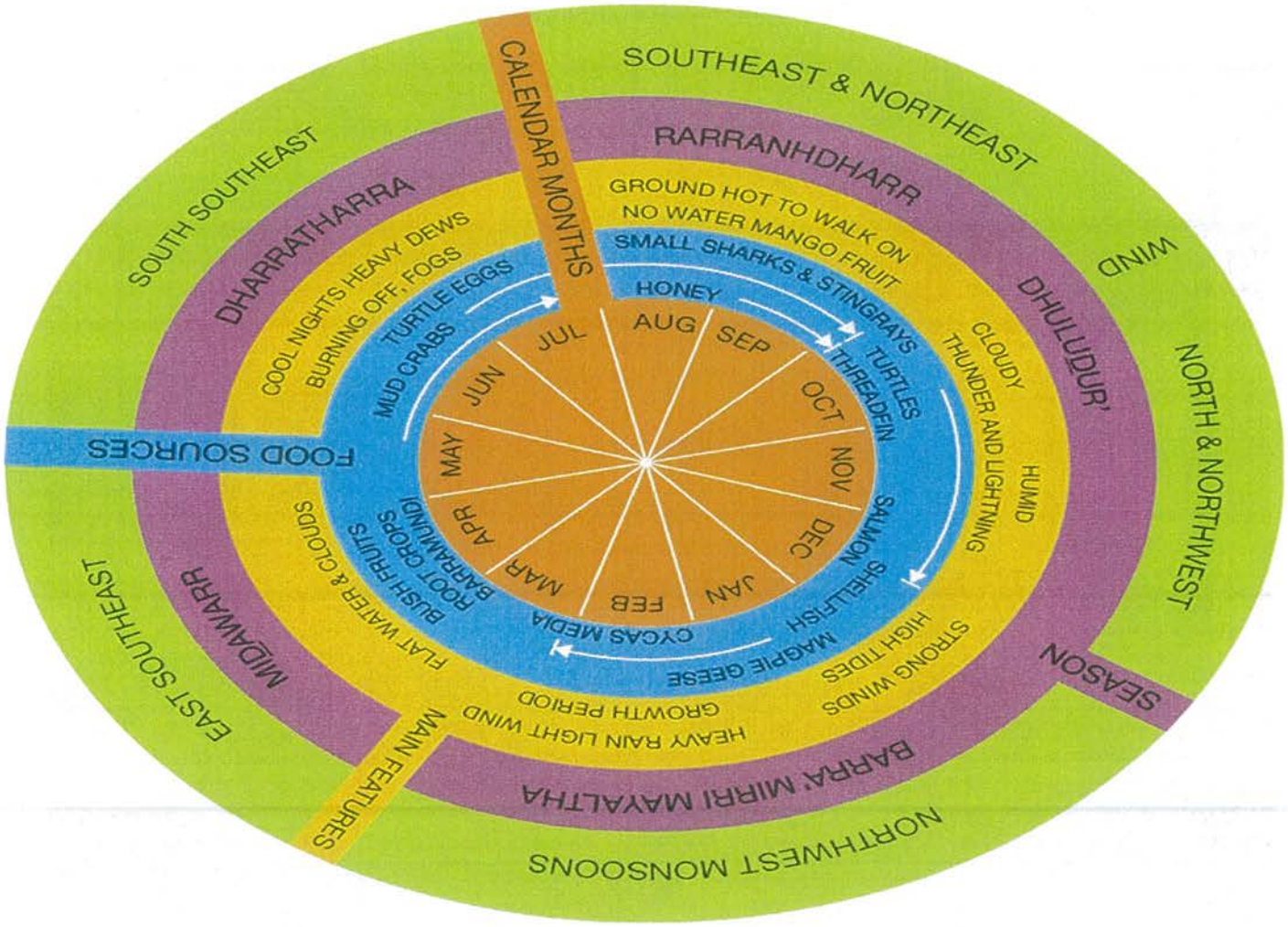
5. Which ecosystem service do you think is most threatened by human activities? What would change if this service could no longer be provided by the environment? Provide reasons for your answer. _____

Aboriginal and Torres Strait Islander People's Management of the Land

Refer to the figures below and read the information provided to complete that tasks that follow.
Figure 1: Indigenous Australians' traditional land management practices and connection to the land

Figure 2 is an example of an Aboriginal seasons calendar. It is for the Yolngu people who live in north-east Arnhem Land. The calendar relates the months of the year to aspects of the environment, although a traditional Indigenous community had no use for the months as we know them. Look carefully and you will see that this particular calendar includes information about the weather and the plants and animals that thrive across the year. Traditional communities were made up of hunters and gatherers. They hunted and fished for particular species and gathered bulbs, fruits and other edible vegetation at different times of the year. The calendar varied from place to place, but whatever the location it enabled Indigenous people to predict seasonal events; for instance, the arrival of march flies signalled the time to collect crocodile eggs and bush honey. The ability to link natural events to a cycle that predicts changes to the seasons is a key factor in the successful development of Indigenous communities and their sustainable use of the land.

Figure 2: Indigenous communities are defined by observable changes in the seasons.

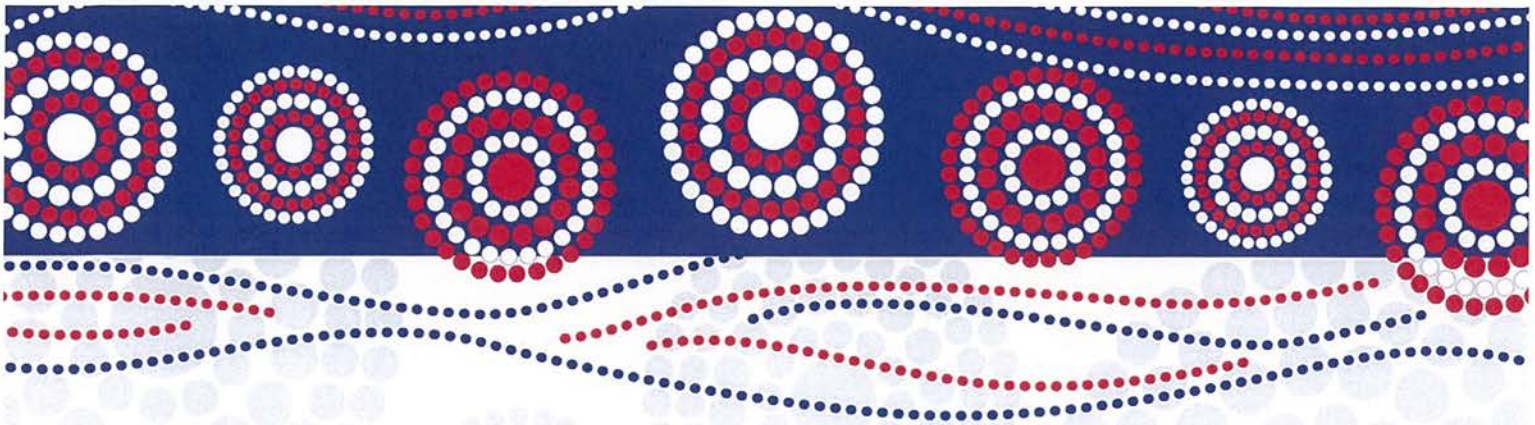


TASK 15 – Aboriginal and Torres Strait Islander People's Management of the Land

1. **Explain why fire is such an important component of caring for the environment.**

2. **Using Figure 2, explain how the Aboriginal calendar demonstrates and interconnection between their connection with the land and sustainable management of the environment.**

3. **Using Figure 1, evaluate (judge) the effectiveness of sustainable management strategies used by Indigenous Australians.**



PDHPE

Week 1 - Basketball (Modified)

Activity = Research the unmodified version of this sport. Change rules, equipment, settings, aim (modify) so that the sport can be played in isolation with the resources you have at home.

Eg. Volleyball- equipment (use balloons and furniture), change aim (to keep up off the ground), setting (inside or outside), rules (if you have a partner you are working together, game is timed (5 mins)).

Expectations:

1. **Type up new rules for sport in the classwork section (Google Doc is provided). Complete by Friday 2.30pm**
2. **Send through video recording of you playing the modified sport with new rules**
3. **Complete the physical activity task assigned for the week and submit video**

3. Basketball

Basketball	
Equipment	
Aim	
Rules	
Setting	

Week 10 - Research Task

Complete 1 of the following Research Tasks relating to 'drugs' below:

Option 1- Drugs
Evaluate one national, state or local community alcohol and/or other drugs campaign analysing and evaluating its key messages and strategies. Propose recommendations to improve the effectiveness of the campaign.

- What is it?
- What does it do/look like?
- How does it do what it does?
- What are its key messages?
- How effective is it?
- Where can people get access?
- Propose some recommendations

Option 2 - Drugs
Research 3 different drugs and provide information on each. Make sure you choose at least one legal and one illegal drug. Include in your task information relating to

- What is the drug
- What does it do/look like
- Forms
- Classifications
- How it can be used
- Short term effects
- Long term effects
- Reasons for use

BLACK OR WHITE

Year 10, Term 3

WHAT IS IT?

What is meant by the term Diversity?

Diversity is any dimension that can be used to differentiate groups and people from one another.

It is about empowering people by respecting and appreciating what makes them different, in terms of age, gender, ethnicity, religion, disability, sexual orientation, education, and national origin.

What is meant by the term Inclusivity?

Inclusion is a sense of belonging.

Inclusive cultures make people feel respected and valued for who they are as an individual, they feel culturally and socially accepted and welcomed, and equally treated.

In simple terms, diversity is the mix and inclusion is getting the mix to work well together.

ADVANTAGES/DISADVANTAGES

ADVANTAGES:

1. Increased community connection.
2. Increased understanding of a range of different cultures and backgrounds.
3. Increase in interpersonal skills.
4. Opportunity for culturally diverse people to have more opportunities e.g. Education/Work
5. Recognition of a wider history as well as a broad range of skills.
6. Increased tourism opportunities.

DISADVANTAGES:

1. Possibility of racism.
2. Possibility of harassment.
3. Possibility of bullying.
4. Language Barriers.

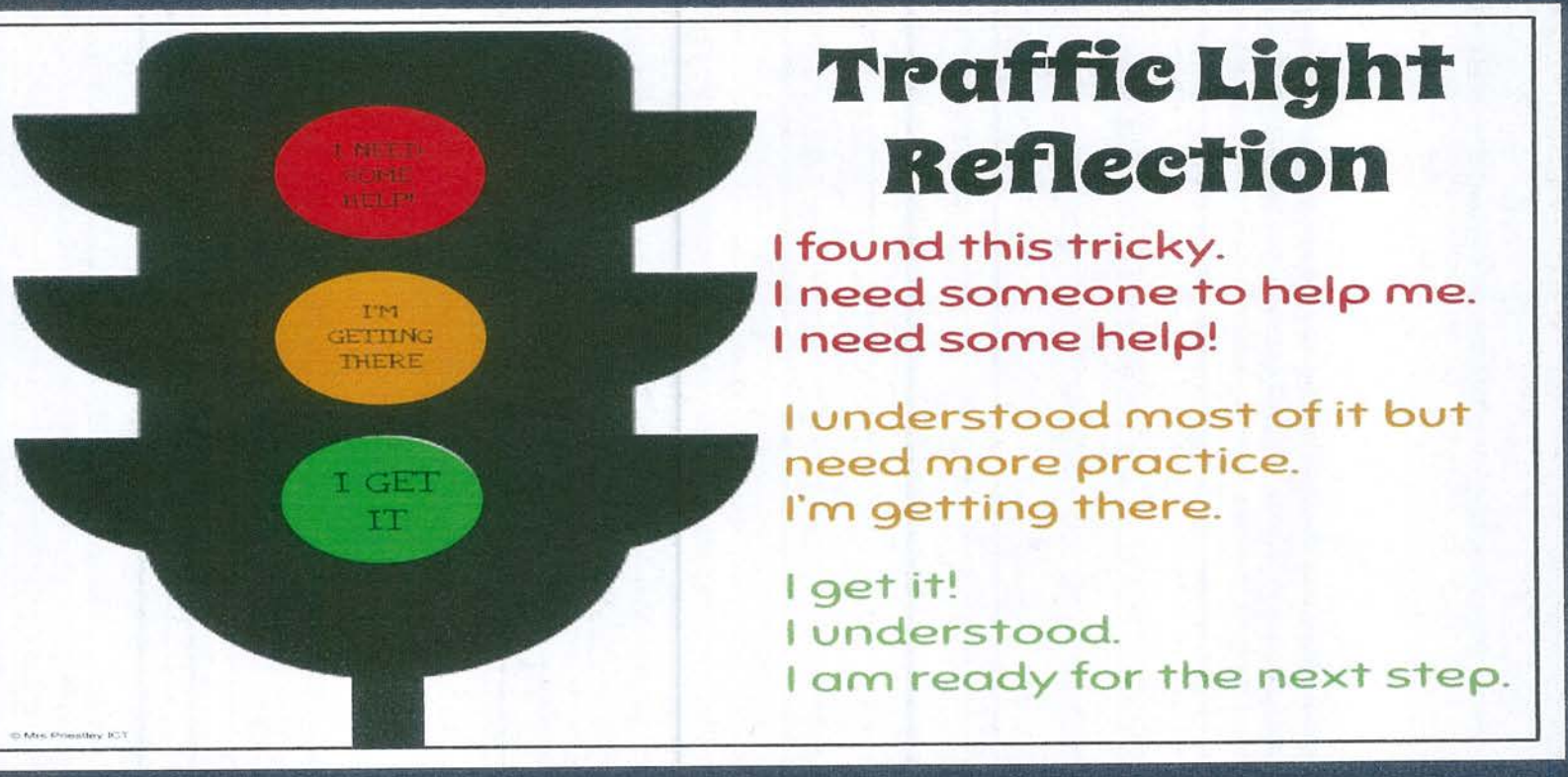
DIVERSITY WITHIN OUR SOCIETY

Create a mind-map as a class highlighting a range of diverse cultures/communities/religions etc.

Diversity in our Society

- ***Activity 4: SBS Activity***
- *Visit the following website: http://www.sbs.com.au/news/interactive/how-diverse-is-my-suburb*
- *Click on the 'most diverse suburbs' tab.*
- *Explore as a class and answer the following;*
- *What do you notice about these suburbs?, are they mostly metropolitan areas/regional/country areas?, why do you think these areas have the greatest diversity?*
- *Discuss*

Exit Ticket


I NEED SOME HELP!
I'M GETTING THERE
I GET IT
Traffic Light Reflection
I found this tricky.
I need someone to help me.
I need some help!
I understood most of it but need more practice.
I'm getting there.
I get it!
I understood.
I am ready for the next step.

Alcohol – media release

Reading and interpreting health information
This media release will be used for several activities to follow. Do not read it in detail first. Follow the instructions about which parts to read and in what order. This will help you learn about research strategies.

Media release - Australians over 40 more likely to receive treatment for alcohol—but young adults at most risk

Young adults are more likely than any other age group to drink at risky levels, but are the least likely to receive treatment for alcohol use, according to a report released today by the Australian Institute of Health and Welfare (AIHW).

The report, 'Trends in alcohol availability, use and treatment 2003–04 to 2014–15' shows that 18 to 24 year olds are the group most likely to report having consumed alcohol at risky levels. These young adults were the largest group to report risky drinking levels on several measures—including risky drinking on a regular basis (making up 47% of the total), yearly (33%) and monthly (18%).

Despite this, it is older age groups who are more likely to receive treatment, with almost half (49%) of clients receiving treatment for alcohol aged in their forties.

'Overall, the use of alcohol treatment has increased, at 30 treatment episodes per 10,000 people in 2013–14—an increase of 20% from a decade ago,' said AIHW spokesperson Tim Beard.

While treatment for alcohol use has been consistently rising, alcohol consumption has fallen. 'In 2013–14, consumption of alcohol was 9.7 litres per person, down from 10.8 litres in 2008–09. On the same note, the proportion of Australians who abstain from drinking alcohol has also risen in recent years, from 17% in 2004 to 22% in 2013,' Mr Beard said.

There have also been some positive trends in risky alcohol consumption—between 2004 and 2013 there was an 11% fall in the rate of Australians drinking at risky levels on a single occasion (from 2,950 to 2,640 per 10,000 population), and a 13% fall in those drinking at risky levels over their lifetime (from 2,080 to 1,820 per 10,000 population).

These results suggest strategies such as increasing the price of alcohol, restricting trading hours and reducing outlet density can have positive outcomes in reducing the overall consumption levels of alcohol.

Canberra, 7 October 2016
Full publication: Trends in alcohol availability, use and treatment 2003–04 to 2014–15
http://www.aihw.gov.au/media-release-detail/?id=60129557220

How to read an article for research

In Personal Development and Health, you often need to do research for a report on health issues and health promotion campaigns. These resources have not been written especially for you so you might have to dig through them to find the information you need. This section provides a step by step approach for reading and interpreting health information for a research report.

1. Before reading - KNOW YOUR PURPOSE

Before you start to read, you need to know what you are looking for. Your purpose for reading will relate to the assignment question or instruction. If you know exactly what you need to find out, you are more likely to read effectively and find what you are looking for.

Imagine you are researching information for a research report on **alcohol use by young Australians**.

1. Analyse the assignment question and key words BEFORE you read. Highlight the key words in the questions above.

2. Use a list of synonyms (words with similar meanings) to help you find what you are looking for. What synonyms can you think of for ALCOHOL USE? e.g. drinking

_____

_____

2. EVALUATE THE SOURCE OR AUTHOR

Identify the author of the article. Is it a credible and authoritative source? Is it relevant to your research report? Is it current? This is an important part of reading that could save you time while researching!

Look at the media release on page 54. Do not read it in detail yet. Look for the author.

1. What is a media release?

2. What organisation wrote this information? _____

3. What is your evaluation of the credibility and relevance of this source?

_____

_____

If the source is not relevant or credible, you do not need to read any further and you need to find a new source of information.

For our purposes, this source is credible and relevant

How to read an article for research

Now that you know your purpose for reading and you have found a credible source, you can use three reading strategies:

skimming
scanning
detailed reading of selected sections.

3. SKIM THE MEDIA RELEASE

Skimming means to look at the text without reading it in detail. Look at the headings and highlight them. Notice any sections that seem relevant to your purpose. Remember, your report is about alcohol abuse by young Australians. Mark any sections you might need to read these in detail later on.

Turn to page 54 and skim the media release.

4. SCAN FOR KEY WORDS

Scan the article for key words related to your question. Scanning means to read 'lightly' and focus on finding key words. Turn to page 54 and scan the article. Highlight or underline:

- words that relate to our topic of alcohol use by young Australians
- synonyms for alcohol use.

Do not read in detail yet.

5. READ IN DETAIL

Read the article in detail. Only read what you need.

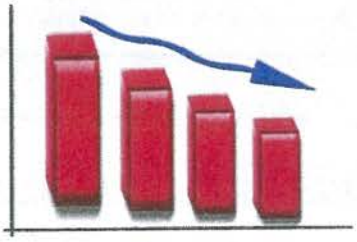
- Your focus is on young people, so you do not have to read anything related to older people.
- Your focus is alcohol use, so you do not have to read anything about alcohol treatment.

As you read, highlight wordings related to your question. Write a summary of what you find in the margins.

6. DEEPER ANALYSIS

After you have read the media release and highlighted key sections, you might need to dig deeper to answer some of the report questions. For example, in your report sections, you might be asked to find statistical data like this.

Questions to answer - Statistical data
How common is this lifestyle behaviour among young Australians?
Future trends: Is the situation getting worse, better or plateauing?



Tables can help you collect information while you are reading. Here are two tables that will help you with your analysis. You will need to find the numbers to fill in these tables. **Look at the tables and try** to find the in**formation from the media release** to fill them in.

How common is the lifestyle behaviour?

	percentage of 18-24 year olds who participate in risky drinking behaviour
regularly	
monthly	
annually	

Is the situation getting worse, better or plateauing?

past		present
average alcohol consumption per head		
year in which research was undertaken		

Now look at the data in the tables. Answer each of these questions based on the statistical data you have found.

1. How common is this lifestyle behaviour among young Australians?

2. Future trends: Is the situation getting worse, better or plateauing?

   _____

   _____

3. In the press release, is the trend information about young people or Australians generally?

   _____

4. As your report focuses on young people what extra information do you need to find out?

   _____

   _____

   _____

   _____

   _____

Home Based Learning

Year 10: Personal Development, Health and Physical Education		
Term 3: Games of the World/ Game Sense	**Week: 2**	**Lesson Focus: Offensive Strategies**
Learning Intention: - To evaluate movement strategies that lead to successful outcomes in invasion games	**Success Criteria:** I can identify five invasion games or sports. I can explain how offensive movement strategies lead to successful outcomes in invasion games. I can select and describe successful offensive 'passages of play' by watching videos of different invasion games.	

Learning Tasks Summary		
WHAT YOU NEED TO DO:	**Recommended Time:**	**Completed By:**
1. Read the information regarding; movement strategies, invasion games and offensive strategies. 2. Complete all questions on the Google Doc worksheet; a. Identify 5 Invasion Games b. Select 2 offensive movement strategies for invasion games and explain how they lead to successful outcomes (e.g. scoring points and winning games). c. Select one offensive passage of play from each of the following videos that lead to a successful outcome and complete the tables (Google Doc); i. AFL – AFLW Grand Final 2019 ii. Basketball – Australia vs USA iii. Korfball – Australia vs Poland	40 minutes	Friday 23rd July 2:30pm
3. Complete a minimum of 20 minutes of physical activity, preferably in relation to one of the following sports; a. AFL – kicking, handball, etc. b. Basketball – dribbling, shooting, mini game, etc. c. Rugby 7's– passing, kicking, etc. If it is not possible, 20 minutes of aerobic exercise; slow jog, fast walk, cycle, etc. *Turn all work in by Friday 2:30pm*	20 minutes	

Term 2 - Last Kiss (Road Safety and Drugs) Summary - (Themes 1-4)

The respondent's email (**null**) was recorded on submission of this form.
* Required

1. Email *

THEME 1 - RISKY SITUATIONS

2. Define 'risky behaviour' *

3. List 3 risky situations e.g. partying

4. Pick 1 risky situation from above then list 3 strategies to 'lower' the risk.

5. What are the 2 types of reactions within your body that make you aware of danger? * 1 point

Mark only one oval.

- Physical indicators and Emotional indicators
- Psychological indicators and Physical Indicators?
- Mental and Emotional indicators
- Social and Emotional indicators

6. Being assertive and saying no is a positive way of dealing with a potentially unsafe situation. * 1 point

Mark only one oval.

- True
- False

THEME 1: First Aid

7. The aim of first aid is; * 1 point

Mark only one oval.

- To preserve life
- To prevent the casualty's injuries or illness from getting worse until professional help arrives
- To promote the casualty's recovery
- All of the above

8. When should first aid be utilised? *

9. Identify the steps of 'Applying First Aid' *

10. When performing CPR it should be * 1 point

Mark only one oval.

- 30 compressions to 2 breaths
- 32 compressions to 2 breaths
- 34 compressions to 2 breaths
- 36 compressions to 2 breaths

11. If somebody is unresponsive and not breathing do you commence CPR? * 1 point

Mark only one oval.

- Yes
- No

THEME 2: Protective Behaviours - Road Safety

12. List 5 of the top causes of road accidents * 5 points

13. Identify a protective behaviour for each cause you listed above * 5 points

14. What age group are most likely to be involved in road accidents *

Mark only one oval.

- 17-20
- 21-25
- 40-49
- 70-79

15. Why? *

16. What measures can be implemented to minimise the chance of road accidents? Provide examples. *

THEME 3: Protective Behaviours - Sexual Relationships

17. Define consent * 1 point

18. Define contraception * 1 point

19. The three types of contraception are * 1 point

Mark only one oval.

- Natural, biological and blocker
- Natural, hormonal and barrier
- Neutral, hormonal and condoms

20. Identify 1 example of each type of contraception *

21. Explain which contraception is the most effective and why. Use examples to justify your response. * 4 points

THEME 4: Protective Behaviours - Drugs

22. Which of the following is a legal drug * 1 point

Mark only one oval.

- Cannabis
- Ecstasy
- Alcohol
- Cocaine

23. Identify the three main groups drugs can be classified into (select 3 answers) * 3 points

Mark only one oval.

- [ ] Stimulants
- [ ] Caffeine
- [ ] Amphetamines
- [ ] Hallucinogens
- [ ] Benzodiazepines
- [ ] Depressants

24. identify at least 1 example of a drug in each of the 3 drug classification groups *

25. List influences of drug use *

26. Define 'Binge Drinking' *

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Home Based Learning

Year 10: Personal Development, Health and Physical Education		
Term 3:	**Week:** 3	**Lesson Focus:** Inclusion and Diversity
Learning Intention: - To gain insight into the importance of valuing diversity within society.	**Success Criteria:** ☐ Students are able to identify diversity within society. ☐ Students implement effective strategies to value diversity.	

Learning Tasks Summary		
WHAT YOU NEED TO DO:	**Recommended Time:**	**Completed By:**
1. Create a title page in the 'Title Page' Google doc.	(10 mins)	**Friday 2:30pm 30th July**
2. Read through the attached ppt (Theme 1 - Diversity and Inclusion)	(10 mins)	
3. Write notes from ppt. in your books.	(10 mins)	
4. Complete the 'Valuing Diversity' Google Doc	(30 mins)	
5. Turn both Google Docs in by Friday 2:30pm.		

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Classwork to be completed and submitted

CREATE YOUR TITLE PAGE HERE - You can use pictures, words, anything you like that relates to our topic.

(Black or White - Diversity and Inclusion)

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VALUING DIVERSITY

1. View 'A New Hero - Sabrina Frederick-Traub' Episode 3: 'New Heights in Footy' and read through the associated vlog-doc text.

https://womens.afl/discover/player-stories/new-heights-in-footy

Note: You will need to scroll down the webpage to find Episode 3 - 'New Heights in Footy' and associated text.

2. Consider the following question:

- How does Sabrina show diversity in action?

Respond in the space provided below:

3. Come up with one example of when you have seen diversity in action, and write it down here:

4. Draft a statement in response to the prompt below:

What is the value of diversity?

Reflection

Respond in writing to ONE of the prompts below:

The way my understanding of diversity has changed is…

OR

Something I still wonder about diversity is…