Seymour College

Humanities Work Pack 2021

Year 10

Student: Teacher:

Learning Intention	Success Criteria
- Understand the role in the system of government - The constitution of Victoria and what it involves - Identifying the different people and members in parliament - Understand how laws are made.	- I can complete the quiz and check my answers - Complete the provided readings and take relevant notes - Complete the mapping activities - I can analyse information

Lesson 1	Quiz
Lesson 2	Reading on the parliament
Lesson 3	Mapping activities
Lesson 4	Mapping activities
Lesson 5	Word search

Notes to Parents/Guardians:

You can support your child to complete their work at home by:

- Encouraging them to allocate time for specific subjects
- Reading the material and talking about the ideas with your child (where possible)
- Checking in with your child to ask how they are going
- Contacting Teachers if more support or explanation is required

Submission of Work and Feedback:

Students can upload work to Compass where access is available. Photos of handwritten tasks may also be uploaded. Students can also mail hard copies of their work back to the school in the supplied envelope.

Students and parents can continue to communicate with Teachers via Compass email. Any questions should be directed to the school email:
seymour.co@education.vic.gov.au

Here is a quiz about the Parliament of Victoria. See how many of these questions you can answer now. Then answer them again after the visit, to see if you have increased your knowledge about the Parliament.

WHO IS THE PREMIER?	
WHAT PARTY IS HE/SHE IN?	
WHO IS THE LEADER OF THE OPPOSITION?	
WHICH PARTY IS HE/SHE IN?	
WHAT IS A MINISTER?	
NAME THREE MINISTERS.	
WHAT IS A SHADOW MINISTER?	
ME THREE SHADOW MINISTERS.	
WHAT IS A BACKBENCHER?	
WHAT DOES PARLIAMENT DO?	
WHAT ARE THE TWO HOUSES OF PARLIAMENT CALLED?	
WHO ARE YOUR STATE MEMBERS OF PARLIAMENT? (YOU HAVE 8)	
WHAT IS YOUR ELECTORAL DISTRICT?	
WHAT IS YOUR ELECTORAL REGION?	
WHAT ARE TWO IMPORTANT JOBS YOUR MPS DO?	

PARLIAMENT'S ROLE IN THE SYSTEM OF GOVERNMENT

A Representative Democracy

Parliament is central to our representative democracy. In a direct democracy, such as in a workplace, we might be able to vote directly on measures which affect us, but modern populations are so large and societies so complex that we need representatives to act on our behalf. Parliament is the place where our elected representatives, the members of Parliament (MPs), speak for the people they represent by proposing, debating and passing laws (legislation) affecting all Victorians. The name Parliament is derived from the French parler, to speak.

Parliament's Main Functions

- to represent the people of Victoria and raise their concerns publicly
- to form a government
- to make laws which enable the state to function efficiently and fairly
- to scrutinise the working of the executive arm of the government (the ministers and Cabinet)
- to authorise and approve a Budget.

The Parliament of Victoria is bicameral, i.e. it has two separately elected Houses, the **Legislative Assembly** and the **Legislative Council**.

The legislative process has three stages. The first two stages involve the Legislative Assembly, or the **Lower House**, and the Legislative Council, or the **Upper House**. A proposed law is introduced into Parliament as a bill. Most bills are initiated in the Legislative Assembly where they are debated, refined, approved and then sent to the Legislative Council for review. Sometimes legislation is changed or rejected by the Legislative Council. A bill amended by the Legislative Council is returned to the Legislative Assembly for consideration of those amendments. On occasion a bill will originate in the Upper House, in which case it is reviewed by the Lower House. For a bill to become an Act of Parliament - a law - both Houses must pass it in identical form.

The third stage in the legislative process involves the **Crown**, the King or Queen of Australia, represented in each state by the **Governor**. The Governor is appointed by the government. No legislation can become law until signed by the Governor.

The Legislative Assembly is the House where the government is formed. The party or coalition (combination of parties) that wins the majority of seats becomes the government of the day, and is responsible for revising current, and implementing new, legislation. The government does not require a majority in the Legislative Council.

PARLIAMENT'S ROLE IN THE SYSTEM OF GOVERNMENT

Responsible or Accountable Government

Victoria has a **Westminster** style of government. Our system of government was modelled on the British Parliament, located at Westminster in London. Reflecting our early history as a British colony, all the Parliaments in Australia are influenced by the Westminster system, a characteristic of which is **responsible** or **accountable government**.

All **government ministers** are **members of Parliament**, and can come from either House, with the exception of the **Premier**, who must come from the Legislative Assembly. The ministers as a group are called the Cabinet. Any MP may question or criticise the government and demand that they explain their actions and decisions. The ministers are therefore responsible (accountable) for their actions to the Parliament and, through members of Parliament, to the people.

Separation of Powers

The term **separation of powers** refers to the idea that in a democracy the three main branches of government are separate – they cannot all be controlled by the elected government of the day or by any one party or interest group. These three branches are:

- the **legislature**, the Parliament, consisting of MPs, which makes the laws (legislation)
- the **executive**, the Cabinet; government ministers (who are also MPs) and public servants in their departments, who carry out (execute) the legislation. Parliament also has a role in scrutinising the actions of the executive
- the **judiciary**, judges in courts, who interpret legislation and sometimes rule on whether it is **constitutional**.

It is their **separation** and independence that allows them to act as **checks and balances** on each other.

The intricately patterned tile floor of the vestibule of Parliament House carries a Biblical quote (Proverbs 11:14): "Where no counsel is the people fall but in the multitude of counsellors there is safety".

THE DEVELOPMENT OF REPRESENTATIVE GOVERNMENT IN VICTORIA

Prior to British settlement in Australia, Aboriginal nations had established a complex society and culture and evolved procedures for meetings and interaction of people within the nation. Victoria's Parliament House is thought to stand on or near a corroboree site of the Kulin nation, where periodic gatherings occurred to celebrate, hold ceremonies, arrange marriages, trade, exchange news and settle conflicts. Since the opening of Victoria's 55th Parliament, this heritage is recognised in ceremonies carried out by representatives of the Wurundjeri people of the Kulin nation. In 2004 a statement recognising Aboriginal people was included in Victoria's Constitution. This is the first time a Constitution in Australia has explicitly recognised indigenous people in a preamble or preliminary statement.

Wurundjeri man marked for corroboree ca. 1858 (SLV)

Late 1700s – 1835

The colonisation of Australia by Britain in 1788 established the Colony of New South Wales and this included the area which was to become Victoria in 1851. After communities at Sydney Cove and in Van Diemen's Land (present-day Tasmania) were established, there were several unsuccessful attempts to establish a colony in the south-east. Until 1835, the area now known as Melbourne was inhabited by indigenous people.

1835

The Creation of 'Melbourne'

In 1835 two groups of people from Tasmania sailed to the land surrounding the Yarra River and claimed it as their own. One group, the people on the ship *Enterprize* led by John Pascoe Fawkner, ignored the existing Aboriginal people and simply took over land for farms and houses. The other group, led by John Batman, had previously visited the area and had prepared a 'treaty' that they claimed meant that Aborigines had 'sold' them the area. The treaty had no moral or practical validity and was never accepted as legal by the British Government. The two groups occupied the river flats and started to create the settlement that would become Melbourne.

John Pascoe Fawkner and local Aborigines at the new settlement, 1835

Victoria was then part of New South Wales, and governed by the New South Wales Governor and Legislative Council. The settlement was declared illegal but, despite this, more and more people migrated to the area, and a new arrangement for government was required.

THE DEVELOPMENT OF REPRESENTATIVE GOVERNMENT IN VICTORIA

1836–1842
Government from Sydney

In 1836 the area that is now Victoria was named the Port Phillip District of New South Wales. In 1839 Charles Joseph La Trobe was named Superintendent of the District, the official representative of the New South Wales Government, to which he was responsible and accountable for his actions. In effect his home, La Trobe Cottage, now in the Domain, was Victoria's first Government House.

La Trobe
(SLV)

1842–1851
Port Phillip District was represented in the NSW Legislative Council

In 1842 the NSW Legislative Council was expanded so that six of its 36 Members could represent Port Phillip District. Only the wealthiest landowners were eligible, as only they could afford to travel to Sydney (by horse or by sailing ship), and the interests of Victoria could be outvoted by 30 to six.

1851
Separation

As the Port Phillip District grew, there were calls by the colonists for separation from New South Wales. In 1850 an Act of the British Parliament created three new self-governing colonies: South Australia, Tasmania and Victoria (the latter named after Queen Victoria), each to be governed by a 30-member Legislative Council and each to have a representative of the Crown (Lieutenant-Governor). On 1 July 1851 Victoria was legally separated from New South Wales, and became a colony of Great Britain.


V R
MORNING HERALD
EXTRAORDINARY
GLORIOUS NEWS!
SEPARATION
AT LAST!!
INDEPENDENT COLONY.
GENERAL JUBILEE.
New-born Colony!

SLV

1851–1856
A Legislative Council

Opening of the Legislative Council of Victoria, 1851

The Colony of Victoria was governed by a Lieutenant-Governor and a Legislative Council which met at St Patrick's Hall in Bourke Street, where the Law Institute now stands. 20 of the 30 were elected by people who were substantial property owners and the remaining 10 were chosen personally by Lieutenant-Governor Charles La Trobe.

1855

New Constitution Proclaimed:

Creates Representative, Responsible Government


AN ACT

The original Constitution Act

The Legislative Council wrote a new Constitution for Victoria that created a system which was very democratic for the era. While only 20% of adult males in England had the right to vote, Victoria would have a 36-member Legislative Assembly. This was elected by most adult males in the colony, who were also eligible to run for election. The new Legislative Council would have 30 elected members, but only wealthy property owners could vote or stand. Ministers would now be elected and could be replaced at elections if the voters were not satisfied with their performance. The British Crown would continue to be represented by the Governor, appointed from London.

1856

A World First – the Secret Ballot

The first Parliament of Victoria was also the first to be elected by a secret ballot. Prior to 1856, voting was public and an employer, for example, could watch how an employee voted, and apply pressure to vote for a particular candidate. A running tally was also kept, and if a candidate saw that he was losing, he could round up supporters, sometimes even paying them for their votes. From 1856 votes were cast in secret on an official ballot paper, removing the possibility of intimidation and bribery. The rest of the democratic world eventually adopted this innovation, which was at first known as the Victorian and then Australian ballot.

'Counting the Ballot Papers': an 1880 newspaper illustration depicting the counting of votes cast in a secret ballot

1856

The First Parliament

The first Parliament to be elected under the new Constitution was officially opened on 25 November 1856.

THE DEVELOPMENT OF REPRESENTATIVE GOVERNMENT IN VICTORIA

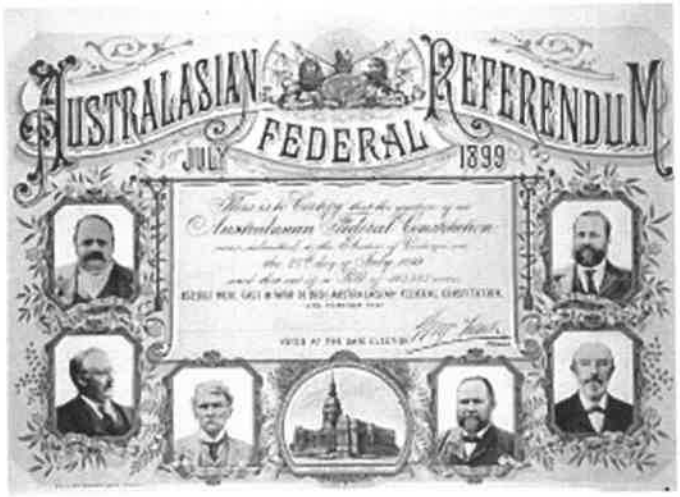
1857-1901
A Colonial Democracy

In 1857 the Constitution was changed so that every male over 21 years of age could vote for the Legislative Assembly (Lower House). The 'democratic' Lower House clashed frequently with the 'landed', wealthy Upper House. Whether the Upper House has the power to block the measures passed by the Lower House, the seat of government, has regularly been an issue in Victoria and in other parliaments in Australia.

Opening of first Parliament, Legislative Council 1856, Melbourne

There was not the same strong party system that exists today, so support or opposition to government measures could change dramatically, according to the beliefs and attitudes of individual members. As a result, governments changed frequently in this period. During this time, the executive power of the Governor was reduced, and this trend has continued.

1901
Federation



Certificate awarded to voters in the 1899 Australasian Federal Referendum (SLV)

On 1 January 1901, the Commonwealth of Australia came into being, and Victoria and the other five colonies became states. The new Australian Constitution gave some government powers, or roles, to the Commonwealth, while some remained with the states.

The new Commonwealth Parliament occupied Parliament House in Melbourne until the location of the new capital, Canberra, was chosen. The Parliament of Victoria moved to the Exhibition Building in Melbourne and remained there for the next 26 years, until the federal Parliament relocated to Canberra.

THE DEVELOPMENT OF REPRESENTATIVE GOVERNMENT IN VICTORIA

1901 to the Present Day
The Growth of Party Government

Parties started to develop their modern forms in the 1890s. By 1944 there were three major party groups in Victoria: the Labor Party, the Liberal Party, and the Country Party, which is now called the National Party or 'The Nationals'. While the last two are sometimes in coalition (acting together), they maintain their separate existence and are recognisably different groups. The Victorian Parliament now includes minor parties such as The Greens and sometimes independent members, but politics in Victoria has traditionally been dominated by the three major parties.

Originally, most members of Parliament were independents who would join with a government or opposition, often supporting different factions on particular issues. This meant that members of Parliament were free to represent what the majority of their constituents wanted, but it could also lead to uncertainty and instability within government and to frequent elections. Gradually the characteristics of the modern party developed. They are:

- the sharing of a basic philosophy and agreement of MPs to vote as a whole group
- the election of MPs on a set platform, or set of promises
- the nomination and support for election of candidates as part of the party.

Although parties bring stability to Parliament and present a clear set of policies to voters, they allow little flexibility for members to vote independently. Voters frequently vote for the party rather than the individual representative at an election. In some cases parties allow 'conscience' or 'free' votes on issues, when the MPs can vote in any way they choose, but this is unusual.

Independents and minor parties can be very significant if they hold the balance of power and the government relies on their support to pass legislation.

Electoral Changes

Since federation the number of electorates and the sizes of the two Houses have altered. There have also been important changes to voting, including the introduction of voting rights for women, lowering the voting age to 18, amendments to rules about who is eligible to be elected and the establishment of preferential and compulsory voting.

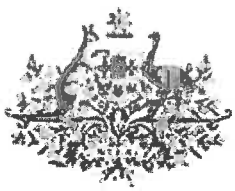
Constitutional Changes

The Victorian Constitution has also been changed frequently. Unlike the Commonwealth Constitution, which requires a referendum or popular vote to approve an alteration, the Victorian Constitution can be amended by Parliament itself. However, since 2003 some sections of the Victorian Constitution, including those concerning representation, can only be amended following approval granted in a referendum. The 2003 amendments also introduced fixed terms of Parliament, new voting arrangements for the Legislative Council, and changed some rules about the way the two Houses interact. These changes are regarded as some of the most significant in Victoria's constitutional history.

THREE LEVELS OF GOVERNMENT IN AUSTRALIA

There are three tiers, or levels, of government in Australia – Commonwealth (federal), state or territory, and local.

Commonwealth Level



The Australian (Commonwealth or federal) Parliament is responsible for matters that affect the nation as a whole. It has been given a number of specific areas of responsibility (powers) in which it can make laws. A few of those powers are exclusive – that is, only the Commonwealth can make laws in that area. Section 51 of the Australian Constitution gives the Commonwealth exclusive powers in defence, foreign policy, currency, airports and communications. Many of the Commonwealth's powers (such as taxation and industrial relations) are concurrent, i.e. the power to make laws in certain matters is shared with the states and territories. Where a power is concurrent and Commonwealth and state/territory laws are inconsistent, the Commonwealth law prevails.

In theory, all other areas of law-making belong to the state or territory alone. However, in practice, the Commonwealth can make financial grants to a state or territory and specify how the money is to be spent, for example, in education, health and transport. In these instances the state has to implement programs according to Commonwealth standards. A state or territory can choose to hand over (refer) a power to the Commonwealth.

The federal Parliament operates on a system quite similar to Victoria's Parliament. Further details can be found on the Australian Parliament website: www.aph.gov.au.

State Level

The state Parliament makes laws that affect most areas of our lives, such as health, agriculture, conservation, road safety, car registration, transport, fire brigade, ambulance, water, gas, electricity and law and order.

Local Level

CITY OF MELBOURNE

At the third level, Victorian local government (city and shire councils) is usually responsible for garbage collection, parks and gardens, libraries, swimming pools, art galleries and sporting facilities. Local government's power to do this, however, has been granted by an Act of the Victorian Parliament. If the Parliament chooses, it can expand or restrict the powers of local government and take over its administration for a time. Local government has no constitutional independence.

THREE LEVELS OF GOVERNMENT IN AUSTRALIA

AUSTRALIA'S THREE LEVELS OF GOVERNMENT			
Level	Commonwealth or federal	State	Local: shire, city, rural city
Crown Representative	Governor-General	Governor	-
Law	Commonwealth/ federal	State	Local laws
Leader	Prime Minister	Premier	Mayor
Revenue	Taxes	Taxes, federal grants	Rates, state and federal grants
Health	Funding, Medicare, drug control	Public hospitals, nursing services	Meals-on-Wheels, garbage collection
Education	Funding - post-secondary	Funding - primary and secondary	Childcare
Transport	Highways, railways, airports, air safety	Some railways and buses, roads	Footpaths, street signs
Other	Foreign affairs, immigration, pensions, post, arts	Police, fire brigade, environment	Libraries, pets

The Northern Territory (NT) and Australian Capital Territory (ACT) have their own governments which have a similar relationship to the federal government as the states. They do not have the same constitutional independence as the states.

THE CONSTITUTION OF VICTORIA

Constitution

A constitution is the statute (law or Act) which sets out the poweres of the government and Parliament.

Whether a power is state or federal is essentially determined in Section 51 of the Australian Constitution. Since 1901 it has defined certain powers that are exclusive to the federal Parliament. Some powers are termed concurrent, i.e. the Commonwealth and state can both make laws in relation to the same issue. Commonwealth law prevails if there is any clash or inconsistency. Disputes about the extent of a parliament's constitutional power are frequently resolved in the High Court of Australia, which interprets the federal Constitution. The High Court often rules on disputes about state versus Commonwealth powers and has the final word in these matters.

The Victorian Constitution defines the power and privileges of the Parliament of Victoria. Victoria's original Constitution was approved by the British Parliament in 1855. It is the main document defining the powers of the Parliament, and sets out the features of its three key components: the Crown, represented by the **Governor**; the **Legislative Assembly**; and the **Legislative Council**.

Governor

The Constitution requires that all legislation receives **Royal Assent**, i.e. is signed by the **Governor**, before it takes effect as law. The Governor is assisted by an **Executive Council**, which comprises ministers of the government. The Governor also formally calls, opens, prorogues (ends a session) and dissolves Parliament. The Governor reads a statement of the government's proposed legislative program at the formal opening of Parliament.

Theoretically, the Governor represents the Crown, but actually follows the advice of the government of the day, unless the Governor believes that the government is acting unconstitutionally. The Governor is formally appointed by the Crown, but again is actually appointed by the government of the day, which 'recommends' a nominee to the monarch. It is now extremely rare for the Governor to intervene in matters affecting Parliament and government. This would only happen in specific and unusual circumstances.

Former Governor David de Kretser and officials at the opening of the 57th Parliament

THE CONSTITUTION OF VICTORIA

Legislative Assembly

The Victorian Constitution sets out the number of electorates, termed **electoral districts**, for the Legislative Assembly. Boundaries are altered periodically as population distribution changes. Currently there are 88 electoral districts and one member of Parliament is returned from each. Government is formed by the party or parties which have a majority of these 88 elected members. The opposition comprises the largest party or group that does not support the government. The Assembly is the **seat of government** in our Westminster-style Parliament, and it is not necessary for the government to have a majority in the Upper House, the Legislative Council. Only the Assembly can initiate finance bills, those dealing with the raising or spending of money by the government. Since 2006 the Parliament has had fixed four-year terms.

Legislative Council

The Victorian Constitution also sets out the number of electorates, **electoral regions**, of the Legislative Council and these boundaries might also be altered as population distribution changes. There are eight regions, each covering the geographic area of 11 Legislative Assembly districts. Each region elects five Legislative Councillors, making 40 members in all. The Legislative Council also has fixed four-year terms, matching those of the Legislative Assembly. Most bills originate in the Legislative Assembly while the Legislative Council acts as a **House of review**, providing the opportunity for Parliament to consider them again. The Council may initiate any legislation other than finance bills. The Council may reject but cannot amend such bills. It can, however, suggest amendments to the Assembly. The Council no longer has the power to reject **appropriation bills**, i.e. those authorising the spending of money by the government to provide its regular services and cover ongoing operating expenses.

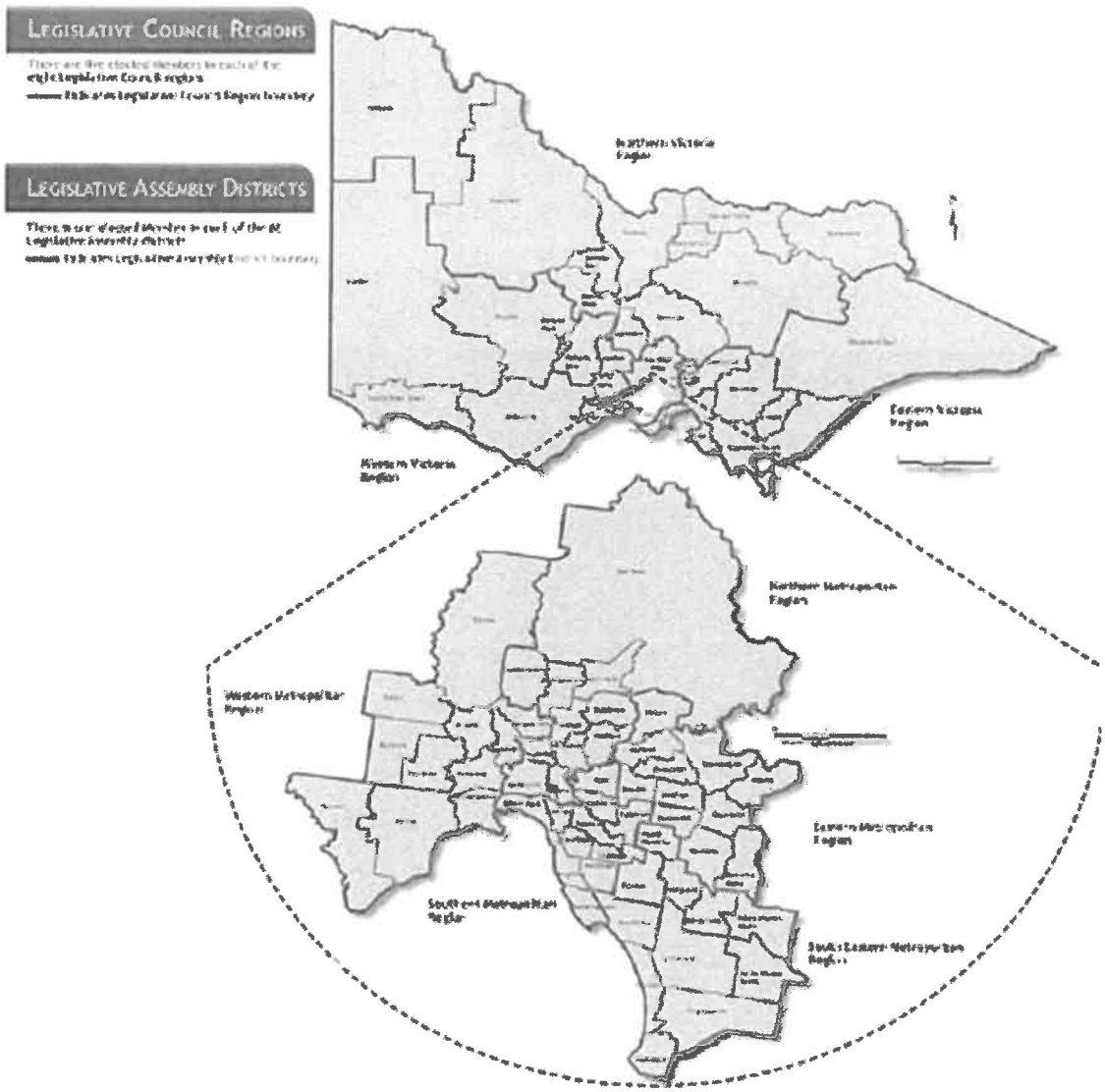
Changing the Consitution

Parliamentary numbers, voter eligibility, payment of members, voting methods, size of the ministry, electorate numbers and the powers and responsibilities of both chambers have all been changed over time in the Victorian Constitution. An important change was made in 1975, when the Constitution became an Act of the Victorian Parliament, rather than of the British Parliament. Until recently, the Victorian Constitution could be amended by Parliament itself, unlike the Commonwealth Constitution, which requires a referendum, a popular vote in which all Australians on the electoral roll vote for or against a particular proposal, to approve any change.

In 2003, the Constitution was amended so that changes to some of its provisions, such as the representation of Victorian voters in Parliament, now have to be determined by a referendum. The 2003 amendments also provide for fixed four-year terms for both Houses, election of the Legislative Council by **proportional representation**, removal of the Council's power to block an appropriation bill and a dispute resolution process for bills which don't pass both Houses. These are regarded as some of the most significant changes to the Victorian Constitution in its 150-year history.

REPRESENTATION IN PARLIAMENT

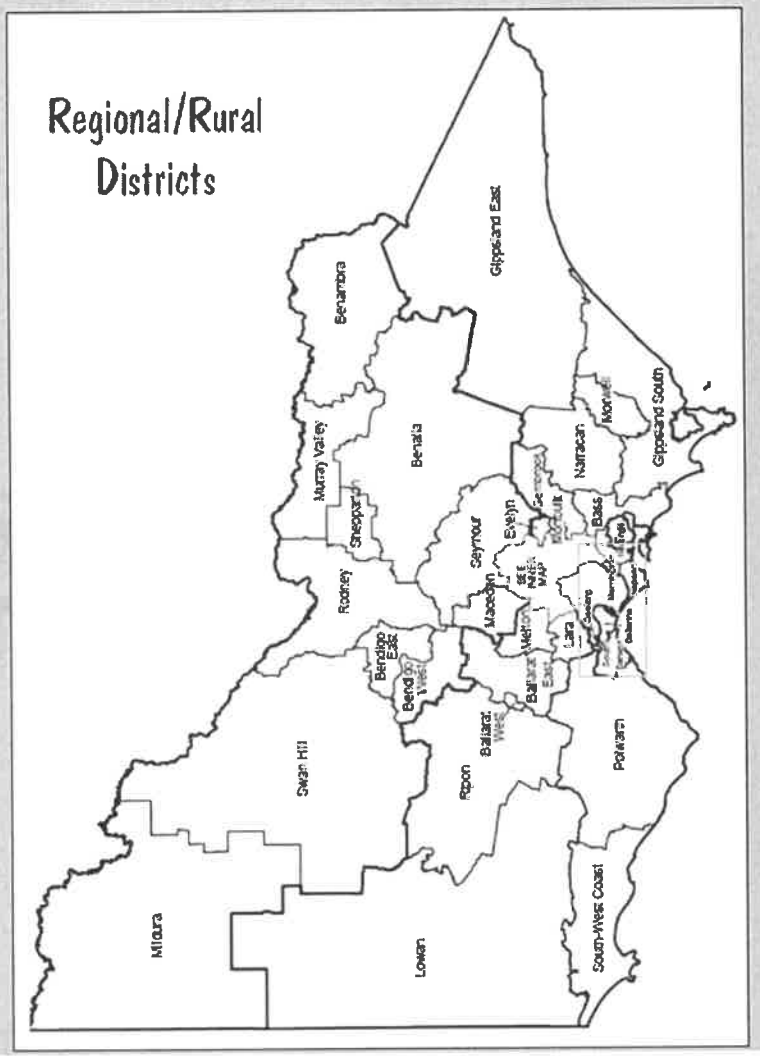
Electoral Regions Showing Districts



ACTIVITY FOUR

Electorates

PRE-VISIT

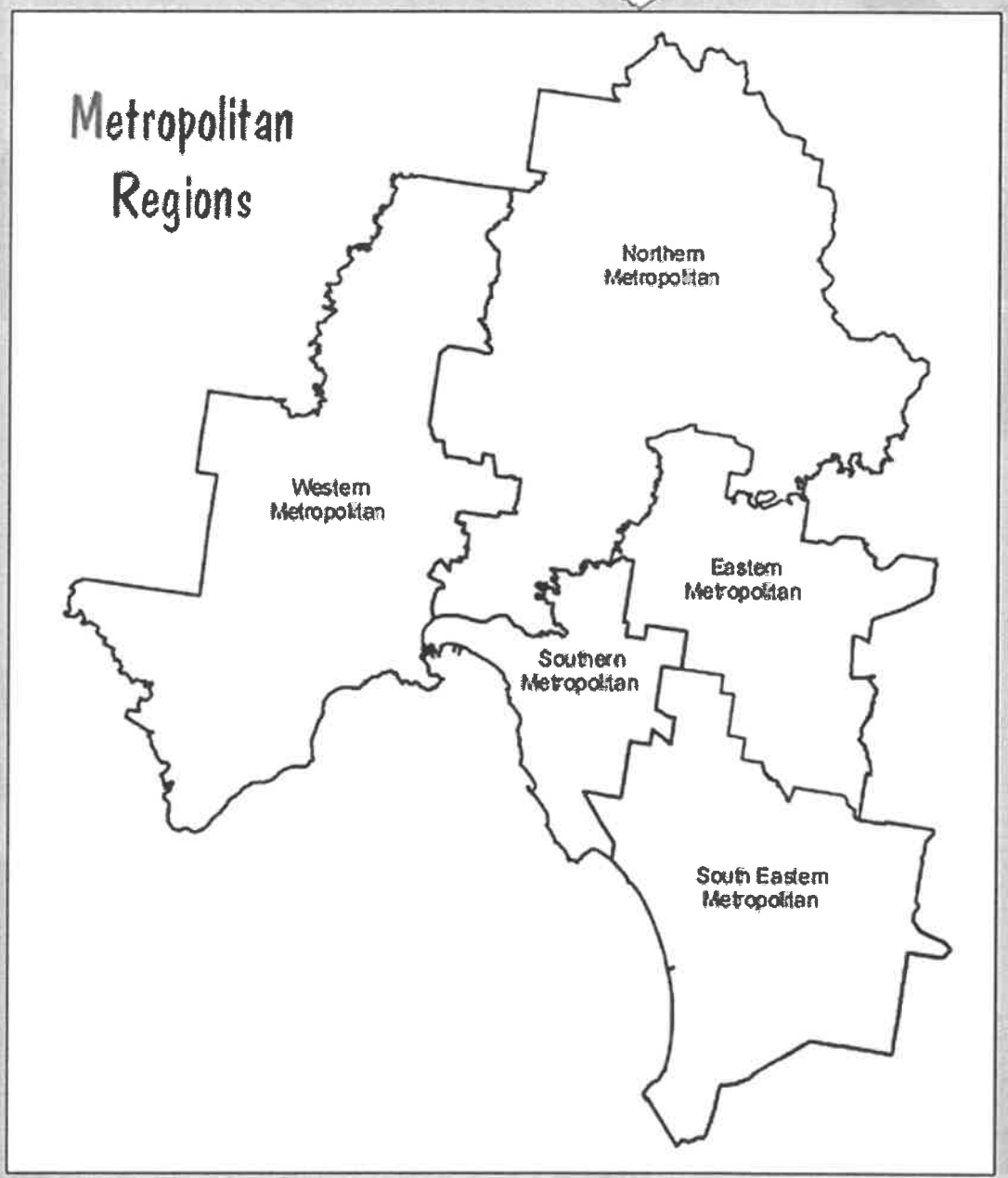


PRE-VISIT

ACTIVITY FOUR

Electorates

Mark (in red) the **Electoral Region** where you live. You can find your electorate at www.vec.vic.gov.au.

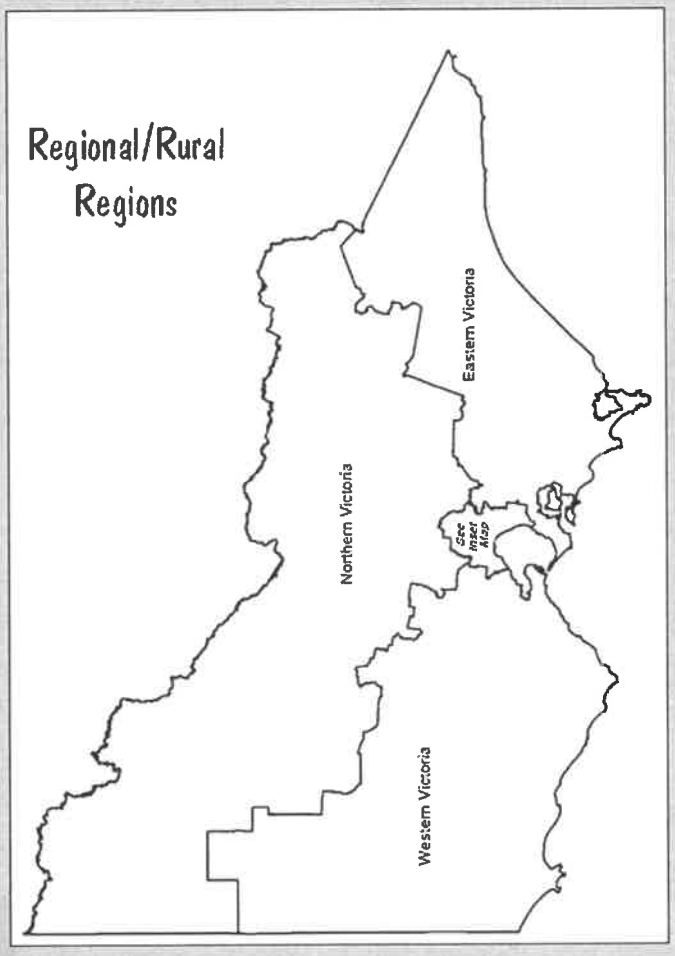


The rest of Victoria can be found on the next page.

ACTIVITY FOUR

PRE-VISIT

Electorates

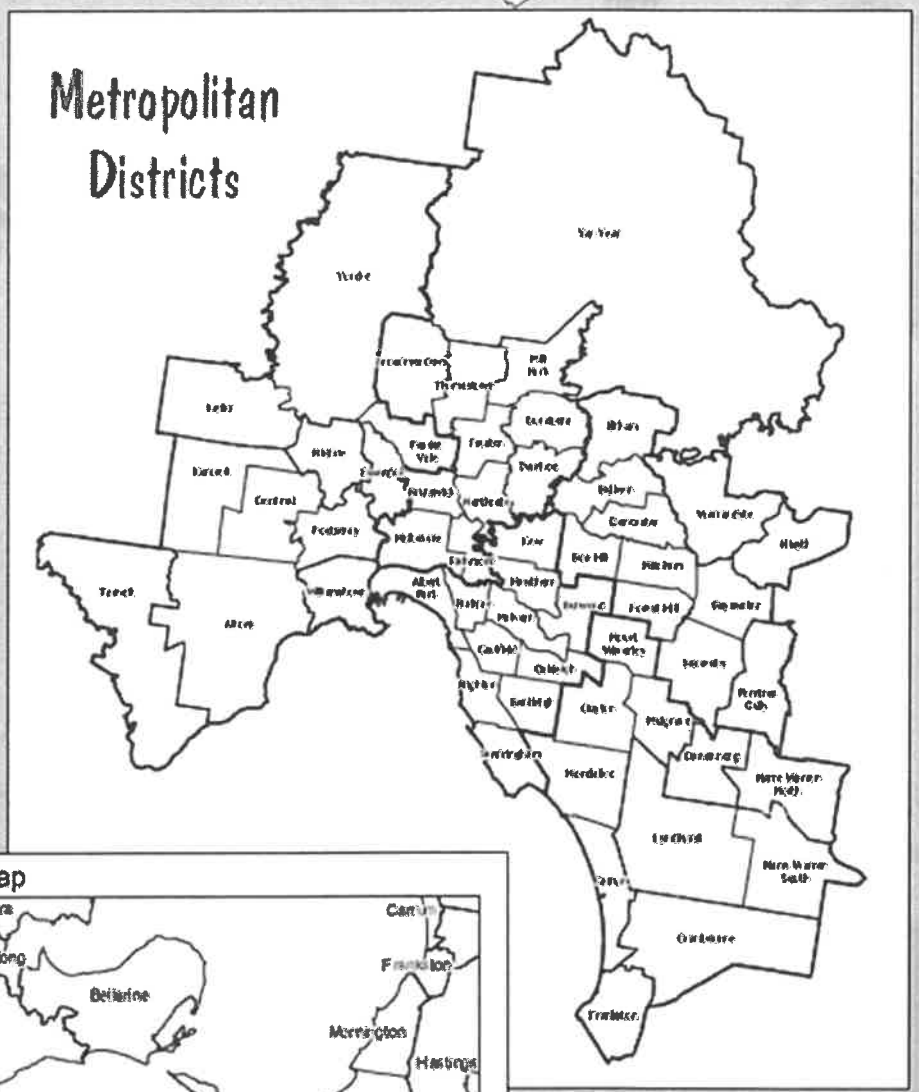


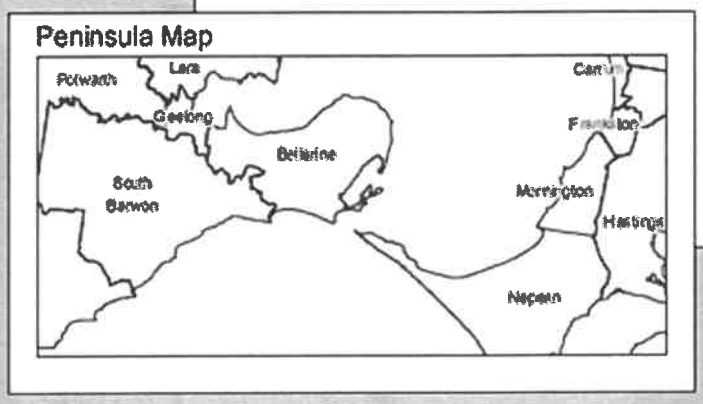
PRE-VISIT

ACTIVITY FOUR

Electorates

Mark (in green) the **Electoral District** where you live. You can find your electorate at www.vec.vic.gov.au.





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Seymour College

English Work Pack 2021

Year 10

Instructions to Students:

Learning Intention	**Success Criteria**
• To develop my skills in comparing and contrasting a range of texts.	I can: • Discuss similarities and differences between two images or films • Use the connective language in my discussion • Use the metalanguage from each text-type to assist my explanations. • Complete an essay plan • Write an essay

Week 1

Lesson	
1	Plan your comparative essay
2	Begin drafting your essay
3	Continue drafting your essay
4	Complete your draft essay and submit it for feedback.

Week 2

Lesson	
1	Workshop your draft essay – show editing/proofreading
2	Begin working on a good copy of your essay
3	Continue work on good copy of your essay
4	Complete your essay and submit for marking.

Notes to Parents/Guardians:

You can support your child to complete their work at home by:

- Encouraging them to allocate time for specific subjects
- Reading the material and talking about the ideas with your child (where possible)
- Checking in with your child to ask how they are going
- Contacting Teachers if more support or explanation is required

Submission of Work and Feedback:

Students can upload work to Compass where access is available. Photos of handwritten tasks may also be uploaded. Students can also mail hard copies of their work back to the school in the supplied envelope.

Students and parents can continue to communicate with Teachers via Compass email. Any questions should be directed to the school email: seymour.co@education.vic.gov.au

Lesson 1

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Complete an essay plan	
First	5 minutes	1. Select your essay topic from the CAT coversheet included in your work pack	Tick when completed:
Next	10 minutes	2. Brainstorm ideas for a response to your chosen topic - define key words - identify arguments you can make - identify key quotes and film techniques you can reference	
Then	30 minutes	3. Write a detailed plan for your essay. You can use one of the planners provided in the work pack or create your own. You **MUST** complete a plan before writing.	
Last	5 minutes	4. Review your plan. Submit the plan to your teacher for feedback.	

Lesson 2

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	5 minutes	1. Review your essay plan from the previous lesson	Tick when completed:
Next	40 minutes	2. Begin drafting your essay. 3. Aim to complete an introduction and one body paragraph today	
Last	5 minutes	4. Review your work. Contact your teacher if you have any questions or require support.	

Lesson 3

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	5 minutes	1. Review your essay from the previous lesson	Tick when completed:
Next	40 minutes	2. Continue working on your essay draft. Aim to complete your second body paragraph and begin your third body paragraph today	
Then		3. If you get stuck, try getting in touch with a friend to share your ideas with. Alternatively, contact your class teacher or Mrs Hicks for extra support.	
Last	5 minutes	4. Review your work.	

Lesson 4

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	5 minutes	1. Review your essay from the previous lesson	Tick when completed:
Next	40 minutes	5. Continue working on your essay draft. Aim to complete your third body paragraph and conclusion today. Remember the conclusion must be a complete paragraph.	
Then		2. If you get stuck, try getting in touch with a friend to share your ideas with. Alternatively, contact your class teacher or Mrs Hicks for extra support.	
Last	5 minutes	3. Submit your draft for feedback.	

Lesson 5

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	10 minutes	1. Re-read your completed essay	Tick when completed:
Next	30 minutes	2. Use feedback from your teacher if it is already available and if not, use the checklist in this work pack to revise and edit your own work. ***Essay Proofreading Checklist can be fouind on the final page of this work pack.***	
Then	10 minutes	3. Contact a friend if possible and swap essays: give one another constructive feedback on how to improve.	
Last		4. Contact your teacher if you have any questions of require support.	

Lesson 6

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	5 minutes	1. Review your essay changes from the previous lesson.	Tick when completed:
Next	10 minutes	2. Utilise any feedback from your teacher or peers to make changes to your essay.	
Then	30 minutes	3. Begin working on a good copy of your essay.	
Last	5 minutes	4. Contact your teacher if you have any questions of require support.	

Lesson 7

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	5 minutes	1. Review your essay changes from the previous lesson.	Tick when completed:
Next	10 minutes	2. Utilise any feedback from your teacher or peers to make changes to your essay.	
Then	30 minutes	3. Continue working on the good copy of your essay.	
Last	5 minutes	4. Contact your teacher if you have any questions of require support.	

Lesson 8

	Approx. Time	**Learning Intention:** To develop my skills in comparing and contrasting a range of texts. **Success Criteria:** I can - Discuss similarities and differences between two images or films - Use the connective language in my discussion - Use the metalanguage from each text-type to assist my explanations. - Follow an essay plan - Write an essay	
First	5 minutes	1. Review your essay changes from the previous lesson.	Tick when completed:
Next	10 minutes	2. Utilise any feedback from your teacher or peers to make changes to your essay.	
Then	30 minutes	3. Complete the good copy of your essay. Ensure one final proofread.	
Last	5 minutes	4. Submit your final piece of work for marking.	

Seymour College

Common Assessment Task

STUDENT NAME: _____ **Due Date:**

Task Title:

Learning Intention	Success Criteria
- To identify film techniques - To create a cohesive piece of writing - To compare two texts - To discuss themes	I can - Identify themes and how they are presented - Complete an essay plan - Write an essay

Task Summary

Students demonstrate their ability to compare and contrast two different films.

Task Description:

Select ONE option from the list below to write your answer on.

1. **Entry level:** using the first two screenshots provided (scene 1 and scene 7) compare and contrast how the two texts introduce the voyeuristic features of their worlds. Include the use of colour in your analysis

2. **At level:** Using all of the screenshots provided, compare and contrast the two text's ideas about power, voyeurism and manipulation. Include concepts like mise-en-scene in your analysis

3. **Extension level:** Using both films, compare and contrast the two text's ideas about power, voyeurism, and manipulation. Use all available structural features in your analysis

4. **Extension two:** Watching others suffer makes you just as guilty. To what extent is this true?

Resources

Image Bank

Entry Level: images for topic 1

Resources

Image Bank

At level: images for topic 2

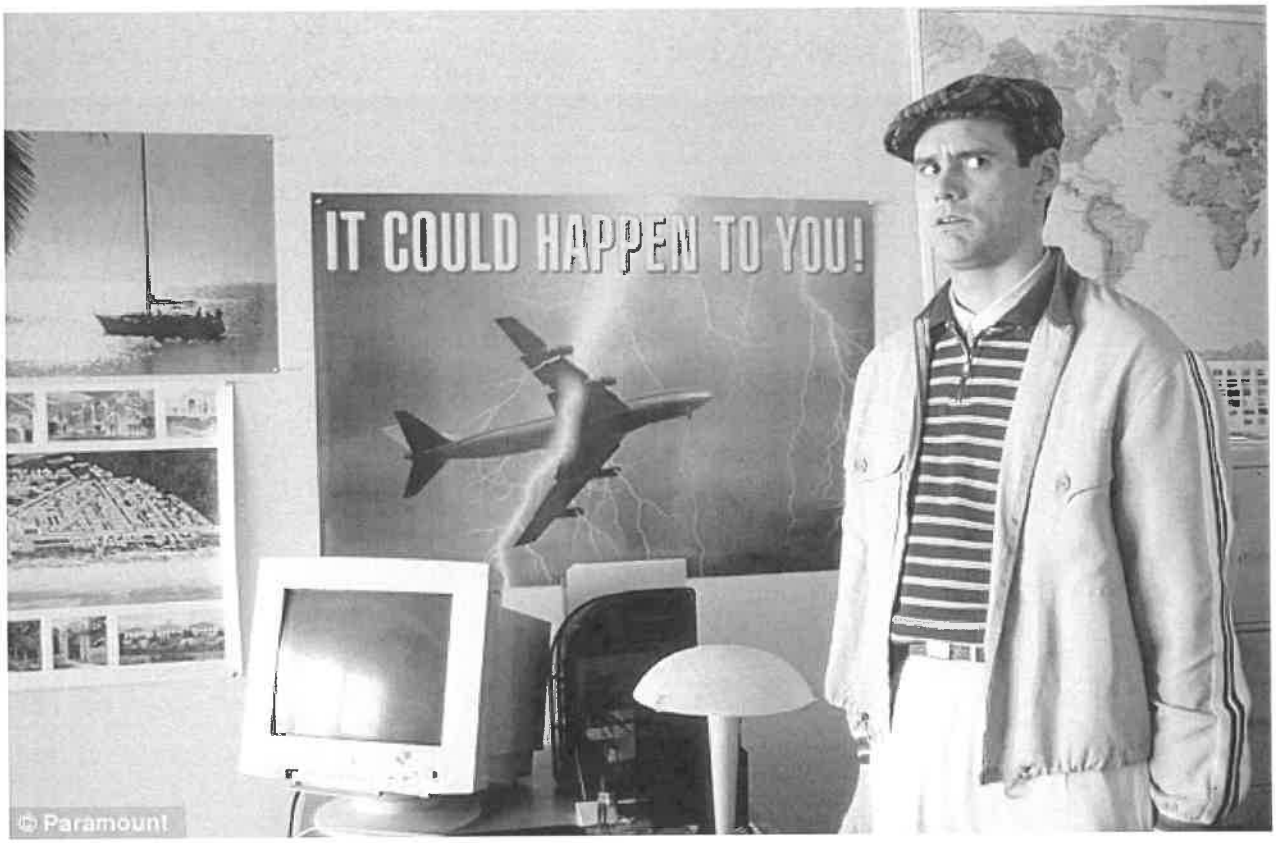
Shot 1

Shot 2

Shot 3

Shot 4

Shot 5



Shot 6

Shot 7

Shot 8

Shot 9

Shot 10

Shot 11

Shot 12

Language of Comparison

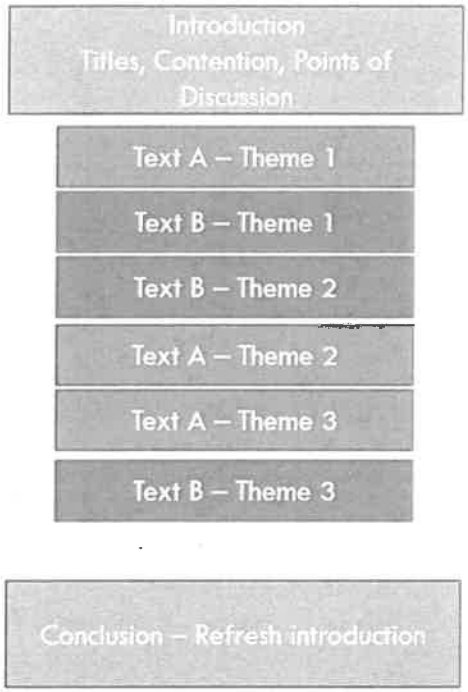
To express:				
Similarity	Difference	Comparison	Contrast	Summarising or Emphasising
Exactly	Considerably	Like	Although	In terms of...
Precisely	A great deal	Similar	Yet	They are virtually identical
Virtually	Very much	As	Whereas	They are almost exactly the same
Practically	Rather	Same	However	There are more similarities than differences
More or less	Somewhat	In the same way	But	They are quite different because
Almost	A little	Too	While	One of the few similarities/differences is
Nearly	Slightly	Both	Differ	In every way
Approximately	Scarcely	Most important	Instead	
About	Hardly	Have in common	Unless	
Entirely	Totally	The same as	Unlike	
Quite	Completely	Similarly	Though	
	Entirely	As well as	On the contrary	
	Quite	While	Contrary to	
	Dissimilar		Even though	
			On the other hand	
			The reverse	

Essay Structure

Choose ONE structure to help plan your essay.

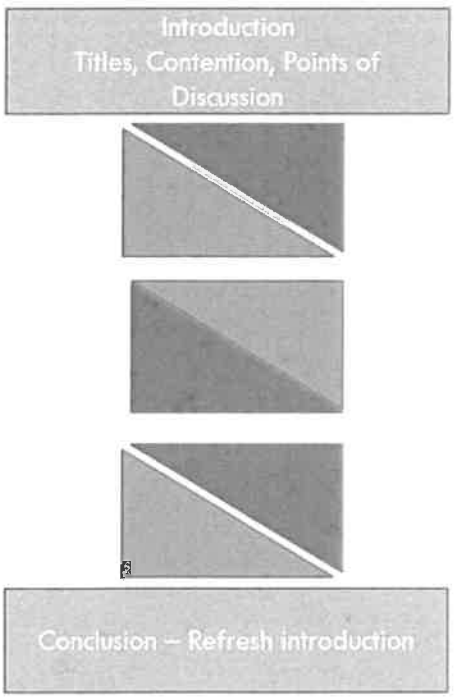
Block Essay Approach:

Structure A: Text By Text



Integrated Essay Approach:

Structure B: Point by point.

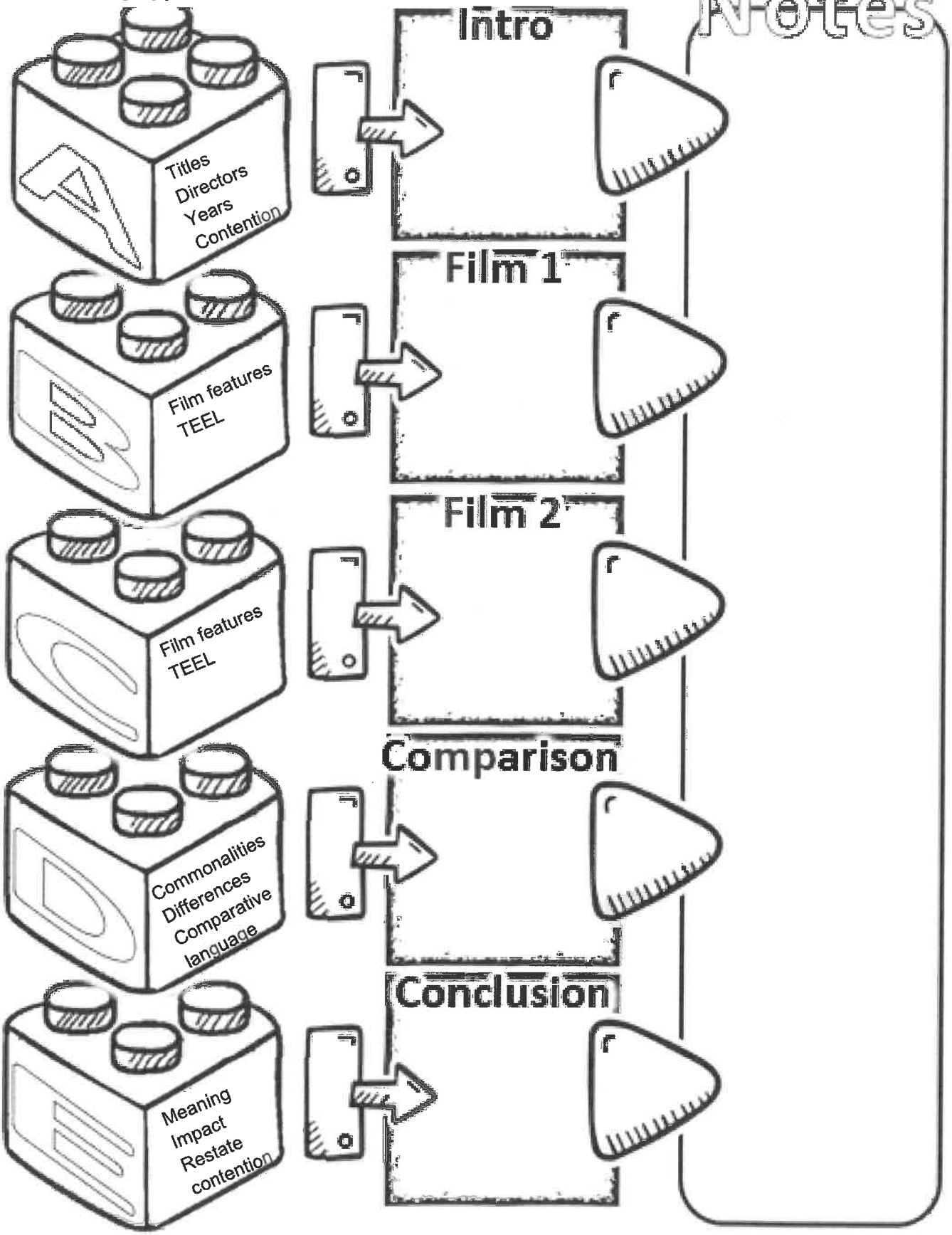


Essay Planning Resources: Select and complete ONE planner that works for you

Use the table to plan your response.

Topic: What is the idea you want to talk about? Just in **one sentence.**	**Example** or **evidence:** Where can this be seen in the text? Was something shown, said, done or seen in the film that gave you this idea? Try to pick **2 examples** for each point so you have a choice.	**Explanation:** explain your point in detail. What makes this distinct in text or what makes it different to the other one?
Topic/ Idea 1		
Topic/ Idea 2		
Topic/ Idea 3		

BLOCK essay approach: 1 text at a time



NOTE

Integrated essay approach: 1 theme at a time

Theme 1

Theme 2

Theme 3

TOPIC

Main contention

Conclusion:

Key features to include:

Traditional Essay plan: Fill in the planner below. Include key points you will make as well as evidence such as key quotes and examples of important film techniques.

Topic	
Contention *What will be the main argument you will draw back to?*	
Paragraph 1 *Either a key idea (theme) for an integrated approach* ***OR*** *Film 1 for a block approach*	
Paragraph 2 *Key idea/theme 2* **OR** *Film 2*	

Paragraph 3 *Key idea/theme 3* **<u>OR</u>** *Comparison of films*	
Conclusion *Restate the contention.* *Explain the meaning created by each film in relation to the topic.*	

Essay Rubric						
		3.4 Discusses texts in terms of similarities and differences	4.4 Link arguments to contention	5.3 Discuss structural components of texts		*At this level the student is able to compare and contrast both texts, elaborating on the similarities and differences. They write linking sentences connecting their arguments to their overarching contention and discuss the structural elements (film techniques) of the texts, including how the structure impacts the reader. They are able to justify their decision-making process when making changes to their writing.*
1.3 Explains themes	2.3 Explains themes	3.3 Contrasts differences in texts	4.3 Identify arguments	5.2 Explain how evidence supports arguments	6.2 Correct errors	*At this level the student is typically able to explain the themes of both texts, contrast the differences between the texts, identify arguments and explain their supporting evidence. They are also able to correct errors in their writing.*
1.2 Summarises story	2.2 Summarises story	3.2 Compares similarities in texts	4.2 Outline contention			*At this level the student is typically able to summarise both stories, compare similarities in the texts and outline their contention.*
1.1 Outlines info of text a	2.1 Outlines info of text b	3.1 Connects text A and B	4.1 Follow essay structure	5.1 List evidence from texts	6.1 Identify errors	*At this level the student is typically able to provide details about both texts, connect the texts together. They include evidence from the texts and identify errors in their writing.*
Text A	**Text B**	**Connections**	**Structure**	**Evidence**	**Spelling/Grammar**	*Level Statements*
Introduction		**Body Paragraphs**			**Proofing**	

Essay Proofreading Checklist: Block Essay Approach

Introduction:

- Clearly states the topic
- Introduces text 1 details: title, director, year of release
- Introduces text 2 details: title, director, year of release
- Offers a clear contention: takes a stance on the topic

Body Paragraph 1: Block approach using TEEL

- Clearly identifies how the topic relates to text 1
- Includes quotes and examples
- Clearly explains and elaborates on evidence
- Includes discussion of film techniques and/or relevant images
- Finishes with a clear statement about the meaning conveyed/ links back to the main essay topic

Body Paragraph 2: Block approach using TEEL

- Uses a comparative statement to open the paragraph
- Clearly identifies how the topic relates to text 2
- Includes quotes and examples
- Clearly explains and elaborates on evidence
- Includes discussion of film techniques and/or relevant images
- Finishes with a clear statement about the meaning conveyed/ links back to the main essay topic

Body Paragraph 4: Comparison

- Clearly discusses points of ***similarity*** between the texts – related to the essay topic
- Clearly discusses points of ***difference*** between the texts – related to the essay topic
- Identifies common messages conveyed by the texts
- Relates both texts clearly to the essay topic

Conclusion:

- Restates the main topic and contention (in different wording)
- Ties together the arguments made for text 1: what messages were conveyed?
- Ties together the arguments made for text 2: what messages were conveyed?
- Clearly states the ways the texts connected and/or diverged in their messaging
- Offers a final statement about the relevance or meaning of the essay topic

Essay Proofreading Checklist: Integrated Essay Approach

Introduction:

- Clearly states the topic
- Introduces text 1 details: title, director, year of release
- Introduces text 2 details: title, director, year of release
- Clearly outlines how key themes/ideas are present in the texts (a statement for each idea/theme, not a lengthy explanation)
- Offers a clear contention: takes a stance on the topic

Body Paragraph 1: Integrated approach using TEEL

- Clearly identifies a key theme or idea connected with the topic
- Includes quotes and examples from both texts
- Clearly explains and elaborates on evidence
- Includes discussion of film techniques and/or relevant images
- Utilises appropriate comparative language
- Finishes with a clear statement about the meaning conveyed/ links back to the main essay topic

Body Paragraph 2: Integrated approach using TEEL

- Clearly identifies a 2nd key theme or idea connected with the topic
- Includes quotes and examples from both texts
- Clearly explains and elaborates on evidence
- Includes discussion of film techniques and/or relevant images
- Utilises appropriate comparative language
- Finishes with a clear statement about the meaning conveyed/ links back to the main essay topic

Body Paragraph 4: Integrated approach using TEEL

- Clearly identifies a 3rd key theme or idea connected with the topic
- Includes quotes and examples from both texts
- Clearly explains and elaborates on evidence
- Includes discussion of film techniques and/or relevant images
- Utilises appropriate comparative language
- Finishes with a clear statement about the meaning conveyed/ links back to the main essay topic

Conclusion:

- Restates the main topic and contention (in different wording)
- Ties together the arguments made for text 1: what messages were conveyed?
- Ties together the arguments made for text 2: what messages were conveyed?
- Clearly states the ways the texts connected and/or diverged in their messaging
- Offers a final statement about the relevance or meaning of the essay topic

MATHS MATE 10

Term 1 - Sheet 8

Name: .....

Due Date: ...../...../.....

Parent's Signature: .....

1. [Long ×,÷] *
$1\,036\,000 \div 400 =$

2. [Decimal +,−] *
$1.009 - 0.19 =$

3. [Decimal ×,÷]
$0.001 \times 10.2 =$

4. [Fraction +,−] *
$5\frac{8}{9} - 2\frac{2}{9} =$

5. [Fraction ×,÷] *
$\frac{5}{8} \div \frac{5}{12} =$

6. [Percentages] *
0.5% of 120 mL = ____ mL

7. [Decimals / Fractions / Percentages] *
Write $\frac{5}{6}$ as a recurring decimal.

8. [Integer +,−]
$(+12) - (-23) =$

9. [Integer ×,÷]
$(+42) \div (-7) =$

10. [Rates / Ratios] *
A garden snail can travel at 0.012 m/s. At this speed, how long does it take a snail to cover 12 m?
____ s

11. [Indices]
Simplify $m^6 \times m^5$

12. [Square Roots]
$\sqrt{0.04} =$

13. [Exploring Number]
$\cos 15° \approx 0.96593$
Write the rational approximation of cos 15° correct to three decimal places.

14. [Applied Number] *
A 15% increase followed by a 10% decrease on the same item is >, < or = a 5% increase of the original value?

15. [Number Patterns]
Complete the pattern:
$-26, -20, -14, -8, -2,$ ____ , ____

16. [Expressions]
Simplify $m \times 6 \times n \div -p$

17. [Substitution] *
If $y = \frac{2x}{15}$, find y when $x = 5$

18. [Expansion]
Expand $t(7t - 4u + 2)$

19. [Factorisation] *
Factorise and evaluate
$-7 \times 54 - 7 \times 46$

20. [Equations] *
Solve the inequation:
$15 \geq 5(7 - 2x) - 60$

21. [Graphs & Functions] *
Which of these points lie on the line defined by the rule $y = -2x - 3$?
A(3,−9)
B(0,3)
C(−2,1)

QUOTE OF THE WEEK: April Fools have a day all their own; the rest of us have to muddle along without any recognition at all. Rossiter

22. [Units of Measurement / Time]

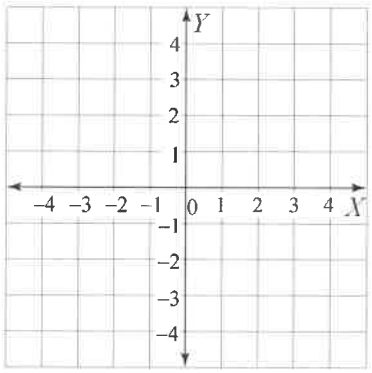
'A tennis ball must weigh between 57.7 g and 58.5 g.'

Choose the description for the weight tolerance of a tennis ball given this statement.

A) 58.1 ± 0.4 g
B) 57.7 ± 0.8 g
C) 58.1 ± 0.8 g

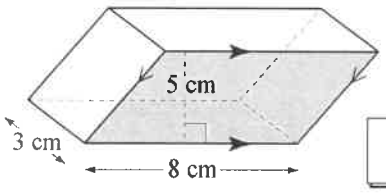
23. [Perimeter / Area] *

Plot the points A(−4,3), B(4,3), C(0,−2) and D(−3,−2) and use them to find the area of the trapezium ABCD.



24. [Surface Area / Volume] *

Find the volume of the shape.

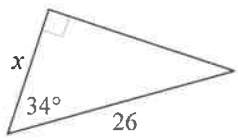


cm^3

25. [Pythagoras / Trigonometry]

Which trigonometric ratio would be used to find the unknown side x?

A) sine
B) cosine
C) tangent



26. [Shapes]

Euler's formula, **E** = **V** + **F** − 2 defines the relationship between **E**dges, **V**ertices and **F**aces of any polyhedron. Verify Euler's formula for a pentagonal pyramid:

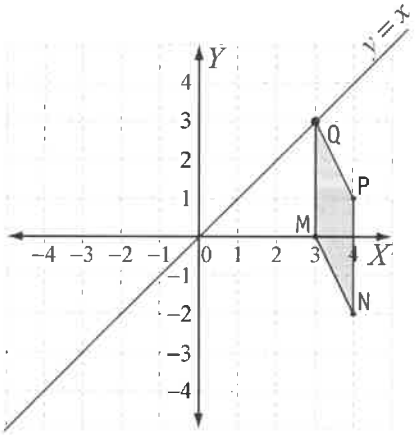
[ ] = [ ] + [ ] − 2

27. [Angles] *

Find the value of $x°$.

28. [Exploring Geometry]

Draw the reflection of the parallelogram MNPQ in the line of equation $y = x$.

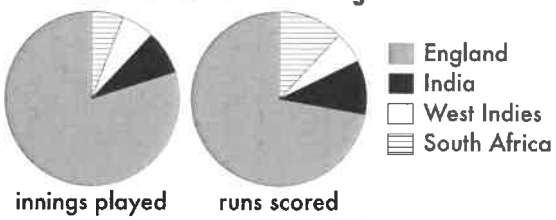


29. [Statistics]

Against which country did Don Bradman have the highest test batting average?

[Hint: Batting average = runs per innings]

Don Bradman's Test Cricket Batting



30. [Probability] *

There are 8 choc chip, 12 coconut macadamia, 7 smiley and 5 chocolate dipped cookies in the cookie jar. If a cookie is chosen at random, what is the probability it will be a coconut macadamia?

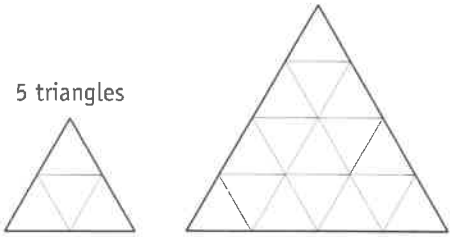
31. [Problem Solving 1] *

There are 141 rooms in a block of 39 apartments. Each apartment has either 3 or 4 rooms. How many apartments have 4 rooms?

32. [Problem Solving 2] *

The diagram on the left below includes 5 triangles (four small and a larger one). How many triangles are there in the diagram on the right? [Hint: The answer is not 16 or 17.]

5 triangles



MATHS MATE 10

Term 2 - Sheet 1

Name: .....

Due Date: ...../...../.....

Parent's Signature: .....

1. [Long ×,÷] *

$269 \times 15 =$

2. [Decimal +,–] *

$21.08 - 2.064 =$

3. [Decimal ×,÷]

$0.08 \times 0.6 =$

4. [Fraction +,–]

$3 - \frac{2}{7} =$

5. [Fraction ×,÷] *

$\frac{2}{3} \times \frac{9}{10} =$

6. [Percentages] *

10% of 5 m = ____ cm

7. [Decimals / Fractions / Percentages] *

Approximately 35% of the calories in a leg of lamb come from fat. Write this percentage as a fraction in simplest form.

8. [Integer +,–] *

$(+13) - (+18) + (-21) =$

9. [Integer ×,÷] *

$(-3) \times (+5) \times (+2) =$

10. [Rates / Ratios] *

In New Zealand the minimum rate of pay for adults is $12.75 per hour. At this rate what is the pay for a person working 8 hours?

$

11. [Indices]

Simplify $a^7 \div a^3$

12. [Square Roots] *

$5\sqrt{400} =$

13. [Exploring Number]

4.18×10^7 is the scientific notation for:

A) 4.1800000 B) 4 180 000 C) 41 800 000

14. [Applied Number] *

Roald, a sales manager, earns $24 per hour after tax for a 40 hour week. If his pay this fortnight is $1944, by how much was Roald overpaid?

15. [Number Patterns]

Complete the pattern:

$-2, 10, -50, 250,$ ____, ____

16. [Expressions]

Choose the like terms:

$4p, -3p^2, 0.5p, 0.5$

17. [Substitution] *

Use $P = 2l + 2w$ to find the perimeter P of a rectangle when $l = 8$ and $w = 3$

18. [Expansion]

Expand $-4h(5 - 4h)$

19. [Factorisation]

Factorise

$3pq - 4p + 2pqr$

20. [Equations] *

Solve for x: $5x + 3(x - 11) = 7$

21. [Graphs & Functions] *

Find the y-intercept of the graph defined by the linear rule $y = -2x + 3$

[Hint: Let $x = 0$ in the rule.]

QUOTE OF THE WEEK: One of the problems in life exists in trying to find out something you should know without letting on you don't already know. P. K. Shaw

22. [Units of Measurement / Time] *

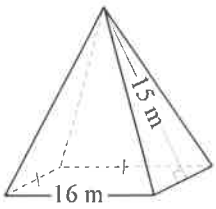
The day and time is Monday, 1815 hours in Cairo, and Tuesday, 0315 hours in Melbourne. By how many hours is Cairo time behind Melbourne time?

23. [Perimeter / Area] *

An Australian $100 note measures 15.8 cm by 6.5 cm. What is its perimeter in millimetres?

24. [Surface Area / Volume] *

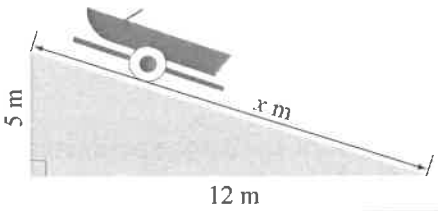
Find the total surface area of the regular square pyramid.



m^2

25. [Pythagoras / Trigonometry] *

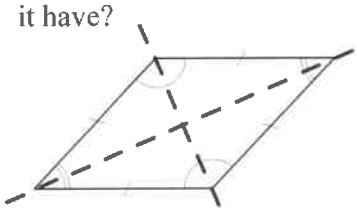
How long is the ramp on which the boat descends?



m

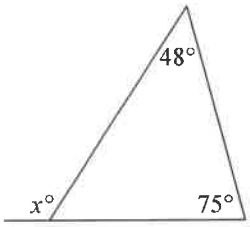
26. [Shapes]

Draw all the axes of symmetry of the rhombus. How many axes of symmetry does it have?



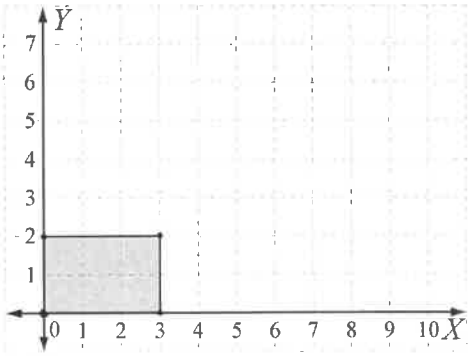
27. [Angles] *

Find the value of $x°$.



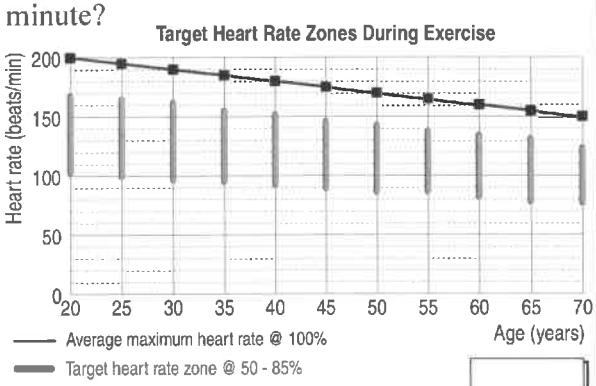
28. [Exploring Geometry]

Redraw the rectangle enlarged by a scale factor of 3 about the origin of the axes.



29. [Statistics]

At what age does the target heart rate for adults range between 90 and 153 beats per minute?



30. [Probability] *

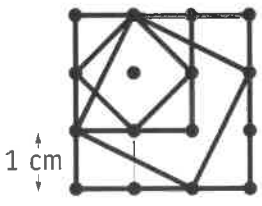
A student is chosen at random from a class of 16 girls and 12 boys. What is the probability that the student chosen is not a girl?

31. [Problem Solving 1] *

In the Williams family George is twice as old as his son Jack, and Jack is twice as old as his son Alex. If the total of their ages is 147, how old is George?

32. [Problem Solving 2] *

A square is to be constructed using any 4 of the sixteen points below as corner points. The smallest square that can be constructed in this way has an area of 1 cm^2. What other areas are possible?



1, ___, ___, ___ & ___ cm^2

MATHS MATE 10

Term 2 - Sheet 2

Name: .....

Due Date: ...../...../.....

Parent's Signature: .....

1. [Long ×,÷] *

$374 \times 18 =$

2. [Decimal +,−] *

$3.6 - 0.046 =$

3. [Decimal ×,÷] *

$0.07 \times 0.14 =$

4. [Fraction +,−]

$4 - \frac{2}{5} =$

5. [Fraction ×,÷] *

$\frac{3}{4} \times \frac{8}{9} =$

6. [Percentages] *

50% of 2 kg = ____ g

7. [Decimals / Fractions / Percentages]

Write 4% as a fraction in simplest form.

8. [Integer +,−] *

$(+14) + (-11) - (+15) =$

9. [Integer ×,÷] *

$(-4) \times (+3) \times (-6) =$

10. [Rates / Ratios]

Italy has an area of just over 300 000 km^2, and reached a population of nearly 60 000 000 people in 2010. What was the average population density of Italy in 2010?

____ people/km^2

11. [Indices] *

Evaluate $\frac{8^8}{8^6}$

12. [Square Roots] *

$10\sqrt{144} =$

13. [Exploring Number]

5.6×10^{-6} is the scientific notation for:

A) 5.600000 B) 0.0000056 C) 0.000056

14. [Applied Number] *

A salesman earns a monthly salary of $800 plus 4% commission on sales. What value are his sales if he earns $4000 for a month?

15. [Number Patterns]

Complete the pattern:

$3, -15, 75, -375,$ ____ , ____

16. [Expressions]

Choose the like terms:

$b^2, -2b, -c^2, 2b^2$

17. [Substitution] *

Use $A = \frac{1}{2}(a+b)h$ to find the area A of a trapezium when $a = 9$, $b = 4$ and $h = 5$

18. [Expansion]

Expand $-3x(2 - 3y)$

19. [Factorisation]

Factorise

$5g^2 - 10gh - 15gi$

20. [Equations] *

Solve for x: $2x + 3(1 - 2x) = 3$

21. [Graphs & Functions] *

Find the y-intercept for the linear rule $y - 3x = -4$ [Hint: Let $x = 0$ in the rule.]

QUOTE OF THE WEEK: My mind is already made up. Don't confuse me with facts! Rossiter

22. [Units of Measurement / Time] *

Wade departs Perth on Tuesday at 1430 and arrives in New York on Wednesday at 0030. If New York time is 12 hours behind Perth, how long was the flight?

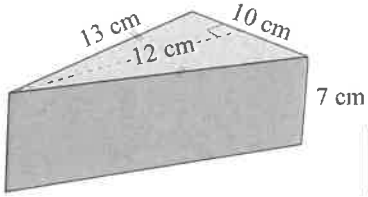
23. [Perimeter / Area] *

A badminton court measures 6.1 m by 13.4 m. What is the perimeter of the court?

m

24. [Surface Area / Volume] *

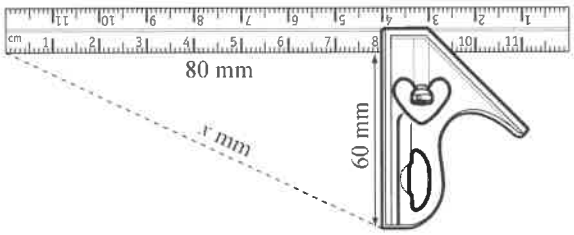
Find the total surface area of the piece of mud cake.



cm^2

25. [Pythagoras / Trigonometry] *

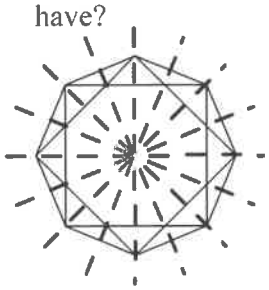
Find the missing length in this diagram showing a T-square.



mm

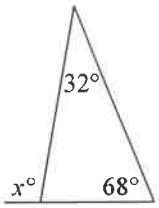
26. [Shapes]

Draw all the axes of symmetry of this shape. How many axes of symmetry does the shape have?



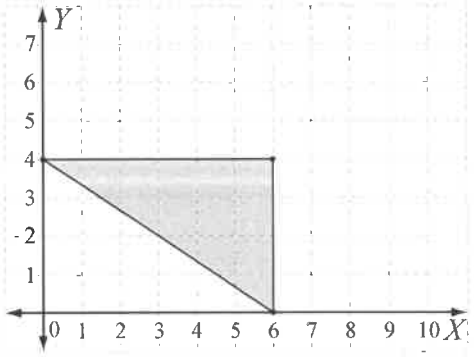
27. [Angles] *

Find the value of $x°$.



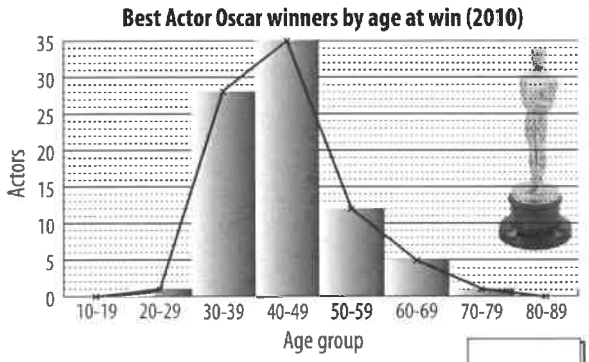
28. [Exploring Geometry]

Redraw the triangle reduced by a scale factor of 2 about the origin of the axes.



29. [Statistics]

How many Oscars have been won by actors aged less than 30?

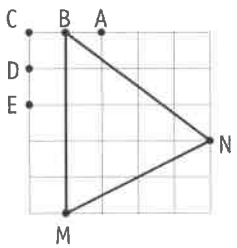


30. [Probability] *

A 52-card deck of playing cards is shuffled, and one card is dealt from the top of the deck. What is the probability that it is not a club? [Give your answer as a decimal.]

31. [Problem Solving 1] *

Points A, B, C, D and E are placed on a square grid as shown. Which of these five points forms an isosceles triangle with the other two vertices M and N?



32. [Problem Solving 2] *

Gino and Pedro are bricklayers. Gino lays 150 bricks in 60 minutes and Pedro lays 20 bricks in 10 minutes. If they work together, how long will it take them to lay 180 bricks?

min

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Understand conditional probability

Name: _____ **Date:** _____

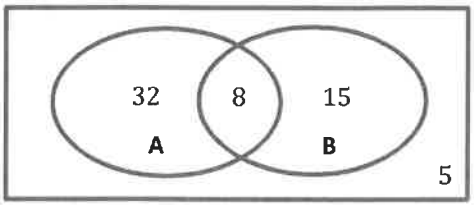
Chance	Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language (VCMSP348)

Understanding

1. If a standard die is rolled and lands on a number less than 4, what is the probability that the number is 1?

2. If a standard die is rolled and it lands on a number greater than 4, what is the probability that the number is 6?

3. Use the Venn Diagram below to calculate the following.



a) Pr (A∩B)

b) Pr (A∩B')

c) Pr (A'∩B')

d) Pr (A∪B)

e) Pr (A'∩B)

Fluency

1. A standard die is rolled, followed by a coin being tossed. Complete the 2-way table and answer the questions.

		Coin	
		H	T
Die	1		
	2		
	3		
	4		
	5		
	6		

a) Pr $(4, H)$

b) Pr $(< 3, T)$

c) Pr $(\geq 5, H)$

2. Twenty Year 10 students went on a camp. Five students lost their mobile phone, eight students spent all their money, four students lost their mobile phone and spent all their money.

a) What is the probability that a student who lost their mobile phone did not spend all of their money?

b) What is the probability that a student arrived home without issue?

Problem Solving

1. A survey was conducted to compare the percentage of people employed to the percentage of people studying. The results showed that 73% of people surveyed were employed, and 34% of people were doing some form of study. Draw a Venn Diagram to help calculate the probability that a person that is employed is doing some sort of study.

Reasoning

1. If a coin is tossed 5 times in a row and the coin lands on heads all 5 times, is the chance of obtaining a tail on the next toss increased because of this history? Explain your reasoning. _____

_____

_____

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Explore two- and three-step experiments

Name: _____ **Date:** _____

Chance	Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence (VCMSP347)

Understanding

1. Draw a tree diagram in the space provided to represent a coin being tossed 3 times in a row.

2. Use the tree diagram to help you calculate the following theoretical probabilities.

a) Pr (3 tails)

b) Pr (2 heads, 1 tail)

c) Pr (2 tails, 1 head)

d) Pr (3 heads)

Fluency

1. Complete the table to represent the total of 2 dice being thrown.

Purple Dice \ Green Dice	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

2. Use the table to help you calculate the following theoretical probabilities.

a) Pr (total of 8)

b) Pr (odd total)

c) Pr (total > 5)

d) Pr (total even or a 9)

e) Pr (total of 9)

f) Pr (total ≤ 10)

Problem Solving

1. If the 8 coins pictured are placed in a bag, find the theoretical probability of drawing out the following coins in each case <u>without replacement</u>.

a) Pr ($\$1, \$2$)

b) Pr ($\$1, \$1, 10c$)

c) Pr ($\$1, \$1, \$1$)

d) Pr ($10c, \$2, \$2$)

2. For the same 8 coins pictured, find the theoretical probability of drawing out the coins in each case <u>with replacement</u>.

a) Pr ($\$1, 10c$)

b) Pr ($10c, \$2$)

c) Pr ($10c, \$1, \$2$)

d) Pr ($\$1, \$1, \$1$)

e) Pr ($\$2, \$2, \$2$)

f) Pr ($\$2, \$1, \$1$)

Reasoning

1. Is the second event dependent or independent of the first?

a) A coin is tossed 2 times, landing on heads first and tails second. _____

b) A black counter is chosen and not replaced. This is followed by a grey counter. _____

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Find quartile and interquartile ranges

Name: _____ **Date:** _____

Data Representation and Interpretation	Determine quartiles and interquartile range and investigate the effect of individual data values, including outliers on the interquartile range (VCMSP349)

Understanding

1. For each set of data identify the minimum and maximum values and the range.

a) 17, 20, 43, 38, 92, 82, 27, 13, 75, 46, 78, 39

Minimum _____ Maximum _____

Range _____

b) 156, 218, 439, 133, 526, 574, 127, 573, 233, 373, 182, 573

Minimum _____ Maximum _____

Range _____

2. For each set of data identify the median.

a) 10, 12, 23, 38, 44, 45, 56, 57, 75, 81, 92, 96

Median _____

b) 18, 12, 10, 23, 17, 58, 28, 32, 37, 15, 18, 31, 48, 37, 57, 23

Median _____

c) 283, 322, 326, 362, 463, 246, 483, 467, 463, 372, 462

Median _____

Fluency

1. For each set of data identify the lower and upper quartile.

a) 12, 15, 15, 18, 20, 22, 24, 27, 29, 31, 32

Lower quartile _____

Upper quartile _____

b) 31, 36, 39, 42, 46, 53, 55, 61, 68, 73, 82, 86, 92, 97, 99

Lower quartile _____

Upper quartile _____

2. For each set of data identify the interquartile range.

a) 9, 11, 16, 19, 26, 29, 33, 37, 39, 42, 46

Interquartile Range _____

b) 38, 47, 49, 52, 55, 67, 69, 71, 74, 78, 85, 89, 96, 99, 111

Interquartile Range _____

c) 23, 11, 26, 32, 44, 28, 52, 12, 63, 24,18

Interquartile Range _____

Problem Solving

1. 20 students have completed a Maths test with the mark of each being shown below. Use this data to prepare a 5-figure summary.

82%, 74%, 41%, 97%, 63%, 62%, 74%, 26%, 39%, 37%, 58%, 59%, 72%, 95%, 76%, 58%, 69%, 94%, 97%, 73%

2. Perth General Hospital would like to perform an analysis of the weights of newborn babies this week. Use this data to prepare a 5-figure summary for the hospital.

2.2 kg, 2.5 kg, 2.7 kg, 2.7 kg, 2.9 kg, 3.1 kg, 3.3 kg, 3.4 kg 3.6 kg, 3.8 kg, 3.8 kg, 3.9 kg, 4.0 kg, 4.1 kg, 4.1 kg, 4.3 kg

Reasoning

1. For the Maths test above, what approximate percentage of students got a test score above 65%?

2. For the hospital analysis above, what percentage of newborn babies had a weight of at least 3.3 kg?

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Understand box plots

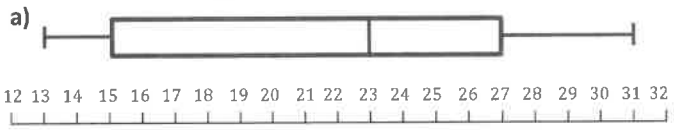
Name: _____ Date: _____

Data Representation and Interpretation	Construct and interpret box plots and use them to compare data sets (VCMSP350)

Understanding

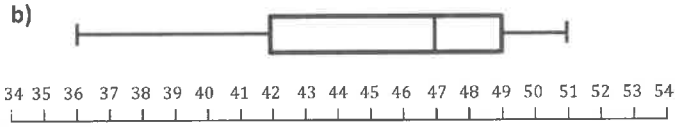
1. Prepare a five-figure summary for each of the box plots.

a)



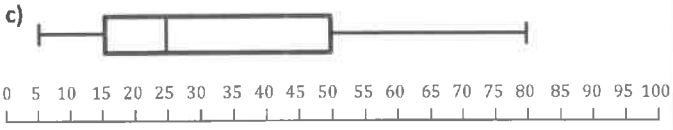
Min _____ Q1 _____ Median _____ Q3 _____ Max _____

b)



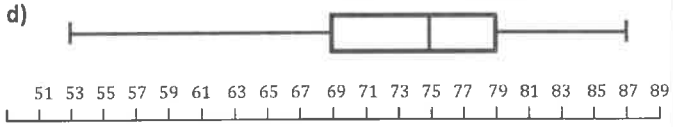
Min _____ Q1 _____ Median _____ Q3 _____ Max _____

c)



Min _____ Q1 _____ Median _____ Q3 _____ Max _____

d)



Min _____ Q1 _____ Median _____ Q3 _____ Max _____

Fluency

1. The air quality index for Melbourne has been recorded by Environment Victoria for a one-month period with the results being printed below.

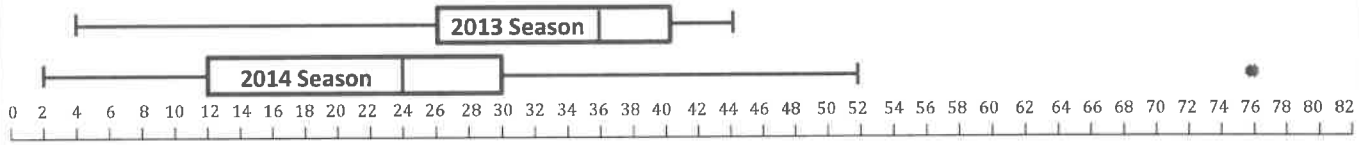
Date	AQI	Date	AQI	Date	AQI
01-Sep	16%	11-Sep	31%	21-Sep	11%
02-Sep	23%	12-Sep	33%	22-Sep	13%
03-Sep	34%	13-Sep	25%	23-Sep	19%
04-Sep	12%	14-Sep	22%	24-Sep	23%
05-Sep	20%	15-Sep	26%	25-Sep	27%
06-Sep	29%	16-Sep	30%	26-Sep	29%
07-Sep	43%	17-Sep	25%	27-Sep	31%
08-Sep	41%	18-Sep	21%	28-Sep	34%
09-Sep	38%	19-Sep	17%	29-Sep	38%
10-Sep	32%	20-Sep	10%	30-Sep	40%

a) Prepare a five-figure summary for the data.

b) Draw a box plot to represent the five-figure summary. Make sure you include a scale on your plot.

Problem Solving

1. The Flying Eagles Football Club has completed an analysis of its winning margins over the past two seasons. The data has been presented to the coaching staff in a set of parallel box plots. The head coach has requested that further analysis be conducted and has asked you to answer the following questions.



a) What does the dot represent?

b) What was the difference between our median winning margins for both seasons?

c) Which season did we have a smaller range of victory?

d) What was the difference between the interquartile ranges for the two seasons?

Reasoning

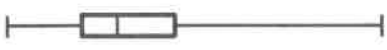
1. Comment on how the data in each box plot is skewed.

a) 

_____

b) 

_____

c) 

_____

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Compare box plots and histograms

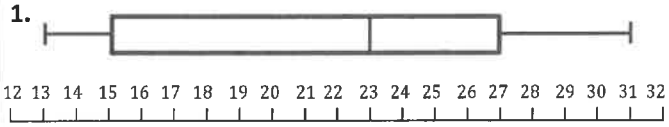
Name: _____ **Date:** _____

Data Representation and Interpretation	Compare shapes of box plots to corresponding histograms and dot plots and discuss the distribution of data (VCMSP351)

Understanding

Analyse each of the box plots below to answer the questions.

1.

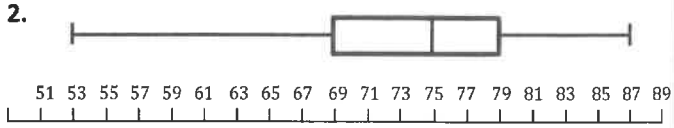


a) What approximate percentage of the data is < 23?

b) What approximate percentage of the data is > 15?

c) 75% of the data is less than what number?

2.



a) What approximate percentage of the data is > 81?

b) What approximate percentage of the data is < 71?

c) 50% of the data is greater than what number?

Fluency

1. Prepare a five-figure summary for the dot plot.

<u>10C Class - Average Weekly Wage - Part-Time Work</u>

2. Use this five-figure summary data to construct a box plot which is drawn correct to scale.

Problem Solving

1. Digibit Teleco recorded a random sample of current download speeds available to some of its customers in the Dandenong region. Use this data to construct a five-figure summary, histogram and box plot.

Dandenong Region - Internet Speeds (Mb/sec)		
48	83	35
55	93	57
23	43	58
47	74	47
65	32	84

a) Prepare a five-figure summary of the data.

Min _____ Q1 _____ Median _____ Q3 _____ Max _____

b) Draw a box plot of the five-figure summary to the correct scale.

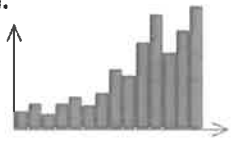
c) Draw a histogram of the data to the correct scale.

Reasoning

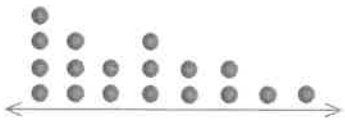
1. Comment on how the data in each plot is skewed.

a)

b)



c)



_____ _____ _____

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HOW MANY TIMES and WINNING STREAKS

When you toss a coin it can land as a "Head" or a "Tail". Mathematically this means that you have 1 chance out of 2 (written as ½) or a 50% chance of getting either a head or a tail.

1. When it comes to chance and one-off-events, theoretical probability and what actually happens can be quite different. Estimate how many throws of a coin you think you would need to perform before you have the same number of heads as tails?

   Estimate . . . . . .

2. Test to see if your estimate is correct. Using 10 trials, throw a coin and record the results. Stop each trial after you have the same number of heads as tails. After 10 trials write the mean number of throws needed.

	results	Total throws
Example Trial	H H T H T T	6
Trial 1		
Trial 2		
Trial 3		
Trial 4		
Trial 5		
Trial 6		
Trial 7		
Trial 8		

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Trial 9

Trial 10

Mean

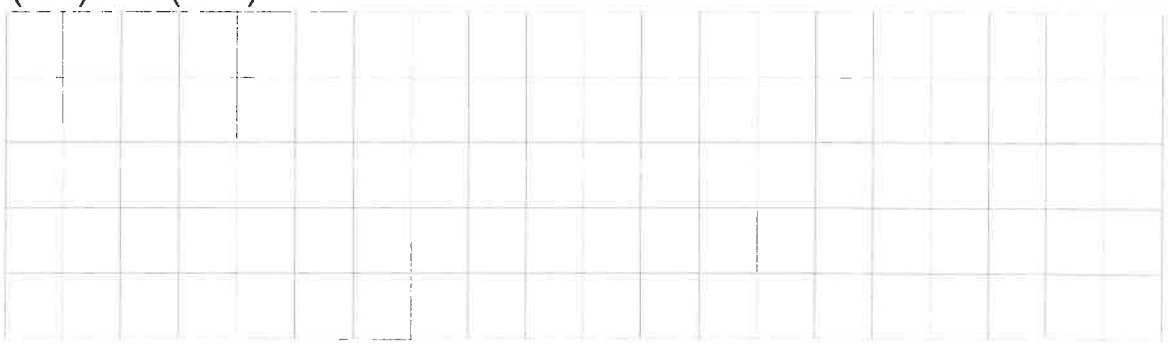
3. What was the longest winning streak of heads and tails? . . . . . .

4. Using the results from at least 6 others students in your class find the least, the most and the mean number of throws needed before 50% heads and 50% tails was achieved?

Number of Throws Least . . . . . Mean . . . . . Most . . . . . .

You play Dorothy each week at tennis. You both play in the same grade for your club and consider yourselves of equal ability. In your games together you both seem to win an equal amount of the time. However in one particular period Dorothy wins five games in a row before you can beat her again. Can you or Dorothy claim to be the better player?

5. In the simulation below you will find how common different winning streaks are if there are two teams or two people of equal ability. Either use a coin or a die (using heads / tails, odds / evens or 1, 2 or 3 for a win and 4, 5 or 6 for a loss). Play 100 games and record the results in the table below as a W (win) or L (loss).



A winning streak is defined as the number of wins in a row before a loss.
A winning streak can be 1, 2, 3, 4 or more.

6. Analysing the outcomes.

The total number of wins was . . . . . .

The total number of losses was . . . . . .

The total number of winning streaks was . . . . . .

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The average winning streak length was . . . . . .

Record your results as well as 4 others in the table below.

Number of Wins	Number of Streaks	Length of Wining Streak 1	2	3	4	5	6	7
i.								
ii.								
iii.								
iv								
v.								

Averages

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7. Draw a bar graph that shows the number of each winning streak size.

8. Even if players or teams are of seemingly equal ability, it is still possible for one to have a 6 or 7 game winning streak. How then can you tell if one player is better than another? Is it because they have longer or more winning streaks or is it because of some other factor?

. . . . . .

9. Suppose a player has a probability of winning other than 50% (e.g 10%, 20%, 30%, 40%, 60%, 70%, 80% or 90%). Divide your class into groups and design a 100 game simulation with each group choosing a different probability. Make a summary of the results on your own paper.

10. Using the results from question 9 answer the following questions.

i. As the probability goes above 0.5 the number of winning streaks goes

. . . . . and their average length goes . . . . . .

ii. As the probability goes below 0.5 the number of winning streaks goes

. . . . . and the average length goes . . . . . .

iii. From this experiment how can you tell if one player or team is better than another?

. . . . . .

. . . . . .

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SUMS AND DIFFERENCES

When you toss a die the chance of throwing a 1, 2, 3, 4, 5 or 6 is $\frac{1}{6}$.

However how many times do you think you would need to throw a die before each number has appeared one sixth of the time?

Estimate: . . . . . .

1. Each member of the class should throw a die and record the results. Stop when you have an equal amount of each number. Record your results in the table below. Then compare your results with others in your class.

1	2	3	4	5	6

2. Using the results from your whole class give the following statistics:

Minimum number of throws . . . . . Maximum number of throws: . . . . .

Median number of throws: . . . . . Mean number of throws . . . . . .

3. In this game you can win if you throw a 1, 2, 3, 4, and lose if you throw a 5 or 6. This means you have 4 out of 6 chances (or 2/3) of winning. How many times do you need to throw the die until you have won 2/3 of the time?

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Win

Lose

4. Compare your results with others in the class. If you were going to conduct an experiment where you didn't know the probabilities of each value occurring, how many trials would you use to be sure that you had the best result?

. . . . . .

. . . . . .

When you throw two dice the difference between the two is 0, 1, 2, 3, 4 or 5.

5. Choose a partner.

Player 1 wins if the difference between the two numbers is 0, 1 or 2.

Player 2 wins if the difference between the two numbers is 3, 4 or 5.

Who do you think will win? Give a reason for your answer.

. . . . . .

. . . . . .

Toss the two dice 60 times and record the results of who wins.

6.

Results	Number of Wins	Total /60
Player 1: 0, 1, 2		
Player 2: 3, 4, 5		
		Total

7. Now record your results along with 9 others in your class.

Player 1:											
Player 2:											

8. Below is a table of all the theoretical results. Complete the table and highlight all the possible differences for Player 1 to win.

die 2 \ die 1	1	2	3	4	5	6
1	0	1	2	3	4	5
2	1					
3	2					
4	3					
5	4					
6	5					

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9. Was the game fair?

. . . . . .

10. What is the theoretical probability that each player wins? How close were each of the results to the actual theoretical probability?

. . . . . .

11. How can we modify this game to make it fair?

. . . . . .

12. In this next game simulation, Player 1 wins if the sum of the two dice is 5, 6, 7 or 8 and Player 2 wins if the sum is 2, 3, 4, 9, 10, 11 or 12.

Who do you think will win the most? . . . . . Toss the dice 60 times and record who wins.

Results	Number of Wins	Total /60
Player 1: , 6, 7, 8		5
Player 2: , 3, 4, 9, 10, 11		2

13. Now record your results along with 9 others in your class.

										Total
Player 1:										
Player 2:										

14. Was this game fair? Write down the theoretical probability of winning for each player and compare it to the results from your class. Finally, choose sums that will give each player an equal and fair chance of winning.

. . . . . .

. . . . . .

. . . . . .

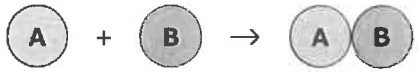
3.2 Types of Chemical Reactions

Introduction

- Chemical reactions can be categorised into general types, based on the way atoms and molecules are _____ during the reaction.
- Classifying chemical reactions can make it possible to predict _____ of reactions.

Combination (Synthesis) Reactions

- Combination reactions involve _____ reactants combining to form _____ product.



- They can be generalised by the following equation:

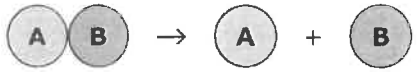
Examples

$H_2\ (g) + O_2\ (g) \rightarrow H_2O\ (l)$

$Li_2O\ (s) + CO_2\ (g) \rightarrow Li_2CO_3\ (s)$

Decomposition Reactions

- Decomposition reactions involve _____ reactant breaking down to form _____ products.



- They can be generalised by the following equation:

Examples

$Mg_3N_2\ (s) \rightarrow Mg\ (s) + N_2\ (g)$

$NH_4NO_3\ (s) \rightarrow N_2O\ (g) + H_2O\ (l)$

YEAR 10 REMOTE LEARNING
SCIENCE
CHEMISTRY

Seymour College

LEARNING INTENTION: We are learning that chemical reactions can be categorised based on the way atoms and molecules are rearranged during the reaction and how to identify the different types of chemical reactions.

SUCCESS CRITERIA: I can list the main types of chemical reactions and classify chemical reactions by reading a chemical equation.

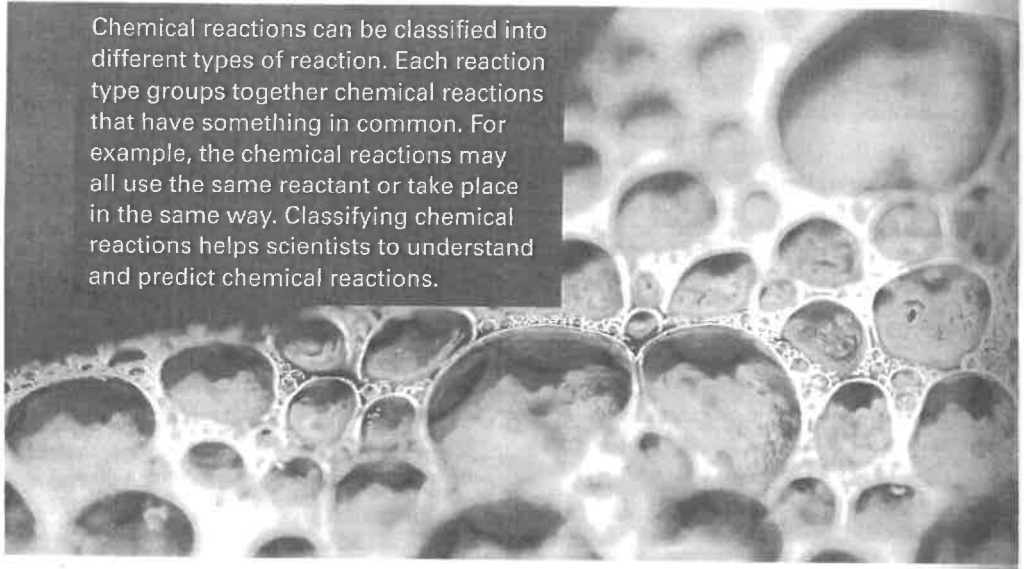
Chemical Reaction

A	K	N	O	I	T	A	U	Q	E	L	A	C	I	M	E	H	C	U	B	N	H	F	P
Q	W	X	C	N	O	I	T	C	A	E	R	N	O	I	T	S	U	B	M	O	C	K	V
U	A	N	O	I	T	C	A	E	R	E	L	B	I	S	R	E	V	E	R	E	D	K	J
E	C	G	D	B	A	L	A	N	C	E	D	E	Q	U	A	T	I	O	N	E	M	T	S
O	J	F	U	W	F	S	Y	J	N	Y	Z	Y	K	T	R	S	T	J	C	Q	O	N	K
U	X	E	K	K	S	V	O	D	I	T	U	D	V	F	C	B	U	O	Q	I	E	A	E
S	R	N	O	I	R	O	T	A	T	C	E	P	S	O	F	U	M	X	Q	A	Q	T	L
S	I	L	J	U	J	Q	A	S	J	C	G	Y	M	X	R	P	D	N	N	A	P	C	E
O	M	I	V	I	D	K	C	L	F	Y	Z	N	J	J	O	K	G	D	I	R	N	A	T
L	P	O	H	M	C	O	Z	G	Z	M	Y	G	A	S	X	N	R	Y	R	A	Z	E	O
U	N	E	T	I	O	N	I	C	E	Q	U	A	T	I	O	N	T	M	I	P	Q	R	N
T	C	T	Z	I	H	G	O	Q	O	E	F	I	F	B	X	Y	L	M	B	Q	Y	F	E
I	N	V	A	L	E	H	A	I	D	G	O	O	C	U	L	H	E	Z	G	T	F	I	Q
O	V	W	A	P	I	I	I	B	V	N	A	L	T	O	C	L	T	H	R	C	G	T	U
N	C	T	C	Q	W	F	V	G	R	S	Y	V	K	Y	E	K	S	T	W	E	H	N	A
S	D	L	I	E	Y	S	V	E	Y	A	Y	Y	R	M	I	F	Z	O	X	I	D	R	T
T	U	E	Q	H	U	L	A	S	E	K	F	C	X	N	G	Q	F	J	T	D	H	Y	I
S	W	C	F	N	J	C	Y	B	L	A	K	Q	F	K	H	R	U	I	R	J	L	W	O
Y	L	X	A	N	T	G	V	I	P	H	J	X	Z	E	S	N	A	C	C	Z	M	A	N
L	B	E	M	I	O	A	O	W	C	Q	Y	N	A	L	F	M	V	K	M	I	I	V	Y
A	M	C	O	H	I	J	S	E	I	R	E	S	Y	T	I	V	I	T	C	A	E	S	E
T	A	N	Z	U	Z	M	T	X	R	K	E	D	I	C	K	M	N	H	D	O	Q	N	K
A	N	O	I	T	C	A	E	R	N	O	I	T	A	N	I	B	M	O	C	M	L	P	T
C	P	V	U	Q	K	N	H	Y	Y	J	Z	G	E	M	P	P	M	M	I	Y	B	R	K

yeilds
balanced equation
combustion reaction
reactant
product
spectator ion
chemical equation
combination reaction
decompostion reaction
reversible reaction
aqueous solution
catalyst
coefficient
net ionic equation
skeleton equation
activity series

MODULE
6.3 Classifying chemical reactions

Chemical reactions can be classified into different types of reaction. Each reaction type groups together chemical reactions that have something in common. For example, the chemical reactions may all use the same reactant or take place in the same way. Classifying chemical reactions helps scientists to understand and predict chemical reactions.



science 4 fun

Raisin lava lamp

Can you use a chemical reaction to make a lava lamp?

Collect this ...

- clear fizzy drink such as lemonade or tonic water
- raisins
- clear glass or bottle

Do this ...

1. Pour the lemonade into the clear glass or bottle.
2. Add several raisins.

Record this ...

1. Describe what you saw.
2. Explain why you think this happened.

Decomposition reactions

Some chemical reactions are classified by how the reactants form the products. For example, when a single reactant breaks apart to form several products, the reactant is said to decompose. This type of chemical reaction is known as a **decomposition reaction** and has the general equation:

$$XY \rightarrow X + Y$$

An everyday example of a decomposition reaction is the chemical reaction that puts the fizz in soft drinks like the one shown in Figure 6.3.1. Soft drinks contain dissolved carbonic acid (H_2CO_3). When carbonic acid decomposes, it forms water (H_2O) and bubbles of carbon dioxide gas (CO_2). The carbon dioxide gas formed by this reaction remains dissolved in the soft drink until the lid is removed.

The equations for the decomposition of carbonic acid are:

carbonic acid	→	water	+	carbon dioxide
H_2CO_3	→	H_2O	+	CO_2

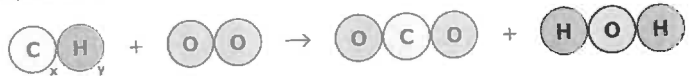
3.2 Types of Chemical Reactions

Combustion Reactions

- Combustion reactions involve the burning of _____ (compounds containing carbon and hydrogen).
- The products of combustion reactions vary, depending on the supply of _____.

Complete Combustion

- For complete combustion reactions, the supply of oxygen is / is not limited.



- They can be generalised by the following equation:

_____ + _____ → _____ + _____

Examples

$CH_4\ (g) + O_2\ (g) \rightarrow CO_2\ (g) + H_2O\ (g)$

$C_4H_8\ (g) + O_2\ (g) \rightarrow CO_2\ (g) + H_2O\ (g)$

Double Displacement (Double Replacement) Reactions

- Double displacement reactions involve two _____ reacting to form two different _____.

compound-1 + compound-2 → compound-3 + compound-4

- They can be generalised by the following equation:

_____ + _____ → _____ + _____

Examples

_____ reactions – two soluble salts reacting to form an insoluble salt:

$AgNO_3\ (aq) + NaCl\ (aq) \rightarrow AgCl\ (s) + NaNO_3\ (aq)$

_____ reactions – an acid and a base reacting to form a salt and water:

$H_2SO_4\ (aq) + NaOH\ (aq) \rightarrow Na_2SO_4\ (aq) + H_2O\ (l)$

6.3 Classifying chemical reactions

Science understanding

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Scientists classify chemical reactions into different types. The classification might depend on the type of reactants that are involved, the type of products that are produced or how the reactants interact to form the products. This helps scientists to understand more about chemical reactions because by understanding one chemical reaction, they can also understand other chemical reactions of the same type.

Some common types of chemical reactions are:

- *decomposition*—when one reactant breaks apart to form two or more products
- *precipitation*—when two aqueous solutions mix to produce a solid
- *neutralisation*—when an acid reacts with a base to produce a salt and water
- *combustion*—a highly exothermic reaction in which a substance combines with oxygen to produce heat and light.

(1) Classify each reaction listed below by placing a cross in the relevant column. Remember, a chemical reaction may fit more than one classification.

Chemical reaction	Decomposition	Precipitation	Neutralisation	Combustion
(a) $4HNO_3 \rightarrow 2H_2O + 4NO_2 + O_2$				
(b) $2AgNO_3 + Na_2S \rightarrow Ag_2S + 2NaNO_3$				
(c) $2H_2 + O_2 \rightarrow 2H_2O$				
(d) $HNO_3 + KOH \rightarrow KNO_3 + H_2O$				
(e) $2Na + O_2 \rightarrow Na_2O$				
(f) $2SO_3 \rightarrow 2SO_2 + O_2$				
(g) $2KI + Pb(NO_3)_2 \rightarrow 2KNO_3 + PbI$				
(h) $H_2SO_4 + Mg(OH)_2 \rightarrow MgSO_4 + 2H_2O$				
(i) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$				
(j) $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$				
(k) $H_2O_2 \rightarrow H_2 + O_2$				
(l) $NaOH + HCl \rightarrow NaCl + H_2O$				

FIGURE 6.3.1 The decomposition reaction of carbonic acid gives carbonated water its fizz.

Thermal decomposition

Some substances will only decompose when heated. This is known as thermal decomposition. Metal carbonates and metal hydrogen carbonates both undergo thermal decomposition when heated. For example, when sodium hydrogen carbonate is heated above 50°C, it decomposes to form sodium carbonate, carbon dioxide and water. The equations for this reaction are:

sodium hydrogen carbonate → sodium carbonate + carbon dioxide + water

$2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$

Thermal decomposition of sodium azide (NaN_3) is a chemical reaction that saves lives every day by inflating vehicle airbags like the one in Figure 6.3.2.

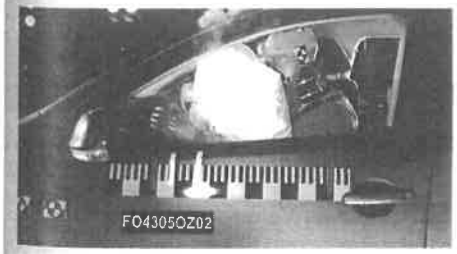

FIGURE 6.3.2 The decomposition of sodium azide (NaN_3) saves lives every day.

When sodium azide is heated, it decomposes into sodium metal and nitrogen gas. The equations for this reaction are:

sodium azide → sodium + nitrogen gas

$2NaN_3 \rightarrow 2Na + 3N_2$

Just 100 grams of sodium azide can produce around 56 litres of nitrogen gas in under 0.03 seconds. This reaction rapidly inflates the airbag in the event of a collision.

Thermal decomposition is particularly important for extracting metals from their ores. This was an important discovery in human history. As early as 3000 BCE, humans discovered that they could heat copper ores to extract copper metal. The chemical equations for this chemical reaction are:

copper(II) oxide → copper + oxygen gas

$CuO_2(s) \rightarrow Cu(s) + O_2(g)$

This decomposition reaction allowed our ancestors to produce new tools and weapons made of bronze (a copper alloy), like the ones in Figure 6.3.3. The discovery took human civilization out of the Stone Age and into the Bronze Age.

FIGURE 6.3.3 Tools and weapons from the Bronze Age

Combination reactions

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Combination reactions occur when two reactants combine to form a single product. The general equation for a combination reaction can be written as:

$X + Y \rightarrow XY$

Combination reactions are important in industry. For example, a combination reaction is used to create hydrochloric acid for industry and laboratories. First, hydrogen gas (H_2) and chlorine gas (Cl_2) are combined to form hydrogen chloride gas (HCl) in large chemical plants.

The equations for the combination of hydrogen and chlorine are:

hydrogen gas + chlorine gas → hydrogen chloride

H_2 + Cl_2 → 2HCl

The hydrogen chloride gas that is produced is then bubbled through de-ionised water to produce hydrochloric acid.

Precipitation reactions

Occasionally when two clear solutions are mixed together, they react to form an insoluble solid. The solid is said to precipitate (fall) out of the solution. These types of reactions are known as **precipitation reactions**. For example, the scale that builds up in kettles, taps and pipes is solid calcium carbonate ($CaCO_3$) that has precipitated out of the tap water as shown in Figure 6.3.4.

FIGURE 6.3.4 A close-up photograph of a tap with calcium carbonate that has precipitated out of the tap water

Precipitation reactions and solubility

A precipitation reaction occurs when two **soluble** reactants combine to form an **insoluble** product known as the **precipitate**. A precipitation reaction is shown in Figure 6.3.5.

A substance is said to be soluble if it dissolves. For example, sugar is soluble in water. When a soluble substance is dissolved in water, the particles that make up the substance are spread thinly throughout the solution. The particles are so small and so thinly distributed that they cannot be seen with the naked eye. As a result, the solution appears transparent (clear), not cloudy or murky.

In precipitation reactions, particles from two soluble compounds mix together and some stick together to form an insoluble solid. The solid precipitates out of the solution, making it murky. Usually, the solution then clears as the precipitate settles on the bottom or rests at the top.

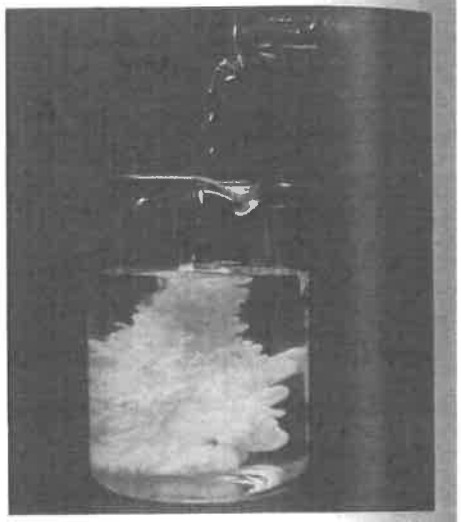

FIGURE 6.3.5 Precipitation reactions occur when two soluble solutions react to produce an insoluble solid.

SciFile

Painful precipitates

Your body is full of dissolved compounds. However, sometimes these compounds precipitate out as hard deposits in the kidneys. These deposits, called kidney stones, are extremely painful. Usually kidney stones will pass out of the body with urine. However, in severe cases, the stones may have to be removed surgically or shattered by intense soundwaves.

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SciFile

Houston we have a problem!

A neutralisation reaction saved the lives of the astronauts on the *Apollo 13* space mission (Figure 6.3.11). In the last stages of their mission, the crew members were faced with a serious build up of carbon dioxide gas that would have suffocated them. They managed to use lithium hydroxide, a base, to neutralise the carbon dioxide and keep the air breathable.

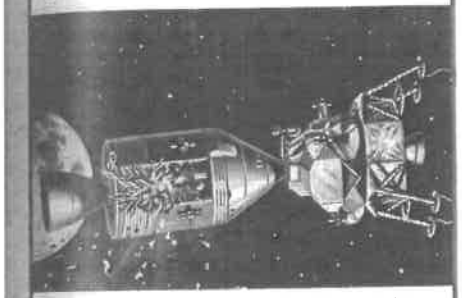


FIGURE 6.3.11 An artist's impression of the explosion that crippled *Apollo 13* on its way to the Moon in 1970

Acids and metals

Acids react with metals to produce a salt and hydrogen gas. The general equation for this type of reaction is:

acid + metal → salt + hydrogen gas

For example, the reaction between hydrochloric acid (HCl) and magnesium metal (Mg) produces large amounts of hydrogen gas (H_2). The balanced chemical equation for this reaction is:

hydrochloric acid + magnesium → magnesium chloride + hydrogen gas

2HCl + Mg → $MgCl_2$ + H_2

Acids and metal reactivity

Most metals will react with acids, but some react more than others as shown in Figure 6.3.12. Very reactive metals such as sodium (Na), potassium (K) and calcium (Ca) react violently. Others such as lead (Pb) require hot and highly concentrated acids before a reaction will occur. Gold (Au) does not usually react with acids.

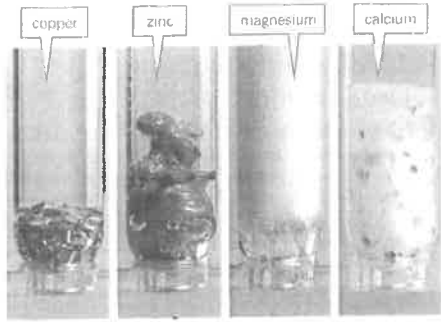


FIGURE 6.3.12 Copper, zinc, magnesium and calcium all react with acid to varying degrees. Copper hardly reacts at all, but calcium reacts violently.

Acids and carbonates

Acids react with carbonates to produce salt, water and carbon dioxide gas. The general word equations for these reactions are:

acid + carbonate → salt + water + carbon dioxide

For example, when sulfuric acid (H_2SO_4) reacts with calcium carbonate ($CaCO_3$) to produce calcium sulfate ($CaSO_4$), water (H_2O) and carbon dioxide (CO_2). The balanced equation for this reaction is:

sulfuric acid + calcium carbonate → calcium sulfate + water + carbon dioxide

H_2SO_4 + $CaCO_3$ → $CaSO_4$ + H_2O + CO_2

Acid–carbonate reactions are better for cleaning up acid spills than a neutralisation reaction or acid–metal reactions. To neutralise a concentrated acid you need a concentrated base, which is just as dangerous as the concentrated acid. Using an acid–metal reaction would clean up the acid but produce large amounts of hydrogen gas, which is highly explosive. In contrast, carbonates are relatively harmless but can completely neutralise concentrated acids without producing flammable gases.

Prac 3 p. 257 | AB 6.3 | AB 6.4

Reactions with acids

Another method of classifying chemical reactions is based on the type of reactants used. Acids are a common type of reactant used throughout industry and in the home. There are several types of chemical reactions that use acids, including neutralisation reactions, acid–metal reactions and acid–carbonate reactions.

Neutralisation reactions

Neutralisation reactions occur when an acid reacts with a base. An **acid** is any substance that releases hydrogen ions (H^+) when dissolved in water. Acids have a pH of less than 7 and vary in strength from very safe to highly corrosive.

For example, sulfuric acid (H_2SO_4), hydrochloric acid (HCl) and nitric acid (HNO_3) are strong acids that can cause severe chemical burns to living tissue and eat through metals. Other acids are weaker and are often present in the foods you eat. Examples are acetic acid or ethanoic acid (CH_3COOH) found in vinegar, lactic acid ($C_3H_6O_3$) found in sour milk and citric acid ($C_6H_8O_7$) found in citrus fruits like the ones shown in Figure 6.3.9.

FIGURE 6.3.9 Not all acids are highly corrosive. The citric acid found in these citrus fruits is edible. You still wouldn't want to get it in your eye though!

Bases can be considered to be the opposite of acids. A **base** is a substance that produces hydroxide (OH^-) ions when dissolved in water. The solution formed is referred to as being **alkaline**. Bases and alkaline solutions have a pH greater than 7 and can be just as dangerous as acids. However, bases are instead referred to as being **caustic**. Sodium hydroxide (NaOH) is commonly referred to a caustic soda. It is an example of a highly corrosive base. However, there are also mild forms of bases that are safe to use around the home. These bases are commonly used as cleaning products and include household ammonia, soap and toothpaste (Figure 6.3.10).

FIGURE 6.3.10 Everyday cleaning products that you find in the home are often bases, such as toothpaste, soap and drain cleaner.

When an acid and a base are mixed together they can neutralise each other. This is because the hydrogen ions (H^+) from the acid react with the hydroxide ions (OH^-) from the base to form water (H_2O). Water is **neutral**. It has a pH of 7 and is neither acidic nor basic. The ions that the acid and base leave behind form a salt in the solution. The general equation for a neutralisation reaction is:

$$\text{acid} + \text{base} \rightarrow \text{salt} + \text{water}$$

The scientific term *salt* does not just refer to common table salt, sodium chloride (NaCl). Rather, the term *salt* has a very specific definition. To chemists, **salt** refers to ionic compounds that are produced through a chemical reaction with an acid. For example, sulfuric acid (H_2SO_4) is neutralised by magnesium hydroxide ($Mg(OH)_2$). Its equations can be written as:

$$\underset{\text{sulfuric acid}}{H_2SO_4} + \underset{\text{magnesium hydroxide}}{Mg(OH)_2} \rightarrow \underset{\text{magnesium sulfate}}{MgSO_4} + \underset{\text{water}}{2H_2O}$$

The hydrogen ions (H^+) from the sulfuric acid combine with the hydroxide ions (OH^-) in the magnesium hydroxide to form water molecules. This leaves behind magnesium (Mg^{2+}) and sulfate (SO_4^{2-}) ions that form a magnesium sulfate solution. In this case, magnesium sulfate is the salt.

Heartburn is caused by an excess of acid in the stomach. It can be controlled by a neutralisation reaction. Antacids are essentially bases in solid or liquid form that neutralise the excess acid. This is why they relieve heartburn.

Ionic compounds

Most precipitation reactions happen when solutions of different **ionic compounds** have been mixed.

Ionic compounds are substances made up of a crystal lattice of positive **ions** (**cations**) and negative ions (**anions**). They are often brightly coloured like the ionic compounds shown in Figure 6.3.6.

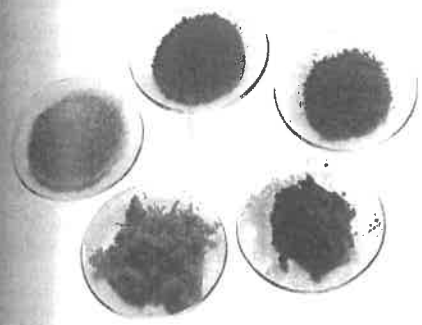


FIGURE 6.3.6 Ionic compounds are normally hard and brittle and come in a wide variety of colours.

The cations that make up the crystal lattice are atoms (or groups of atoms) that have lost electrons and therefore have a positive charge. Anions are atoms (or groups of atoms) that have gained electrons and therefore have a negative charge. Table 6.3.1 lists common cations and anions.

When ionic compounds dissolve, the cations and the anions break away from the crystal lattice and spread evenly throughout the solvent. For example when sodium chloride (NaCl) dissolves in water, the sodium cations (Na^+) and chloride anions (Cl^-) are dispersed throughout the liquid as shown in Figure 6.3.7.

Naming ionic compounds

The name of an ionic compound is simply the name of the cation followed by the name of the anion. For example, barium sulfate ($BaSO_4$) is made up of the barium cation (Ba^{2+}) and the sulfate anion (SO_4^{2-}). In the cases where an atom can form more than one type of ion (such as copper(I), Cu^+, and copper(II), Cu^{2+}), a roman numeral is included in the name of the compound. For example, copper(I) hydroxide (CuOH) or copper(II) sulfate ($CuSO_4$). The roman numeral indicates the charge on the cation.

TABLE 6.3.1 Common cations and anions

		Chemical name	Symbol
Cations	Lost 1 electron	Hydrogen ion	H^+
		Lithium ion	Li^+
		Sodium ion	Na^+
		Potassium ion	K^+
		Ammonium ion	NH_4^+
		Copper(I) ion	Cu^+
	Lost 2 electrons	Calcium ion	Ca^{2+}
		Magnesium ion	Mg^{2+}
		Barium ion	Ba^{2+}
		Copper(II) ion	Cu^{2+}
		Iron(II) ion	Fe^{2+}
	Lost 3 electrons	Iron(III) ion	Fe^{3+}
		Aluminium ion	Al^{3+}
Anions	Gained 1 electron	Fluoride	F^-
		Chloride	Cl^-
		Bromide	Br^-
		Iodide	I^-
		Hydroxide	OH^-
		Nitrate	NO_3^-
		Hydrogen carbonate	HCO_3^-
	Gained 2 electrons	Oxide	O^{2-}
		Sulfide	S^{2-}
		Sulfate	SO_4^{2-}
		Carbonate	CO_3^{2-}
	Gained 3 electrons	Nitride	N^{3-}
		Phosphate	PO_4^{3-}

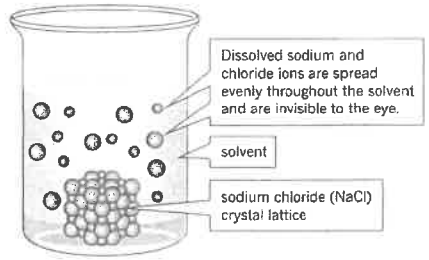


FIGURE 6.3.7 When sodium chloride dissolves, the lattice breaks apart and the ions distribute through the solution.

Ionic compounds have no overall charge—they are always neutral. This is because the total charge of the cations equals the total charge of the anions. For example, sodium oxide is made up of sodium ions (Na^+) each with a charge of +1 and oxide ions (O^{2-}) each with a charge of −2. Therefore, the chemical formula for sodium oxide is Na_2O. This formula indicates that there needs to be two sodium ions for every oxide ion in the crystal lattice to balance the charge.

Polyatomic ions are ions with more than one atom. Examples are NH_4^+ and SO_4^{2-}. The chemical symbol of these ions is put inside brackets when more than one is needed for a balanced formula. For example, the chemical formula for calcium hydroxide is $Ca(OH)_2$. This indicates that there are two hydroxide ions (OH^-) to balance the charge of each calcium ion (Ca^{2+}).

Predicting precipitation reactions

Scientists use the solubility rules in Table 6.3.2 to predict if a precipitation reaction will occur when two ionic solutions are mixed.

TABLE 6.3.2 Solubility rules

Negative ions (anions)	Positive ions (cations)	Solubility of compounds
Acetate, CH_3COO^-	all	soluble
All	Li^+, Na^+, K^+, Rb^+, NH_4^+	soluble
Chloride, Cl^- Bromide, Br^- Iodide, I^-	Ag^+, Pb^{2+}, Hg^{2+}, Cu^+	low solubility
	all others	soluble
Hydroxide, OH^-	Li^+, Na^+, K^+, Rb^+, NH_4^+, Sr^{2+}, Ba^{2+}	soluble
	all others	low solubility
Nitrate, NO_3^-	all	soluble
Phosphate, PO_4^{3-}	Li^+, Na^+, K^+, Rb^+, NH_4^+	soluble
Carbonate, CO_3^{2-}	all others	low solubility
Sulfate, SO_4^{2-}	Ca^{2+}, Sr^{2+}, Ba^{2+}, Pb^{2+}	low solubility
	all others	soluble
Sulfide, S^{2-}	Li^+, Na^+, K^+, Rb^+, NH_4^+, Be^{2+}, Mg^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}	soluble
	all others	low solubility

Using the solubility rules, you can predict what will happen when two ionic solutions are mixed. For example, consider what happens when a potassium chloride solution is mixed with a solution of silver nitrate.

A mixture of potassium chloride (KCl) and silver nitrate ($AgNO_3$) solutions will contain potassium ions (K^+), silver ions (Ag^+), chloride ions (Cl^-), and nitrate ions (NO_3^-).

The positive potassium cations can combine with the negative chloride or nitrate anions to form potassium chloride (KCl) or potassium nitrate (KNO_3). Similarly, the silver cations can combine with the chloride or nitrate anions to produce silver chloride (AgCl) or silver nitrate ($AgNO_3$).

Now, examine the solubility of these four substances. The second row of Table 6.3.2 states that all potassium ionic compounds are soluble. Therefore, potassium chloride and potassium nitrate will stay dissolved.

The fifth row of the table states that all ionic compounds containing nitrate ions are soluble. Therefore, the silver nitrate will remain dissolved.

On the other hand, the third row of Table 6.3.2 shows that ionic compounds with silver cations (Ag^+) and chloride anions (Cl^-) have low solubility. Therefore, it can be predicted that AgCl will precipitate out of the solution as a solid.

Figure 6.3.8 shows this reaction. The chemical equations for this precipitation reaction are:

potassium chloride solution + silver nitrate solution → potassium nitrate solution + silver chloride solid

$$KCl + AgNO_3 \rightarrow KNO_3 + AgCl$$

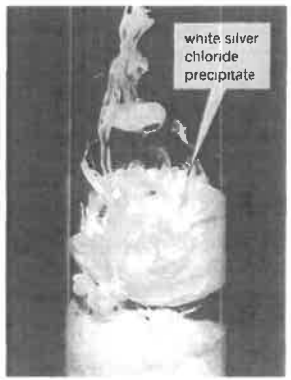


FIGURE 6.3.8 Silver chloride precipitates out as a white solid when potassium chloride is mixed with silver nitrate.

SkillBuilder

Predicting precipitation reactions

It is possible to predict the outcome of mixing two solutions by considering the solubility of all the possible combinations of cations and anions. Consider a mixture of solutions of magnesium sulfate ($MgSO_4$) and barium nitrate ($Ba(NO_3)_2$).

STEP 1

Swap the cations and anions of the reactants to get the possible products.

Product 1 = Magnesium nitrate ($Mg(NO_3)_2$)

Product 2 = Barium sulfate ($BaSO_4$)

STEP 2

Check the solubility of the possible products in a solubility table such as Table 6.3.2.

Product 1 = Magnesium nitrate is soluble because all nitrates are soluble.

Product 2 = Barium sulfate is insoluble because all sulfates are soluble except Ba^{2+}, Ca^{2+}, Sr^{2+}, Pb^{2+}

STEP 3

Write the chemical equation for the reaction showing that barium sulfate is a solid precipitate.

barium nitrate solution + magnesium sulfate solution → barium sulfate solid + magnesium nitrate solution

$$Ba(NO_3)_2 + MgSO_4 \rightarrow BaSO_4 + Mg(NO_3)_2$$

Worked example

Predicting precipitation reactions

Problem

Solutions of aluminium chloride ($AlCl_3$) and sodium hydroxide (NaOH) are mixed. Predict what will happen by writing a word equation.

Solution

Thinking: Swap the anions in the reactants to see what the possible products are.

Working: Product 1: NaCl

Product 2: $Al(OH)_3$

Thinking: Use the solubility table to check the solubility of the products.

Working: Product 1: All sodium compounds are soluble so NaCl must be soluble

Product 2: Only a few hydroxide compounds are soluble and $Al(OH)_3$ is not one of them, so it should precipitate out of the solution.

Thinking: Write out the word equation indicating $Al(OH)_3$ as the solid precipitate.

Working:

aluminium chloride solution + magnesium sulfate solution → aluminium hydroxide solid + sodium chloride solution

Try yourself

The following solutions are mixed. Predict what will happen by writing word equations.

1. potassium sulfate (K_2SO_4) and calcium nitrate ($Ca(NO_3)_2$)
2. copper(I) nitrate ($CuNO_3$) and sodium hydroxide (NaOH)
3. ammonium sulfide ($(NH_4)_2S$) and zinc chloride ($ZnCl_2$)
4. sodium bromide (NaBr) and ammonium hydroxide (NH_4OH)

Year 9/10 PE Scavenger Hunt

Directions: First find what you are looking for. Next, you will complete that task. For example, "find something to jump over" that could be a stick on the ground. After you've found it, you would run and jump over it. Once you complete the task, you can mark it off and keep going.

Find & Do the Activities Below

Find something to jump over _____

Find something to crawl under _____

Find something to throw overhand _____

Find something to climb _____

Find something to kick high in the air _____

Find something to run a lap around _____

Find something to balance on _____

Find something to knock over with a ball _____

Find something to catch (example- balls, insects, bugs) _____

Find something to ride for 10 minutes _____

Find something to balance on your head as you walk to the end of your drive way and back____

Find something to skip around _____

See if you can find the following and then complete the exercise:

Find something smaller than your hand _____ *Do 20 jumping jacks*

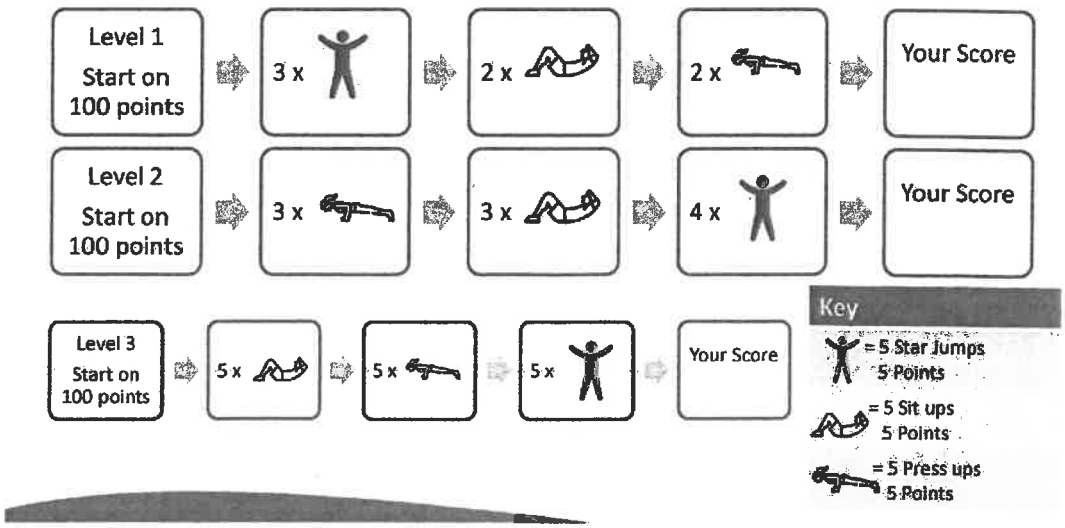
Find something that feels bumpy _____ *Do 15 squats*

Find something that starts with the same letter as your first name _____ *Do a 45 second plank*

Find something the same colour as your eyes _____ *Do 10 lunges per leg*

Find something lighter than a feather ____ *Do 8 push ups.*

Extra challenge: How many points can you get?



Bunny Jumps 60 Second Challenge

Can you keep trying even if you start to feel tired?

How many bunny jumps over a bench or stool can you complete in 60 seconds?

Place two hands on the bench or stool and jump side to side making sure both feet go over the bench. To make it easier step over.

Use a bench or a stool

Challenge other family members.

Achieve Gold
80 bunny jumps

Achieve Silver
60 bunny jumps

Achieve Bronze
40 bunny jumps

Complete P.E. | Youth Sport Trust

Climb the Mountain 60 Second Challenge

Can you keep going even if you start to feel tired?

How many mountain climbers can you complete in 60 seconds?

Make sure you bring your knees up as you move, do not just flick your legs up and down.

No equipment is required. Just make sure you use a clear, open and safe space.

Challenge yourself!

Compete against other family members.

Achieve Gold
50 mountain climbers

Achieve Silver
30 mountain climbers

Achieve Bronze
20 mountain climbers

Complete P.E. | Youth Sport Trust

Star Jumps 60 Second Challenge

Can you maintain your technique even when you are tired?

How many star jumps can you complete in 60 seconds?

Make sure you clap your hands above your head and bring your feet together.

No equipment is required. Just make sure you use a clear, open and safe space.

Challenge yourself! Touch the floor after each star jump for more of a hurdle.

Try jumping in different ways for 60 seconds. Can you compete against different family members?

Achieve Gold
60 star jumps

Achieve Silver
45 star jumps

Achieve Bronze
30 star jumps

Complete P.E. | Youth Sport Trust

The Plank 60 Second Challenge

Can you keep trying even if you feel that you want to stop and give up?

Can you hold the 'plank' position for 60 seconds?

Make sure you keep your bottom down and back straight. Keep your forearms on the floor.

No equipment is required. Just make sure you use a clear, open and safe space.

Achieve Platinum! To achieve platinum can you perform the plank for 90 seconds?

Achieve Gold
60 seconds or more

Achieve Silver
45 seconds or more

Achieve Bronze
30 seconds or more

Complete P.E. | Youth Sport Trust

Fast Feet 60 Second Challenge

Can you keep going even if you lose control of the ball?

How many times can you dribble a ball around a marker and back in 60 seconds?

Place down a starting marker and then a second marker five steps away. Each time you dribble the ball around the marker and back you score one point.

A ball and two markers.

Stop the clock. It's a race!

Achieve Gold
22 dribbles around the marker and back

Achieve Silver
16 dribbles around the marker and back

Achieve Bronze
10 dribbles around the marker and back

Complete P.E. | Youth Sport Trust

Speed Bounce 60 Second Challenge

Are you honest and only count the jumps that are completed properly?

How many times can you bounce over a pillow in 60 seconds?

Both feet must land over the pillow for the jump to count.

Jump over a pillow! If you do not have a pillow, jump over a safe object.

Set a Record!

Compete against a family member!

Achieve Gold
70 bounces

Achieve Silver
50 bounces

Achieve Bronze
30 bounces

Complete P.E. | Youth Sport Trust

Tuck In, Tuck Out 60 Second Challenge

Can you keep trying even when you want to give up?

How many times can you tuck your legs up to your chest and then extend them out in 60 seconds?

You must bring your legs up to your chest and then fully extend them out again!

Use a bench or a stool

Synchronised tuck in tuck outs!

Achieve Gold
40 tuck in, tuck outs

Achieve Silver
30 tuck in, tuck outs

Achieve Bronze
15 tuck in, tuck outs

Complete P.E. | Youth Sport Trust

Squat Jumps 60 Second Challenge

Can you be honest when counting your score?

How many squat jumps can you perform in 60 seconds?

Stand behind a line and jump forwards, perform a squat and repeat.

No equipment is required. Just make sure you use a clear, open and safe space.

Challenge yourself!

Achieve Gold
35 squat jumps

Achieve Silver
25 squat jumps

Achieve Bronze
10 squat jumps

Complete P.E. | Youth Sport Trust