

Unit 1

“Origins of the Ancient World & Orderliness”

This unit gives credit towards the Cert II units...

VU23832 Investigate characteristics of living things; &

VU23838 Investigate the Solar System



Grades

7-10

SCIENCE



Science Grades 7-10

“Origins & Ancient Times (& Orderliness)”

SUMMARY:

This unit explores science topics that relate to the origins and complexity of the known universe. Students gain an understanding of the structure of planet Earth, and the life-forms found there. The lessons address the two prevalent worldviews that provide an explanation for the origin of the universe and of life on Earth. The topics in the lessons relate to Australian Curriculum content in Earth and Space Sciences, Biological Sciences, Scientific Inquiry, and the interaction of systems within natural and designed environments.

RESOURCES:

All the information you need is included within the informational story in each lesson plan. The hands-on or creative activities are designed to use materials you will likely have already in your home, but you should maintain some art and craft materials. Each child will also need a Science Journal (i.e., a lined exercise book or Botany book for writing responses to questions, nature-study or experiment notes, and planning creative projects. It is also helpful to have a good dictionary.

Three lessons a week will provide the basic learning. To enjoy a richer learning experience, you could supplement the lessons with extra books about the topics in this unit, from your local library.

Some suggestions for extra reading include but are not limited to...

- ‘The Creation Answers Book’ from Creation Ministries (now Answers in Genesis)

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Prior to starting each week, review the recommended resources.

Contents

Topic	Description	Page
Topic 1	Evidence for a Created Universe	
Topic 2	Planets & the Solar System	
Topic 3	Geology: Rocks, Soil & Volcanoes	
Topic 4	The Water Cycle	
Topic 5	Classification of Plants	
Topic 6	Classification of Animals	
Topic 7	Weather, Seasons & Calendars	
Topic 8	We are Wondrously Made	
Topic 9	Assessment: This term, submit your Science Journal with answers and reflections from the lessons. Include photographs of any practical activities or creative projects. Send these samples into the Homeward Academy Office 2226 Murphys Creek Rd., Ballard, Qld 4352 or via email at info@hesupport.com.au	

Justification Chart: High School Science Course vs Units of Competency

Unit Element	Performance Criteria	Coverage in Updated Science Course	Gap Analysis
VU23838 – Investigate the Solar System 	1.1 Select a feature of the solar system	Topic 2 lessons: <i>Overview of Solar System, Exploring Planets, Moon & Gravity</i>	Fully addressed
	1.2 Select investigation methods & confirm	Lesson 8: <i>Investigating the Moon's Phases and Impact on Earth</i> – structured planning and confirmation	Fully addressed
	1.3 Develop a plan & confirm	Planning activity included in lesson 8	Fully addressed
	2.1 Investigate impact of feature	Students model phases and link to tides/calendars	Fully addressed
	2.2 Record results using scientific terminology	Formal report required	Fully addressed
	3.1 Present findings	Written and Oral presentation included	Fully addressed
	3.2 Discuss outcomes using scientific terminology	Reflection and discussion tasks included	Fully addressed

Unit Element	Performance Criteria	Coverage in Updated Science Course	Gap Analysis
VU23832 – Investigate the characteristics of living things	1.1 Identify main characteristics of living things	Topic 5–6 lessons: <i>Classification of Plants & Animals, Photosynthesis, Reproduction, Design Features</i>	Fully addressed
	1.2 Identify scientific bases of characteristics	Lessons explain taxonomy, photosynthesis, reproduction, adaptations	Fully addressed
	1.3 Identify classification systems	Taxonomy hierarchy taught (Kingdom → Species)	Fully addressed
	2.1 Select a subject for investigation	Lesson 20: <i>Investigating Plant Classification and Adaptations</i> – students choose a plant	Fully addressed
	2.2 Develop a plan & confirm	Lesson 20: includes structured planning and teacher confirmation	Fully addressed
	2.3 Select classification system & confirm	Students apply taxonomy and confirm with tutor	Fully addressed
	3.1 Apply classification system	Students classify plant using dichotomous key	Fully addressed
	3.2 Record results using scientific terminology	Students produce a formal report with diagrams	Fully addressed
	4.1 Present findings	Oral presentation included in new lesson	Fully addressed

Unit Element	Performance Criteria	Coverage in Updated Science Course	Gap Analysis
	4.2 Discuss findings using scientific terminology	Discussion and reflection tasks included	Fully addressed

TOPIC 1

OUR CREATED UNIVERSE

Lesson 1: Science and the Scientific Method

Theme: Learning to Investigate with Order and Purpose

Character Focus: Orderliness – God designed a world that can be observed, tested, and understood.

Key Concepts:

- What is Science
- The Scientific Method

A) Keeping your Science Journal Orderly:

During this course, as you work on the science lessons, you will record your answers to questions and your thoughts about the topics, in your Science Journal.

Keep it neat and organised by using headings and subheadings to locate your work. If you are leaning with a school (in a classroom or via Distance Learning at Home), then your Science Journal may be collected for assessment and/or for evidence of engagement with the Science course. For each Term of 10 weeks or so, you will need a separate exercise book to use as your Science Journal for that unit of the course.

Organise your Science Journal by creating headings and sub-headings.

The Front Cover: On the front cover, you should record that the subject is science or call it a “SCIENCE JOURNAL”. The name of the unit of study for this first term is “ORIGINS & ANCIENT CIVILISATIONS: THE ORDERLINESS UNIT”. Along with ‘Science Journal’, this should be in the main title for this term’s Science Journal.

Weeks: Although a school ‘term’ in Australia is typically 10 weeks, we have designed 8 weeks of lessons, so there is space in the term for further reading and research, and for assignments, extra field-work and culminating projects that can be used for assessment. To keep your work organised, so it is easy for your teacher to review, you should place a heading for each week of the term. For example – WEEK 1, or WEEK 2 etc.

Lessons: For most subjects there will be between 3 and 5 lessons per week. The course is designed so that if you complete three lessons each week, you will cover the required content in a basic minimal way. The fourth or fifth lesson each week provides opportunity for more in-depth study, extension or review and practice of concepts. The amount you accomplish each week can be adjusted according to your ability and special needs in two ways:

- i) a slower student might accomplish 3 lessons per week, whereas a more able student might accomplish 5 lessons per week;
- ii) adjustments can be made so that a Year 10 student who is struggling to keep up, could answer the Thinking Questions and learning Activities at the Year 7 & 8 level. An advanced Year 7 or 8 student could also complete the Year 9 & 10 activities or there is sometimes an extra Optional Extension Activity at the end of a lesson.

Therefore, to organise your Science Journal, create a subheading for LESSON 1; then write your responses to questions and activities on the pages for that lesson. The next sub-heading will be LESSON 2, etc. Next week there will be a new heading for WEEK 2, followed by the lesson numbers in Week 2.

B) Opening Discussion

Objective: Introduce the scientific method.

Discussion Questions:

Think about it – What is Science?

What is the Scientific Method?

Before we begin an exciting journey of discovering the science of how the world was put together, let's explore what is real science.

“True scientists don't just guess and hope they're right. They use an organised step-by-step method to explore the world and find answers to their questions. This method helps us think carefully and understand God's creation better. It's called the **Scientific Method**.”

"For God is not a God of disorder but of peace." – 1 Corinthians 14:33

Just like God is orderly in creation, we can be orderly in our investigations!

C) The 7 Steps of the Scientific Method

Step 1: Observation

What it Means: Use your senses to notice something in the world around you.

Example: Imagine that you notice that some students in your class have developed a red rash on their legs.

“Let's practise observing. To help you understand why the rash developed, you might look around your class-room and around the school buildings to determine if there is anything that might have caused the rash. What can you see? Hear? Smell? Feel? Those are all observations.”

Step 2: Ask a Question

What it Means: Think of a specific question you want to answer about what you observed.

Example: *What is causing the red rash?*

What do you want to know more about? Can you turn your observation into a question?

You might ask... “Have the students eaten something they might be allergic to?”...or...”Have they all been

playing sport in the sun and running for too long without drinking enough water?”...or...”Have they been exposed to fibreglass insulation bats that can causing itchy skin?”; ...or... “Have they been exposed to some type of bacteria?” ...or... “Are there any prickly plants close by?”.

Step 3: Form a Hypothesis

What it Means: Make an educated guess or prediction that you can test.

Example: After initially looking around the classroom and buildings for clues, and also talking with the cooking staff in the canteen; the teachers and students talked about all of their observations to think about possible causes.

The students had not been playing sport in the sun; there did not seem to be anything in the canteen that could cause allergies; there was no fibreglass insulation accessible to students; and the benches and surfaces of the classrooms, library and eating area had been cleaned each day, so it probably wasn't bacteria. None of the other possible causes seemed to relate; but one student noticed that there are two gated entrances on either side of the garden for medicinal herbs, and some stinging nettle had spread into the pathways. So they devised a 'hypothesis' (a possible guess or prediction) ... *“I think the red rash might be caused by exposure to stinging nettle.”* → →



Parent/Tutor Prompt:

“Your guess should be something you can test. A good hypothesis often starts with, ‘I think... because...’”

Step 4: Experiment

What it Means: Test your hypothesis by planning and doing a fair investigation.

Key Terms to Explain:

If we were testing the effectiveness of a medicine or natural remedy, then an experiment would have a ‘Control Group’ and a ‘Test Group’.

- **Control group** – the group that stays the same (e.g. gets a placebo – like a fake tablet made of sugar)
- **Test group** – the group that gets the treatment (e.g. receives medicine designed to cure or relieve the symptoms.)

However, in this case we are not testing a remedy. We want to test for a possible root cause of the problem.

Example:

The groundsman could have been directed to simply remove the stinging nettle from the pathways, but the students wanted to do a proper scientific experiment using a ‘control group’ and a ‘test group’. The parents were consulted and agreed to allow the experiment to go ahead.

To do the experiment, the groundsman dug out the stinging nettle that had spread into one of the pathways, but left the nettle plants in the other pathway. So, only one factor was going to be changed (the presence of stinging nettle). All the students were prevented from using the stinging nettle pathway for one week until their rashes had disappeared (they only used the cleared pathway).

Then both gates were opened and half the students used the cleared pathway, while the other half of the students used the pathway that still had nettle plants in it. Everything else was kept the same (ie., eating the same food; wearing the same type of uniforms; classroom is kept at a moderate temperature and cleaned daily; they all drink the same amount of water.) But the one thing that was different between the two groups was the use of the pathways (with or without stinging nettle).

In your experiments, you have to be careful to change only one thing – the thing you’re testing. You would need to keep everything else the same so it’s a **fair test**.

Step 5: Record and Analyse Results

What it Means: The next step of an experiment is to write down what happens and look for patterns or differences. So the students did that.

Example:

During the following week, the students who walked on the cleared path did not get any rashes on their legs. Whereas the students using the nettle path got more rashes on their legs.

Part of this step is not only writing down what happened, what was observed; but also putting the results/information into a chart or graph. You check to see if there is any trend showing on the chart or graph. What happened? Did anything surprising occur?

Step 6: Form a Conclusion

What it Means: The next step is to decide if your results support or do not support your hypothesis.

Example:

Our results support the idea that the rash on the students’ legs was caused by contact with stinging nettle.

Was your hypothesis right? What did you learn? If it wasn’t right, that’s OK! Scientists learn from every result. If the experiment did not show a trend that supported your hypothesis, then you might conduct a different experiment to test something different in the environment.

Step 7: Share Results and Develop Theories

What it Means: Scientists share what they have discovered and build ideas over time. The hypothesis eventually becomes a theory. And if a theory is tested and supported again and again with no disproving results or observations, it may become a scientific law.

Example:

After many experiments, scientists agree that stinging nettle can cause skin rashes (but it's not the only cause of a rash).

Let's practise explaining what we discovered. How would you tell someone else about what we found?

D) Visual Diagram (Optional for Students to Draw):

Create a poster or notebook page with 7 labelled steps in a circular flowchart or vertical column:

1. Observation
2. Question
3. Hypothesis
4. Experiment
5. Results
6. Conclusion
7. Share & Build Theory

Decorate with arrows and icons!

E) Hands-On Practice Ideas

Choose one of these to walk through the scientific method:

Option 1: Plant Growth Test

Question: Does music affect how plants grow?

Hypothesis: Plants that listen to music will grow taller.

Experiment: Play music for one plant, none for the other. The type of soil, and the amount of water and light stay the same.

Observe: Measure and record height over 2 weeks.

Conclude: Did the music affect growth?

A further experiment might be test different types of music.



Option 2: Handwashing Test (Bacteria Growth)

Question: Does handwashing with soap remove more germs than water alone?

Hypothesis: Soap removes more germs.

Experiment: Use slices of bread to test clean hands vs dirty hands.

Observe: Watch mould growth over several days.

Conclude: Which piece of bread stays cleanest?



E) Wrap-up:

With what you have read and practiced so far can you have a go at answering the question ... “What is science? Science is... (write answers in your Science Journal.)

The Scientific Method is... (write answers in your Science Journal.)

Proverbs 25:2

“It is the glory of God to conceal a matter, But the glory of kings is to search out a matter..”

It is truly a ‘glorious thing’ to search out a matter, to be a scientist discovering the order and precision of the universe that reflects God’s intentional design.

Australian Curriculum Alignment:

Content Description Code & Full Wording

AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.

AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.

AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.

AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses...

AC9S7I03 / AC9S8I03 / AC9S9I03 / AC9S10I03 – Select and use equipment to generate and record data with precision, using digital tools as appropriate.

AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.

Rationale

The lesson connects the scientific method to a biblical worldview, showing how worldview influences the interpretation and practice of science.

Students learn that hypotheses may change based on evidence, reflecting the process of refining scientific knowledge.

Students practise forming testable questions and hypotheses in relation to their observations.

The lesson’s sample investigations (e.g., plant growth, handwashing) involve planning fair tests that can be repeated.

Students are expected to measure growth, record results, and use appropriate tools in their investigations.

Students create tables, charts, or graphs to display experiment results.

Content Description Code & Full Wording	Rationale
AC9S7I05 / AC9S8I05 / AC9S9I05 / AC9S10I05 – <i>Analyse data and information to describe patterns, trends and relationships and identify anomalies.</i>	Students interpret results to identify patterns and any unexpected findings.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – <i>Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.</i>	Students evaluate whether their investigation methods were fair and results reliable.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – <i>Construct arguments based on analysis of evidence to support conclusions or evaluate claims...</i>	Students present conclusions supported by evidence from their experiments.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students record observations, reflections, and experiment write-ups in their science journals.
AC9TDE8P02 / AC9TDE10P02 – <i>Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.</i>	Designing an experimental setup and creating visual flowcharts of the scientific method uses design thinking and communication skills.

Lesson 2: Review of The Scientific Method

Theme: Learning to Investigate with Order and Purpose

Character Focus: Orderliness – God designed a world that can be observed, tested, and understood.

Key Concepts:

- Science – a glorious pursuit.
 - The Limitations of Science
 - The Two Accounts of Origins
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A) Let's review what you learnt about the Scientific Method:

Read the following extract from 'Exploring Creation with Biology (2nd edition), Wile Dr JL & Durnell MF, 2005, pages 9-11...

'...science must conform to a system known as the scientific method. This system provides the framework in which scientists can analyse situations, explain certain phenomena, and answer certain questions. The scientific method starts with observation. **Observation** allows the scientist to collect data. Once enough data has been collected, the scientists form a **hypothesis** that attempts to explain some facet of the data or attempts to answer a question that the scientist is trying to answer.

Hypothesis – An educated guess that attempts to explain an observation or answer a question.

Once the scientist forms a hypothesis, the scientist (typically with the help from other scientists) then collects much more data in an attempt to test the hypothesis. These data are often collected by performing experiments or by making even more observations. If the data is found to be inconsistent with the hypothesis, the hypothesis might be discarded, or it might just be modified a bit until it is consistent with all data that has been collected. If a large amount of data is collected and the hypothesis is consistent with all of the data, then the hypothesis becomes a **theory**.

Theory – A hypothesis that has been tested with a significant amount of data.

Since a theory has been tested by a large amount of data, it is much more reliable than a hypothesis. As more and more data relevant to the theory are collected, the theory can be tested over and over again. If several generations of collected data are all consistent with the theory, it eventually attains the status of a **scientific law**.

Scientific law – A theory that has been tested by and is consistent with generations of data.

B) The Limitations of Science

Pause & have a think about each of these limitations of science, both from a philosophical and practical standpoint =

- Science does not make moral judgements
- Science does not make aesthetic judgements

- Science does not tell you how to use knowledge
- Science cannot draw conclusions about the supernatural or things outside the natural realm
- Science is not 100% conclusive. There is always a chance further information could arise that changes our understanding
- It must follow the scientific method.

Questions:

1. When trying to convince you of something, people will often insert “Science has proven...” at the beginning of a statement. Can science actually prove something? Why or why not?
2. A scientists makes a few observations and develops an explanation for the observations she has made. At this point, is the explanation a hypothesis, theory, or scientific fact?

More information about the scientific method can be found here:
<https://www.techtarget.com/whatis/definition/scientific-method>

C) Overview of the Two Accounts of Origins

Read the following, and then if your parent/home-tutor is available, **narrate (retell)** what you remember of the article, and then **discuss** it together.

.....

Although there are a range of stories from different cultures, and various theories to explain the origins of the world and the origins of life on planet Earth, there really are only two prevalent explanations that impact all of us. They are “special creation” and “evolution”.

- Creation – An all powerful intelligent being (God) purposefully designed and created the universe, the world and all of life on Earth including mankind (people).
- Evolution – We are the result of some great cosmic accident. All things that exist are the result of the random chance actions of matter and energy over long periods of time (billions of years).

Advances in science are showing the amazing complexity, intricate design and definite patterns rich in information that is evident in every aspect of the natural world. A growing number of respected scientists are coming to the conclusion that there is so much patterned information in the natural world that it cannot possibly have derived from the random actions of chance and time. We will learn more about the scientific principle of Entropy in later lessons; but it is interesting that some scientists still believe in evolution even though it totally contradicts the natural law of entropy which states that *“all systems naturally tend towards a state of maximum chaos and random disorder unless you make an intentional input of energy (or information) into that system”* (think of your bedroom, the lounge or the kitchen bench). Do any of these rooms tend to get more ordered by themselves without anyone tidying them up; or do they tend to get more messy over time? If you answered that the rooms just magically get tidy and ordered, then maybe you don’t realise how much work your mother does when you are away or out playing in the yard.

According to the law of Entropy, the evolutionary theory of increasing order and complexity by the random actions of chance and time, is completely impossible. In later lessons, when we look into the genetic code within our cells, you will see that for evolution to be true, living organisms would need an input of complex specified instructions into their DNA and cell processes to be able to evolve into more complex organisms. When organisms mutate slightly from one generation to the next, there is always a loss of information and never a gain in the information within the cells & DNA.

Anyway, don't worry if you don't understand this at the moment. We will get into all that at some point in the future lessons. At the moment, just enjoy learning about the world we live in and the amazing complexity of specific intelligent design that shows up everywhere in nature and the whole universe. In this course we will try to understand the world around us, and look at the latest science that is proving one worldview over the other.

D) Assessment / Wrap-Up

Activity: Have students write a short paragraph answering:

"In what ways have you noticed order, pattern, information, or design in the natural world?"

Alternative:

- Students can create a **mini-poster or infographic** summarizing at least one aspect of order, pattern, information or design in the natural world.
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E) Final Thought:

Just as a **beautiful painting requires an artist**, the **universe's precision of ordered pattern** points to an **intelligent Designer – God**.

Australian Curriculum (v9) Content Descriptions

Content Description Code & Full Wording	Rationale
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson compares creation and evolution as different worldviews, showing how these perspectives influence scientific interpretation.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Students review how hypotheses can be tested, refined, or rejected, demonstrating how scientific knowledge changes over time.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students practise identifying whether an idea is a hypothesis, theory, or fact, and forming questions about origins.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	The "Limitations of Science" section encourages evaluating the scope and limits of scientific conclusions.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – Construct arguments based on analysis of evidence to support conclusions or evaluate claims...	Students defend or critique explanations of origins using evidence and logical reasoning.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	The written paragraph or infographic summarising design, order, and patterns in nature demonstrates communication skills.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	The infographic/poster task requires designing and presenting information visually for an audience.

Lesson 3: The Fine-Tuning of the Universe

Key Concepts:

- The universe is designed with precise conditions that allow life to exist.
- Factors such as **gravity, the speed of light, and Earth's distance from the Sun** are finely tuned.
- This fine-tuning suggests a purposeful Creator.

A) Lesson Content

Student, read this first:

Today please read the information/story paying close attention, and thinking about it as you go, because after you have read the story and completed the Thinking Questions and Activities, then you will need to retell everything you remember about the lesson to your parent or tutor. Ok?

Story: “Just Right”

Imagine walking into a kitchen and seeing a delicious chocolate cake cooling on the counter. The smell is perfect, the icing is smooth, and the cake is shaped beautifully. What’s the first thing you think?

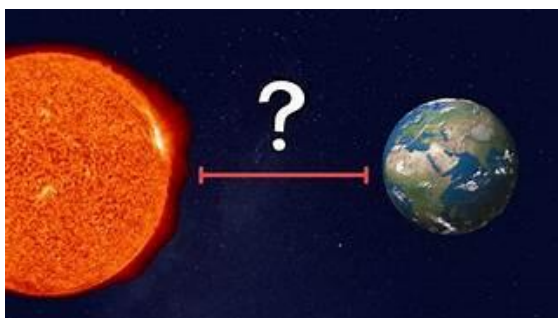
"Wow – who made this?"

Now imagine someone said, “Oh, it just happened. A box of ingredients fell off the shelf, landed in a bowl, mixed themselves, and baked perfectly in the oven.” You’d laugh, right? That’s impossible. Cakes require a recipe, the right ingredients, careful timing, and someone who knows what they’re doing.

Now think about the universe. It’s far more complex than any cake – and yet, some people claim it happened by accident. But when we look at the universe, we see everywhere, evidence of *fine-tuning*. That means certain conditions had to be set *just right* for life to exist.



Let’s start with **gravity**. Gravity holds the planets in place and keeps us from floating into space. If gravity were just a tiny bit stronger, stars would burn out quickly or collapse into black holes. If it were weaker, stars wouldn’t form, and the universe would be dark and cold.



Then there’s the **speed of light**. This universal speed limit allows energy to move in a predictable way. It ensures light reaches us from the Sun and that the laws of physics work the same everywhere.

And what about **Earth’s distance from the Sun**? Earth is in the “Goldilocks Zone” – not too hot, not too cold. If it were

just a little closer to the Sun, the oceans would boil. A little farther, and the planet would freeze. Yet here we are – alive, breathing, thriving.

Earth's **atmosphere** is another miracle. It's made of just the right mix: about 21% oxygen, enough for life, but not too much (or things would catch fire more easily!). There's also nitrogen, carbon dioxide, and other gases – all perfectly balanced.

Then there are the **strong and weak nuclear forces**. These invisible forces hold atoms together and help atoms form the elements in the periodic table. If they were even slightly off, atoms wouldn't stick together. No atoms = no molecules = no life.

So, here's the big question: how did all these conditions get set *just right*?

Some people say it's a lucky accident. But the more we learn about the universe, the more it looks like the work of a Designer.

Just like a cake points to a baker, or a song points to a composer, the universe – with its perfect fine-tuning – points to God. Psalm 19:1 says, *"The heavens declare the glory of God; the skies proclaim the work of his hands."* When we look up at the stars, we're not just seeing light – we're seeing evidence of a Creator who set everything in order.

B) Biblical Connection

Psalm 19:1 – "The heavens declare the glory of God; the skies proclaim the work of his hands."

The Bible tells us that God's creation speaks for itself. It reflects His wisdom, power, and creativity. The incredible precision of the universe – the "fine-tuning" – shows us that it wasn't random. It was personal. God created everything for a purpose, and that includes the laws of physics, the placement of planets, and even *you*.

Questions for your Science Journal:

- What do the heavens "declare" about God?
 - How does the order in creation show that God values structure and design?
 - How can understanding this help you trust God's plan for your own life?
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C) Thinking Questions

Write your answers in your Science Journal.

General Understanding

1. What is "fine-tuning" in the universe?
2. Why is gravity so important for life?
3. How does Earth's location in the solar system support life?

Christian Worldview

4. Why does the universe point to an intelligent Designer?
5. What does the Bible say about the skies and God's glory?

Character Trait Focus: Orderliness

6. How does the precise order of the universe reflect God's character?
 7. Why do you think God designed creation with such detail and structure?
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D) Activity or Science Experiment

Experiment: The Goldilocks Effect – How the Right Conditions Make Life Possible

You'll need:

- 3 identical cups
- Hot water (be careful!)
- Ice water
- Room-temperature water
- A thermometer (if available)
- Paper and pencil

Instructions:

1. Label the cups: *Too Hot*, *Too Cold*, and *Just Right*.
2. Fill one with hot water, one with ice water, and one with room-temperature water.
3. Measure and record the temperatures.
4. Answer these:
 - Which water would be most comfortable to drink?
 - If you were a fish, which water would best support your life?
 - How does this connect with Earth's distance from the Sun?

Connection: Just like only one of the water cups was “just right,” only one planet – Earth – is “just right” for life in our solar system.

E) Experiment Notes

In your Science Journal, write a short reflection:

- What did you learn from this experiment?
- How does this hands-on example help you understand fine-tuning?
- How does the Goldilocks Principle remind you of God's care in creation?

You could title your reflection: “*My Earth Is Just Right*”.

F) Narration

Now it's your turn to **retell the lesson!**

Briefly tell your parent or tutor everything you remember about:

- The fine-tuning of the universe
- What gravity, light, and Earth's position have to do with life
- What the Bible says about the skies declaring God's glory
- What you did in your Goldilocks experiment

You can do this right now, or later during a break or mealtime. The more you practice putting lessons into your own words, the more they will stick with you and the greater will be your power of knowledge. Try to do this narration (retelling) activity every day, even if your lesson doesn't specifically say to do it.

Australian Curriculum (v9) Alignment

Content Description Code & Full Wording	Rationale
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson contrasts a theistic creation view with a naturalistic view of cosmic origins, showing how worldview shapes scientific interpretation.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Students examine how discoveries about universal constants and “Goldilocks” conditions contribute to scientific understanding and debate.
AC9S7H03 / AC9S8H03 / AC9S9H03 / AC9S10H03 – Examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations.	Discussion of fine-tuning connects to broader questions about human significance and the implications for science and philosophy.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Thinking questions and the Goldilocks experiment prompt students to form questions and predictions about habitability and design.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses...	The “Goldilocks Effect” water-temperature activity models controlled investigation.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students measure and record water temperatures and link them to planetary habitability.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	Students consider the limitations of the model in representing actual planetary conditions.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – Construct arguments based on analysis of evidence to support conclusions or evaluate claims...	Students use evidence from the activity to argue whether fine-tuning suggests intentional design.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students communicate their conclusions in written form in their journals.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	Students design the experiment setup and may present their findings using diagrams or visual organisers.

Lesson 4: Evidence from Design

Introduction: The Design Argument

Look around you. Have you ever noticed how **everything in the universe seems to work perfectly together**? From the way your body functions to the way planets move in space, there is incredible **order and complexity** in the world.

Some people say this happened **by chance**, but others believe that such **intricate design points to a Creator** – God. This idea is called the **Argument from Design** or **Teleological Argument**.

Biblical Connection: Romans 1:20

"For since the creation of the world God's invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made, so that people are without excuse."

Think About It:

- What does Romans 1:20 say about how we can know God exists?
- Do you think design in nature is **accidental** or **intentional**? Why?

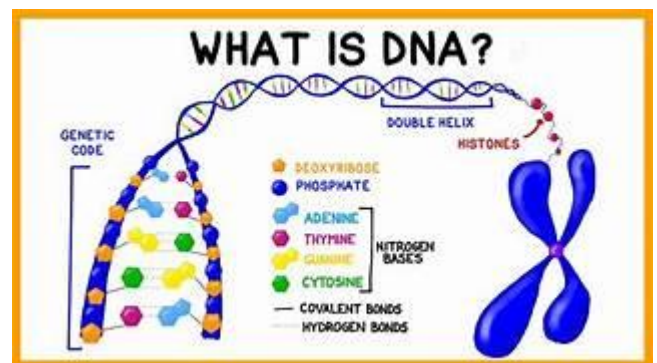
Step 1: Understanding the Argument from Design

The Argument from Design suggests that when we see **complexity, order, and purpose** in the natural world, it points to the existence of an intelligent designer. Just like a watch suggests a watchmaker, the intricate systems of the universe suggest a Creator. This idea is also called the **Teleological Argument**.

Let's take a closer look at three well-known examples that support this view:

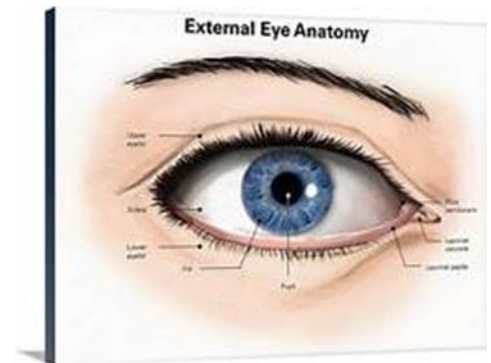
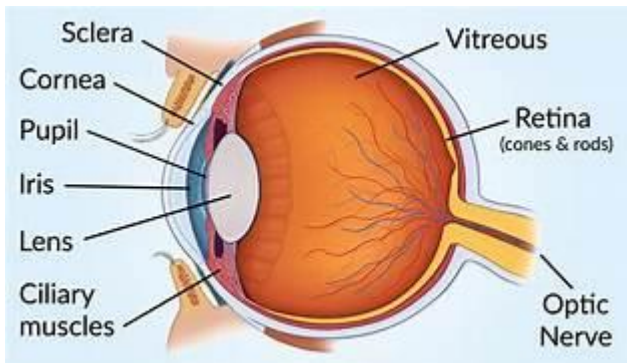
1. DNA – Life's Blueprint

Inside every living cell is DNA, a long molecule made up of chemical “letters” that carry detailed instructions for how to build and run the entire organism. Just one tiny cell in your body contains enough information to fill a library of books. The order of the letters in DNA tells your cells how to grow, repair, and function. It's like software code for life – but far more advanced than anything humans have ever written. If we find computer code on a screen, we know someone intelligent wrote it. So, what does it mean when we find code inside our cells?



2. The Human Eye – More Than a Camera

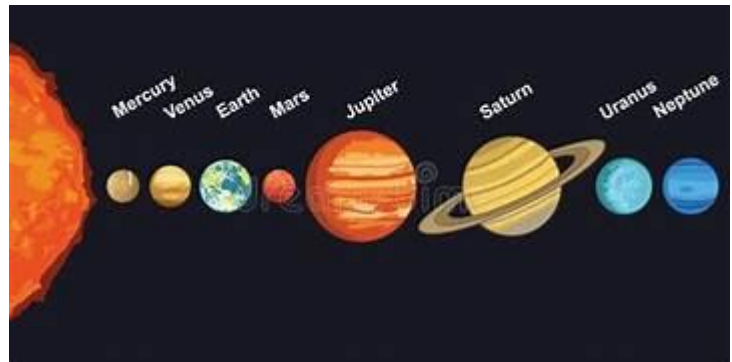
Your eye is made up of millions of parts that all work together perfectly. The cornea bends light, the lens focuses it, the retina captures the image, and the brain processes it in real time. Eyes can adjust to brightness, track movement, and focus quickly. Even the best cameras we've built still can't match everything the human eye can do. What's more, the eye wouldn't work at all unless all these parts were in place and



functioning at the same time – a concept known as **irreducible complexity**. Could something so advanced really be the result of slow, accidental changes??

3. The Solar System – Order in Space

The planets in our solar system follow precise paths, or orbits, around the Sun. Earth is just the right distance – not too hot, not too cold – to support life. The moon controls tides, stabilizes Earth's tilt, and even helps regulate climate. Jupiter's strong gravity protects Earth by attracting many space rocks that could crash into us. Everything seems to be placed just right. If even one part were off, life would be impossible. Does that sound like a cosmic accident – or a perfectly planned system?



Interactive Questions:

- Have you ever seen something so well-designed that you thought, "Wow, someone really put effort into this!"? What was it?
- Do you think nature shows signs of planning and purpose? Why or why not?
- If design points to a designer in everything else we see, what should we conclude when we look at nature?

Step 2: Hands-On Science Experiment – "Design vs. Chance"

Objective: To explore whether complex, ordered patterns happen randomly or require design.

Materials Needed:

- A handful of small objects (e.g., buttons, beads, or LEGO pieces, or scrabble pieces)
- A piece of paper
- A pen or pencil

Instructions:

-

What This Experiment Shows:

-
- A large, curved display of the World Book Encyclopedia. The title "WORLD BOOK" is prominently displayed in white serif font on a blue background. Below the title, there are vertical panels, each featuring a different animal illustration, including a shark, a dolphin, and a whale. The panels are numbered 1 through 22, corresponding to the letters of the alphabet. The display is set against a backdrop of a bright sun and a blue sky.

Write Down:

Step 3: Reflecting on God's Design

- © B & K McNeice – June 2026 v. 1.0

Final Reflection Question:

If the world is designed, what does that tell us about **the Creator**?

Closing Thought – Romans 1:20 Revisited

According to Romans 1:20, God's existence is seen through **what He has made**. This means that every time we observe nature's beauty and complexity, we see **evidence of God's hand in creation**.

Your Challenge:

- Go outside and find **one thing in nature** that shows design.
- Take a moment to thank God for His creation!

Lesson Summary:

- The **complexity and order** in the universe **point to a Creator**.
- Random processes **don't create meaningful patterns** – design requires an **intelligent designer**.
- The **Bible confirms** that God's creation shows His existence (Romans 1:20).

Would you like to continue exploring this topic? Try researching more about **intelligent design vs. evolution** and discuss what you find with a family member!

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson contrasts the teleological argument for design with evolutionary explanations, showing how worldview influences interpretation of biological and astronomical evidence.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Uses examples from DNA, the human eye, and the solar system to show how accumulating evidence can shift or strengthen scientific perspectives.
AC9S7H03 / AC9S8H03 / AC9S9H03 / AC9S10H03 – Examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations.	Discusses broader implications of intelligent design vs. evolutionary theory in education, culture, and ethics.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students form questions and predictions about whether complex patterns can arise from chance versus intentional design.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses...	The “Design vs. Chance” object-arranging experiment models controlled testing of a hypothesis about complexity and randomness.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students compare random scatter results to intentional arrangements and record observations in diagrams or charts.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	Students consider the limitations of the experiment in proving or disproving design in nature.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – Construct arguments based on analysis of evidence to support conclusions or evaluate claims...	Students argue, using evidence from the experiment, whether complex order points to design.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students present their experiment conclusions and reflections in written or poster format.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	The poster/infographic option requires applying design skills to present findings visually.

WEEK 2

PLANETS & THE SOLAR SYSTEM

Lesson 5: Overview of the Solar System

Introduction: The Solar System – God’s Design in Space

Have you ever looked up at the night sky and wondered how everything stays in place? The **Sun, planets, and moons** move in an orderly way, following paths set by God. This structure is called the **Solar System**, and it shows incredible **precision and design**.

Biblical Connection: Psalm 8:3-4

"When I consider your heavens, the work of your fingers, the moon and the stars, which you have set in place, what is mankind that you are mindful of them, human beings that you care for them?"

This verse reminds us that the **Solar System is God’s handiwork**, and yet He still cares deeply for us!



Think About It:

- When you look at the stars, do you ever feel small compared to the universe?
- What does it mean that God "set them in place"?

Step 1: Understanding the Solar System

The **Solar System** is the name we give to the group of planets, moons, and space objects that orbit around our Sun. God designed this system with incredible precision, placing everything exactly where it needs to be. Let’s explore what makes it so special!

The Sun

The Sun is at the centre of our Solar System. It’s a giant ball of burning gas that gives off light and heat. Without it, Earth couldn’t support life. Its gravity holds the planets in orbit and keeps everything moving in an orderly way. It’s like the “anchor” of the Solar System.



The Inner Planets – The Rocky Planets

These planets are closest to the Sun and have solid, rocky surfaces. They're smaller than the outer planets.

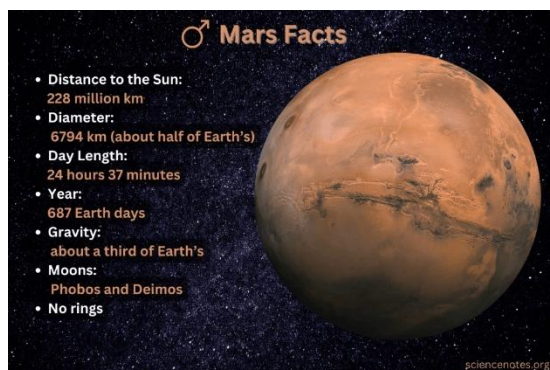
1. **Mercury** – The closest planet to the Sun. It has no atmosphere to trap heat, so temperatures swing from very hot during the day to freezing cold at night. Its surface is covered in craters – like the Moon!



2. **Venus** – The hottest planet in our Solar System, even hotter than Mercury. It's wrapped in thick clouds made of toxic gases. Its atmosphere traps heat like a greenhouse, and it rotates in the opposite direction to most other planets!



3. **Earth** – This is the only known planet that supports life. It has the perfect balance of oxygen, water, sunlight, and distance from the Sun. Everything about Earth shows God's careful planning.

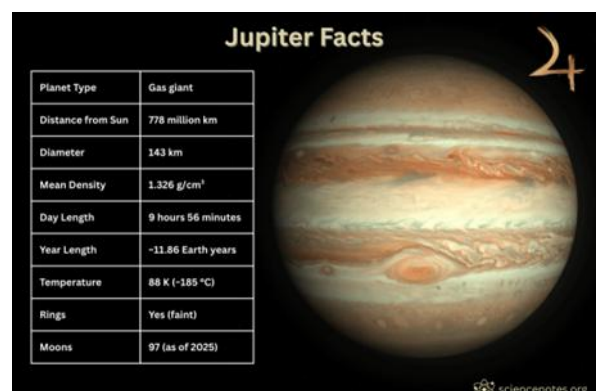


4. **Mars** – Known as the "Red Planet" because of its iron-rich soil. Scientists have found signs that water once flowed on Mars. It has the largest volcano in the Solar System!

The Outer Planets – The Gas and Ice Giants

These planets are much larger than the inner planets and are made mostly of gas and ice. They don't have solid surfaces you could walk on.

5. **Jupiter** – The biggest planet of all! It's so big that more than 1,300 Earths could fit inside it. It has a



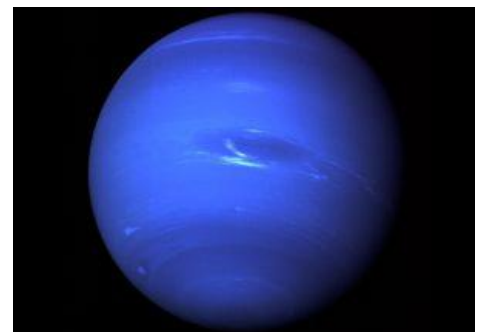
giant storm called the Great Red Spot that's been raging for centuries. Jupiter's gravity also protects Earth by attracting dangerous space debris.

6. **Saturn** – Famous for its stunning rings made of ice and rock. It has over 80 moons and is known for being beautiful but also incredibly windy and stormy.

Saturn Facts	
Planet Type	Gas giant
Position from Sun	6th
Average Distance from Sun	1.429 billion km (9.58 AU)
Orbital Period (Year)	29.45 Earth years
Rotation Period (Day)	~10.7 hours
Diameter (Equatorial)	120,536 km (74,898 mi)
Mass	5.683 × 10 ²⁶ kg (~95 Earths)
Density	0.687 g/cm ³ (less than water)
Gravity	10.44 m/s ² (about 1.07× Earth's)
Escape Velocity	35.5 km/s
Axial Tilt	26.7°
Atmosphere Composition	~96% hydrogen, ~3% helium, trace gases
Surface Temperature	~−139 °C (134 K or −218 °F) at cloud tops
Number of Moons	At least 145 confirmed (Titan is largest)
Ring System	7 main rings (A to G), thousands of ringlets
Strongest Wind Speed	~1,800 km/h (1,100 mph)
Magnetic Field	~580× Earth's, axis nearly aligned with rotation
Auroras	Yes – ultraviolet, seen at poles
Major Missions	Pioneer 11, Voyager 1 & 2, Cassini-Huygens
Potential for Life	Unlikely on Saturn, but possible on moons like Enceladus and Titan



7. **Uranus** – This planet is unique because it spins on its side like a rolling ball. It's a bluish colour because of the gases in its atmosphere, and it has faint rings.



8. **Neptune** – The farthest planet from the Sun. It's a deep blue colour and has the strongest winds in the Solar System – some blow faster than a hurricane on Earth!

Other Interesting Objects

- **Moons** – Many planets have moons that orbit them. Earth has one, while Jupiter has over 90! Moons come in all shapes and sizes.
- **Asteroids** – These are rocky objects that orbit the Sun, mostly found in the Asteroid Belt between Mars and Jupiter.
- **Comets** – Made of ice and dust, comets have glowing tails that appear when they get close to the Sun.

Fun Fact: Pluto was once considered the ninth planet but is now classified as a “dwarf planet.” It's still fascinating and orbits in a different way from the other planets.

Interactive Questions:

1. Which planet do you think is the most fascinating? Why?
2. If you could visit any planet (with a super space suit!), which one would you choose?
3. Why do you think God created such a variety of planets – each one so different from the next?

Step 2: Hands-On Activity – Build a Simple Solar System Model

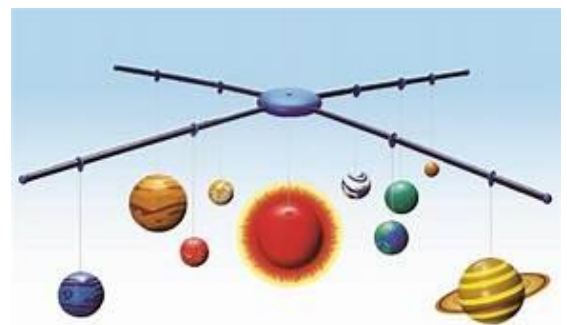
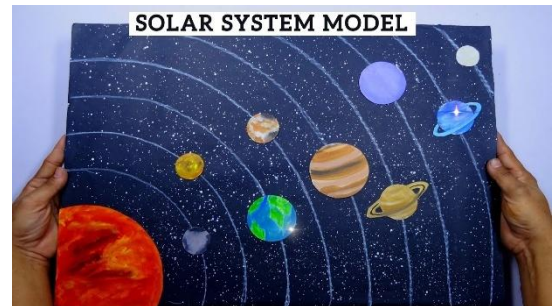
Objective: Create a model of the Solar System to understand the planets' order and sizes.

Materials Needed:

- A **large piece of paper** or cardboard
- Coloured markers or crayons
- Small objects like beads, buttons, or small balls (one for each planet)
- A ruler
- Glue or tape

Instructions:

1. **Draw the Sun** on one side of the paper.
2. **Use the ruler to mark distances** where each planet will go. (Space them out more as you move outward.)
3. **Label the planets in order** from the Sun: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.
4. **Choose small objects** to represent each planet. Use smaller items for Mercury and Mars, and bigger ones for Jupiter and Saturn.
5. **Glue or tape them in place** on your diagram.
6. **Draw the orbits** (curved lines showing how planets move around the Sun).



What You've Learned:

- The planets are arranged in a specific order.
- Some are **rocky** and close to the Sun, while others are **giant and far away**.
- **God created each planet with unique characteristics!**

Optional: Take a picture of your model and share it with a family member or in a homeschool group!



Step 3: Reflection on God's Design

Romans 1:20 Connection

In Romans 1:20, the Bible says that God's power and divine nature are seen through creation. The **Solar System's order and complexity** show God's **wisdom and power**.

Final Reflection Questions:

- How does the perfect order of the Solar System show **God's intelligent design**?
- If Earth were slightly closer or farther from the Sun, life wouldn't be possible. What does that tell you about God's care for us?
- How does learning about space make you feel about God's greatness?

Your Challenge:

Go outside at night and observe the **Moon and stars**. Think about Psalm 8:3-4 and thank God for His amazing creation!

Lesson Summary:

- The **Solar System** is made up of the **Sun, eight planets, moons, and other objects**.
- Planets are arranged in a **specific order**, showing **design and purpose**.
- **Psalm 8:3-4** reminds us that God set everything in place.

Next Steps:

Want to explore more? Research a planet of your choice and create a short report or drawing in your science journal!

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U03 – <i>Model cyclic changes in the relative positions of the Earth, sun and moon and explain how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides.</i>	While the focus is the Solar System, the activity of modelling planetary orbits builds foundational understanding of how celestial body movements create predictable phenomena, which directly aligns with this content description.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	Biblical references to God's design are integrated with scientific facts about the Solar System, showing worldview influence in interpretation.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – <i>Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.</i>	Discusses Pluto's reclassification and how understanding of the Solar System changes with new evidence.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – <i>Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.</i>	Interactive questions encourage predictions and inquiry about planetary differences and habitability.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – <i>Construct arguments based on analysis of evidence to support conclusions or evaluate claims...</i>	Students use planetary facts to support conclusions about order and design in the Solar System.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students communicate their understanding through the Solar System model activity and optional sharing of photos or diagrams.
AC9TDE8P02 / AC9TDE10P02 – <i>Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.</i>	Creating a scale model of the Solar System involves design thinking and effective visual communication.

Lesson 6: Exploring the Planets

Introduction: The Wonders of the Planets

The planets in our **Solar System** are incredible! Each one is unique in **size, atmosphere, composition, and distance from the Sun**.

Biblical Connection: Genesis 1:16

"God made two great lights – the greater light to govern the day and the lesser light to govern the night. He also made the stars."

God **created the Sun, Moon, and planets** with precision and purpose. As we explore them, we can see His **wisdom and creativity** in every detail.

Think About It:

- Why do you think God created so many different planets?
 - What makes Earth different from the other planets?
-

Step 1: Understanding the Planets

Our Solar System is made up of **eight main planets**, each one orbiting the Sun at different distances. These planets fall into two groups based on their size and what they're made of: the **Inner Rocky Planets** and the **Outer Gas and Ice Giants**. Let's get to know each one a little better!

Inner Planets – The Rocky Planets

These planets are closer to the Sun and have solid, rocky surfaces. They're smaller than the outer planets but full of fascinating features.

1. **Mercury** – This is the **smallest** of the eight planets and the **closest** to the Sun. It has no atmosphere to keep in heat, so daytime temperatures are burning hot, while nighttime becomes freezing cold. It's covered with craters and looks a lot like the Moon.
2. **Venus** – Similar in size to Earth, but don't be fooled! Venus has a **thick, toxic atmosphere** that traps heat and makes it the **hottest planet** in the Solar System. Its clouds are made of acid, and the pressure on its surface would crush you!
3. **Earth** – Our home, and the **only planet known to support life**. Earth has water, air, a magnetic field, and a perfect balance of temperature and sunlight to make life possible. Everything about Earth shows signs of careful design.
4. **Mars** – Known as the **"Red Planet"** because of its iron-rich soil. Mars is cold and dusty, with the tallest volcano and deepest canyon in the Solar System. Scientists believe it once had liquid water and possibly could again.

Outer Planets – The Gas and Ice Giants

These planets are much larger and don't have solid ground. They are made mostly of gas or frozen substances and are located far from the Sun.

5. **Jupiter** – The **largest planet** by far! Jupiter is mostly gas, with massive storms, including the **Great Red Spot**, a swirling storm larger than Earth. It has more than 90 moons and a powerful magnetic field.
6. **Saturn** – Easily recognized by its **beautiful rings** made of ice and rock chunks. Saturn is mostly made of hydrogen and helium gas, and it, too, has dozens of fascinating moons.
7. **Uranus** – This icy giant is unique because it **rotates on its side** like a rolling ball. It has a pale blue-green colour caused by methane gas in its atmosphere and faint rings you can't see easily from Earth.
8. **Neptune** – The **furthest planet** from the Sun. It's deep blue and has the **strongest winds** in the Solar System, blowing up to 1,200 miles per hour! Neptune is cold, stormy, and full of mystery.

Bonus: Dwarf Planets

Pluto used to be considered the ninth planet but is now called a **dwarf planet**. It's still an interesting part of our Solar System and orbits in a region filled with icy objects called the Kuiper Belt.

Interactive Questions:

1. Which planet do you think is the most fascinating? Why?
 2. If you could visit any planet (safely!), which one would it be?
 3. Why do you think God made each planet so different from the others?
-

Step 2: Activity – Research & Create a Planet Fact Sheet

Objective: Choose a planet, research its key characteristics, and create a fact sheet.

Materials Needed:

- A notebook or a blank sheet of paper
- Coloured pencils or markers (optional)
- Internet access or a book on planets

Instructions:

1. **Pick a Planet** – Choose one planet to research.
2. **Find These Facts:**
 - **Size** (How big is it compared to Earth?)
 - **Composition** (Is it rocky or gaseous?)
 - **Atmosphere** (What gases surround it?)
 - **Distance from the Sun** (Closer to the Sun or farther away?)
 - **Fun Fact!** (Find something interesting about your planet.)
3. **Create a Fact Sheet:**
 - Write the planet's name in **big, bold letters**.
 - List the facts neatly or create a small **poster**.
 - Draw or print a picture of the planet.

Challenge Yourself: If you finish early, compare two planets and **write how they are different.**

Step 3: Reflecting on God's Creation

The planets show **God's power and order** in creation. The fact that each planet is so different reminds us of **God's creativity.**

Romans 1:20 Connection

"For since the creation of the world God's invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made."

This verse reminds us that by **studying creation, we see evidence of God's power.**

Final Reflection Questions:

- What does the variety of planets tell you about God's creativity?
- If Earth was just a little closer or farther from the Sun, life wouldn't be possible. How does this show God's perfect design?
- What's one thing you learned today that amazes you about the planets?

Your Challenge:

Share your planet fact sheet with a family member and explain what makes your planet special!

Lesson Summary:

- **Inner planets** are small and rocky, while **outer planets** are large and gaseous.
- Each planet has a unique **size, composition, atmosphere, and distance from the Sun.**
- **Genesis 1:16** reminds us that **God created the planets with purpose.**

Next Steps:

Want to explore more? Look up NASA images of planets or watch a video about space exploration!

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U03 – Model cyclic changes in the relative positions of the Earth, sun and moon and explain how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides.	While this lesson focuses on planetary facts, the study of planetary orbits is part of understanding predictable celestial movements covered by this content description.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	Biblical framing of planetary creation is integrated with scientific facts, showing how worldview can influence interpretation of astronomy.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Includes discussion of Pluto's reclassification, illustrating how evidence changes scientific categorisation.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students develop questions about planetary characteristics and predict differences between planets.

Content Description Code & Full Wording

AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – *Select and construct appropriate representations... to organise and process data and information.*

AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – *Construct arguments based on analysis of evidence to support conclusions or evaluate claims...*

AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – *Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...*

Rationale

The planet fact sheet activity requires organising data into a clear, labelled, and potentially illustrated format.

Students use evidence to explain differences between planets and defend conclusions about God's design.

Students produce a fact sheet or poster and present it to a family member, demonstrating structured communication.

Lesson 7: The Moon and Other Celestial Bodies

Welcome to Your Lesson!

Today, you'll explore **the Moon, asteroids, comets, and gravity in the solar system**. You'll also complete a hands-on activity to understand the Moon's phases.

By the end of this lesson, you will:

1. Understand the Moon's phases and why they happen.
 2. Learn about asteroids and comets.
 3. Discover the role of gravity in the solar system.
 4. See how astronomy reveals God's design.
-

What You Need

- Bible (for scripture reading)
 - Notebook and pen/pencil
 - Small ball (to represent the Moon)
 - Flashlight (to act as the Sun)
 - Dark room or a dim space for an activity
 - A printed or digital image of the Moon's phases (optional)
-

Step 1: The Moon and Its Phases

What is the Moon?

The Moon is Earth's **only natural satellite**, meaning it moves around our planet in a regular path, or **orbit**. It's much smaller than Earth – about one-quarter the size – and doesn't have its own light. Instead, it reflects the light of the Sun, which is why we can see it glowing in the night sky. The Moon is important for many reasons. It helps control the **ocean tides**, provides light at night, and has guided calendars for thousands of years. Its predictable movement around Earth takes about **27.3 days**, which is how long it takes to complete one full orbit.

Read Genesis 1:14-16

"And God said, 'Let there be lights in the expanse of the heavens to separate the day from the night...'"

Think About It:

Write the answers in your science journal.

- How does the Moon help us on Earth?

- Why do you think God made it?
-

The Phases of the Moon

As the Moon orbits Earth, the **amount of sunlight** we see reflecting off it changes. These changes are called the **phases of the Moon**. It's not the Moon itself changing shape – it's just the way the sunlight hits it from our point of view on Earth.

This cycle begins with the **New Moon**, when we can't see the Moon at all. Then more light becomes visible each night (this is called “waxing”), leading up to a **Full Moon**, when the entire face is bright. After that, the Moon starts to appear smaller each night (called “waning”) until it returns to the New Moon.

These phases are repeated every month and have helped people measure time for thousands of years. Many ancient cultures used the Moon to mark seasons, plant crops, and even plan festivals.

How the Moon's Phases Affect Earth

1. The Moon's Pull on Earth's Oceans – Tides

The Moon's gravity doesn't just affect the tides in your imagination—it literally pulls on the oceans. Because water can move freely across the planet's surface, it bulges outward on the side of Earth facing the Moon. At the same time, a second bulge forms on the opposite side because Earth itself is pulled slightly toward the Moon, leaving water behind.

As Earth rotates once every 24 hours, different places on the planet move through these bulges. Most coastlines experience **two high tides and two low tides each day**.

When the Moon, Earth, and Sun line up (during the **New Moon** and **Full Moon**), the gravitational forces of the Sun and Moon combine, producing **spring tides**—the highest highs and the lowest lows. When the Sun and Moon form a right angle (during the **First and Last Quarter** phases), their gravitational pulls partly cancel out, giving **neap tides**—gentler, smaller movements of water.

Think About It:

- How would fishermen, sailors, or beach communities depend on knowing the tides?
- Why might God design a rhythmic rise and fall of the seas instead of still oceans?

The steady rhythm of tides shapes coastlines, nourishes tidal ecosystems, and helps certain animals time their behaviour. For instance, some crabs and sea turtles come ashore only during specific tide heights to lay eggs safely.

2. The Moon and Human Time-Keeping – Calendars

Before digital watches or atomic clocks, people looked up. Early civilisations—Hebrews, Babylonians, Chinese, Mayans, and many more—based their **calendars on the Moon's cycle** because it repeats so precisely.

Each complete lunar cycle (New Moon → Full Moon → New Moon) lasts about **29.5 days**. Twelve such cycles equal roughly 354 days—close to one solar year. That’s why months (the word *month* comes from *moon-th*) are about thirty days long.

Even today, several cultural and religious calendars remain **lunar or lunisolar**, including the Jewish, Islamic, and Chinese calendars. Festivals such as Easter, Passover, and the Chinese New Year are still dated according to Moon phases.

By setting natural rhythms for worship, work, and harvest, the Moon became part of humanity’s sense of order and obedience to God’s created cycles—“*Let them be for signs and for seasons, and for days and years*” (Genesis 1:14).

3. The Moon’s Subtle Influence on Living Things

While the strongest measurable effect of the Moon is on tides, scientists and farmers have long wondered whether its phases might also influence **plants, animals, and even human activity**.

- **Plants:** Traditional farmers in many cultures practise **lunar planting**—sowing leafy crops during the waxing Moon and root crops during the waning Moon. The idea is that the increased light and gravitational moisture movement in soil during the waxing phase may support upward growth, whereas waning phases encourage root development. Modern research gives mixed results, but it’s a valuable example of how observation of natural cycles shaped agricultural wisdom.
- **Animals:** Coral reefs, fireflies, and some migratory birds time breeding or feeding with the lunar cycle. The extra light of the Full Moon can change predator–prey behaviour; for example, lions hunt less during bright nights, while small prey stay hidden.
- **Humans:** Historically, people have used the Moon for navigation and storytelling. Some studies have explored links between Moon phases and sleep patterns or moods, though evidence is still uncertain. Whether or not these influences are strong, the Moon’s steady presence has always affected human imagination and daily life.

Try This:

- Research an example of how tides affect a coastal ecosystem (for example, mangroves or coral reefs).
 - Interview a gardener or farmer who uses Moon-phase planting and record their reasoning.
-

4. A World in Rhythm – God’s Order in Creation

The repeating phases of the Moon remind us that God built rhythm into creation: night and day, seasons, tides, and life cycles. Each follows dependable mathematical precision. The same gravity that tugs oceans also keeps Earth’s rotation steady, helping to maintain our climate. If the Moon were much smaller or farther away, Earth’s tilt and seasons could become unstable—another reason to thank God for His perfect design.

Reflection Prompt:

“How do the Moon’s phases show both physical order and spiritual rhythm in creation?”

The 8 Phases of the Moon

1. **New Moon** – The Moon is between Earth and the Sun, so we can't see it.
 2. **Waxing Crescent** – A small sliver of light appears.
 3. **First Quarter** – Half of the Moon is lit up.
 4. **Waxing Gibbous** – More than half is visible.
 5. **Full Moon** – The entire face of the Moon is visible.
 6. **Waning Gibbous** – The Moon starts getting smaller.
 7. **Last Quarter** – Only half is visible again.
 8. **Waning Crescent** – Just a small sliver remains before the cycle repeats.
-

Hands-On Activity: The Phases of the Moon

You will need:

- A **flashlight** (this represents the Sun)
- A **small ball** (this represents the Moon)
- A **dark room**

Steps:

1. **Turn off the lights** and go into a darker space.
2. **Hold the flashlight** in one hand – this is the Sun.
3. **Hold the ball** at arm's length with your other hand – this is the Moon.
4. **Stand still** and slowly turn in a circle while keeping the ball in front of you.
5. **Watch how the light changes** on the ball.
This is how we see different Moon phases!



Write down your observations in your notebook.

Step 2: Asteroids and Comets

What are Asteroids?

Asteroids are **chunks of rock and metal** that orbit the Sun, like mini-planets. Most of them are found in the **Asteroid Belt**, a region between the orbits of Mars and Jupiter. This belt contains millions of rocky pieces, some as small as pebbles and others hundreds of miles wide.

Asteroids are like leftover building blocks from when the planets were formed. Scientists study them to learn more about the early Solar System. Although most asteroids stay in the belt, occasionally one gets bumped out of orbit and passes close to Earth.

Fun Fact: Some scientists think an asteroid hit Earth long ago and caused the extinction of the dinosaurs!

Write This Down:

- Where are most asteroids found?
 - What do you think would happen if a large asteroid hit Earth today?
-

What are Comets?

Comets are made of **ice, dust, and rock**. They orbit the Sun in very long, oval-shaped paths, often taking hundreds or thousands of years to complete a single orbit. When a comet gets close to the Sun, its surface heats up, and gases and dust shoot out from it – this forms the **tail** that we see glowing in the night sky.

The tail always points away from the Sun because of the solar wind (a stream of charged particles from the Sun). Comets are beautiful and mysterious reminders of how vast and varied God's creation is.

Read Psalm 19:1

"The heavens declare the glory of God; the skies proclaim the work of His hands."

Think About It: How do comets and asteroids show God's creativity in the universe?

Step 3: The Role of Gravity in the Solar System

What is Gravity?

Gravity is a **force** that pulls objects toward each other. It's what makes things fall to the ground and what keeps our feet on Earth. Everything that has mass (which means everything with weight) pulls on everything else with gravity – even you! But the more mass something has, the stronger its gravity.

The Sun is the biggest object in our Solar System, so it has the strongest gravitational pull. This is why all the planets orbit the Sun. Gravity is invisible, but we can see its effects everywhere.

Read Job 26:7

"He spreads out the northern skies over empty space; He suspends the Earth over nothing."

Wow! The Bible told us thousands of years ago that Earth **hangs in space**! Science later discovered gravity.

How Gravity Affects the Solar System

Gravity is like the glue that holds the Solar System together. Without it, everything would just float off into space! Here's what gravity does:

- **Keeps the planets in orbit** around the Sun, like a giant invisible string pulling them into a circle.
- **Keeps the Moon orbiting Earth**, which is what gives us tides and Moon phases.

- **Controls the movement of comets and asteroids**, often pulling them toward the Sun or slinging them past other planets.
- **Helps planets and stars form**, by pulling together dust and gas in space to form larger bodies.

Without gravity, there would be no stars, no planets, and no life. It's one of the invisible systems God created to bring order and stability to the universe.

Write in Your Notebook:

- How does gravity show God's perfect design in the universe?
 - What would happen if gravity suddenly disappeared?
-

Step 4: Review & Reflection

- **What is one new thing you learned about the Moon?**
- **How do asteroids and comets show God's power in space?**
- **Why is gravity important for life on Earth?**

Write your answers in your Science Journal.

Step 5: Final Thought & Prayer

Read Isaiah 40:26

"Lift up your eyes and look to the heavens: Who created all these? He who brings out the starry host one by one and calls forth each of them by name."

Astronomy teaches us that God is in control. He knows every star, asteroid, and planet – **and He knows you too!**

Take a moment to pray:

- Thank God for His incredible universe.
 - Ask Him to help you grow in awe of His creation.
-

Bonus Activities (Optional):

Moon Journal – Observe and sketch the Moon's phases for one month.

Gravity Experiment – Drop two objects of different weights and see how they fall at the same speed.

Bible Study on Astronomy – Research other Bible verses about the heavens.

You've Completed the Lesson!

Great job! You've explored the Moon, asteroids, comets, and gravity – all through science and Scripture. Keep observing the night sky and remember: **The heavens declare the glory of God!**

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U03 – <i>Model cyclic changes in the relative positions of the Earth, sun and moon and explain how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides.</i>	The lesson directly models the Moon's phases and explains how its position relative to the Earth and Sun creates observable patterns.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	Biblical passages are integrated with scientific explanations of the Moon, asteroids, comets, and gravity, showing worldview influence in understanding space science.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – <i>Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.</i>	Information about celestial bodies and gravity reflects the ongoing refinement of astronomical knowledge.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – <i>Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.</i>	The Moon phase activity encourages students to form predictions and questions about observable patterns in the sky.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – <i>Plan and conduct reproducible investigations to answer questions and test hypotheses...</i>	The flashlight-and-ball activity is a reproducible investigation into how Moon phases occur.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations... to organise and process data and information.</i>	Students diagram Moon phases or record observations from their activity.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – <i>Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.</i>	Students evaluate how accurately their model represents real Moon phases and identify limitations.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – <i>Construct arguments based on analysis of evidence to support conclusions or evaluate claims...</i>	Students use evidence from their model to explain Moon phases or orbital motion.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students document their findings and reflections in their notebooks or Moon journal.

Lesson 8: Investigating the Moon's Phases & Impact on Earth

Unit alignments for credit in Certificate II in General Education for Adults:
VU23838 – Investigate the Solar System

Do this activity if you are in Year 10 and seeking credit for Science in the Cert II in General Education.

Learning Objectives

- Model the Moon's phases and explain their impact on Earth (e.g., tides, calendars).
- Develop and follow an investigation plan, record observations, and present findings using scientific terminology.

Australian Curriculum Links

- **AC9S7U03** – Model cyclic changes in the relative positions of the Earth, Sun and Moon and explain how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides.
- **AC9S7I01** – Develop investigable questions, reasoned predictions and hypotheses.
- **AC9S7I02** – Plan and conduct reproducible investigations.
- **AC9S7I04** – Select and construct appropriate representations to organise and process data.
- **AC9S7I08** – Write and create texts to communicate ideas, findings and arguments.

Resources

- Globe or ball (Earth)
- Small ball (Moon)
- Flashlight (Sun)
- Darkened room
- Notebook or Science Journal

Activity Steps

1. Introduction

- Do a quick scan-review of the previous lesson, and/or discuss with your tutor or class-mates what you have learnt about the Moon's phases and their significance for tides and calendars.
- Look at diagrams of Earth-Moon-Sun positions.
- At the end of this investigation, you are going to give a presentation to your family or classroom group, and you will need to video the presentation for your Cert II assessor (if the assessor cannot attend and observe the presentation). So, prepare some notes you could use as an introduction to your final presentation.

2. Planning

- Students write an investigation plan including:
 - Aim: What is it you would like to find out through your investigation
 - Hypothesis: Make a statement about your best guess hunch possibly explaining the phenomenon you are investigating (e.g., "The Moon's phases are caused by its position relative to Earth and Sun.")

- Materials: What resources do you need to complete your investigation?
 - Method steps: What steps (actions) do you plan to do - your procedure for the investigation.
 - Confirm plan with teacher/tutor.
 - 3. **Investigation**
 - Set up the model: flashlight as Sun, globe as Earth, small ball as Moon.
 - Rotate Moon around Earth and observe light changes.
 - Record observations for each phase (New Moon, First Quarter, Full Moon, Last Quarter).
 - 4. **Data Representation**
 - Draw diagrams of each phase and label positions.
 - Note how phases relate to tides and calendars.
 - 5. **Reporting & Discussion**
 - Write a scientific report with headings: *Introduction, Method, Results, Discussion, Conclusion.*
 - Present findings orally using correct terminology.
 - i) if you are learning at home, then video your presentation to your family; or
 - ii) orally present to the student classroom or in a small group.
-

Assessment Criteria

- Accuracy of model and observations.
 - Completeness of investigation plan.
 - Quality of diagrams and data representation.
 - Written report and oral presentation clarity.
-

Extra Lesson: Optional Extension Activities

Reflection & Review

This lesson is set aside to round off the week of learning with a reflection and review activity.

Activity: Write a short reflection on how the design of the solar system and the planets points to God's wisdom and creativity.

Bonus Activities (Optional):

Moon Journal – Observe and sketch the Moon's phases for one month.

Gravity Experiment – Drop two objects of different weights and see how they fall at the same speed.

Bible Study on Astronomy – Research other Bible verses about the heavens.

Lesson 9: Earth's Layers

Welcome to Your Lesson!

Have you ever wondered what's beneath your feet? Today, you'll learn about the **four main layers of the Earth** and how they work together in God's amazing design!

By the end of this lesson, you will:

1. Understand the **four layers of the Earth** (crust, mantle, outer core, inner core).
 2. Learn how each layer is unique in temperature, composition, and function.
 3. Explore **Bible verses that describe Earth's foundations**.
 4. Complete a **hands-on activity** to visualize Earth's layers.
-

What You Need

- Bible (for scripture reading)
 - Notebook and pen/pencil
 - A boiled egg (or a small ball, like a rubber bouncy ball)
 - A knife (with adult supervision if using the boiled egg)
 - Coloured pencils or markers (optional, for a diagram)
-

Step 1: What Does the Bible Say About Earth's Structure?

The Bible mentions **Earth's foundations** and how God created everything with order.

Read Psalm 104:5

"He set the earth on its foundations; it can never be moved."

Read Job 38:4-6

"Where were you when I laid the earth's foundation? Tell me, if you understand. Who marked off its dimensions? Surely you know!"

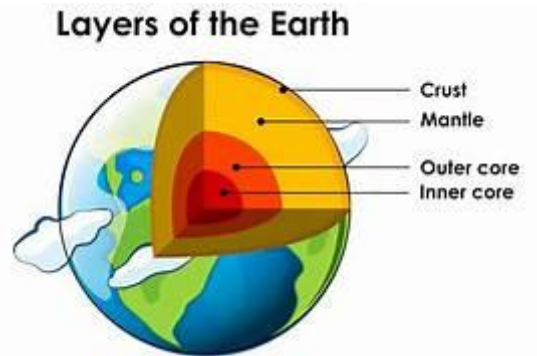
Think About It:

- What do these verses tell us about God's role in Earth's design?
- Why do you think Earth is made of different layers?

Write your thoughts in your notebook.

Step 2: The Four Layers of the Earth

Earth is made up of **four main layers**, and each one has a unique purpose in God's design – like layers in a cake or parts of a boiled egg. These layers work together to support life, protect the planet, and even help shape the land through natural processes like earthquakes and volcanoes.



1. Crust – The Outer Layer

The **crust** is the **thinnest layer**, but it's where all life on Earth exists. We live, build cities, grow crops, and walk on the crust. It's made up of **solid rock**, including **soil, sand, and mountains**. There are two types of crust:

- **Continental crust** (under land): thicker and made of lighter rocks like granite.
- **Oceanic crust** (under oceans): thinner but denser, made of darker rock like basalt.

The crust is broken into large pieces called **tectonic plates**, which slowly move around and sometimes bump into each other, causing earthquakes or volcanic eruptions.

Fun Fact: The crust only makes up about 1% of Earth's volume, yet it's where everything we see happens!

2. Mantle – The Largest Layer

Beneath the crust is the **mantle**, which makes up the **majority of Earth's volume (about 84%)**. It's made of **hot, semi-solid rock** – a bit like thick syrup or melted wax. This rock flows slowly over time, causing the tectonic plates above to move.

This movement is called **convection**, and it's like a slow boil in a pot of soup. It helps recycle Earth's crust and creates **volcanoes, mountain ranges, and earthquakes**.

The top part of the mantle plus the crust forms the **lithosphere**, which moves over the softer layer beneath, called the **asthenosphere**.

Fun Fact: Some of the magma from the mantle escapes through volcanoes and becomes lava on the surface!

Think About It:

- How does the mantle affect volcanoes and earthquakes?
- What would happen if the mantle stopped moving?

3. Outer Core – The Liquid Layer

Deeper still, the **outer core** is made up of **liquid metal** – mostly **iron and nickel**. It is extremely hot, between **4,500°C and 6,000°C**, but not under quite as much pressure as the inner core, so the metals stay in a liquid state.

This swirling, liquid metal creates **Earth’s magnetic field**, which acts like a giant invisible shield around the planet. The magnetic field protects us from harmful **solar radiation** and helps animals like birds and turtles navigate long distances.

*Fun Fact: If Earth didn’t have a magnetic field, the **solar wind** would strip away our atmosphere!*

Write in Your Notebook:

- Why is the outer core made of liquid metal?
- How does Earth’s magnetic field help us?

4. Inner Core – The Solid Centre

At the very centre of the Earth is the **inner core**, a **solid ball of iron and nickel**. Even though it's the hottest part of Earth at over **6,000°C** – **hotter than the surface of the Sun!** – it remains solid because of the **immense pressure** from the layers above.

The inner core is about **1,220 km thick**, similar in size to the Moon. It’s thought to spin slightly faster than the rest of the Earth and plays a role in helping keep the magnetic field stable.

Think About It:

- Why does the inner core stay solid even though it’s so hot?
- How does the inner core affect the rest of the Earth?

*Fun Fact: Scientists can’t dig to the core, but they study it using **seismic waves** from earthquakes!*

Notebook Prompts (Optional Extension):

- How do the four layers of Earth work together like a team?
- Which layer do you think is the most interesting? Why?
- What do you think Earth would be like if it were missing one of these layers?

Step 3: Hands-On Activity – Earth’s Layers Model

Let’s **visualize Earth’s layers** using a simple activity!

Option 1: Using a Boiled Egg

1. **Boil an egg** and let it cool.
2. **Carefully peel off the shell** – this represents **the crust**.
3. **Cut the egg in half** (with adult supervision).
 - The **egg white** represents the **mantle**.

- The **soft yolk** (if not fully boiled) represents the **outer core**.
 - The **hard centre of the yolk** represents the **inner core**.
4. **Observe the layers** and write down what you see.

Write in Your Notebook:

- How does the egg model compare to Earth's layers?
 - What did you learn from this activity?
-

Option 2: Drawing the Earth's Layers

If you don't have an egg, **draw Earth's layers instead:**

1. Start with a **small circle** for the inner core.
 2. Draw a **larger circle around it** for the outer core.
 3. Add a **thicker layer** for the mantle.
 4. Finish with a **thin outer crust**.
 5. Label each part and write a short description.
-

Step 4: Review & Reflection

- **What are the four layers of the Earth?**
- **Which layer is the hottest?**
- **How does Earth's magnetic field protect us?**
- **How does this lesson show God's wisdom in creation?**

Write your answers in your notebook.

Step 5: Final Thought & Prayer

Read Isaiah 40:28

“Do you not know? Have you not heard? The Lord is the everlasting God, the Creator of the ends of the earth. He will not grow tired or weary, and his understanding no one can fathom.”

God designed the Earth **perfectly** – each layer has a special role!

Take a moment to pray:

- Thank God for His **amazing creation**.
 - Ask Him to help you **appreciate the world around you**.
 - Pray for **scientists and researchers** studying Earth's structure.
-

Bonus Activities (Optional):

Earthquake Research – Find out how movements in the mantle cause earthquakes.

Magnetic Field Experiment – Use a magnet and iron filings to see how Earth’s magnetic field works.

Bible Study on Creation – Look up more verses about how God designed the Earth (e.g., Genesis 1:1, Hebrews 11:3).

You’ve Completed the Lesson!

Great job! Now you understand the **crust, mantle, outer core, and inner core** – and how God designed them **for a purpose**. Keep exploring and **never stop being amazed** by God’s creation!

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S8U03 – Investigate tectonic activity including the formation of geological features at divergent, convergent and transform plate boundaries and describe the scientific evidence for the theory of plate tectonics.	The lesson introduces tectonic plates in the crust and explains how their movement can cause earthquakes and volcanoes, which relates to plate tectonics and surface geological features.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	Biblical references to God’s creation of Earth’s foundations are integrated with geological explanations, showing how worldview can influence interpretation.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Understanding of Earth’s layers is based on seismic data and has been refined as new evidence emerged.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students are prompted to ask and answer questions about the role of each layer and what might happen if a layer’s properties changed.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses...	The boiled egg model is a planned, reproducible representation of Earth’s layers.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students create labelled diagrams or models of the Earth’s layers.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	Students compare the egg or drawing model to scientific data, noting limitations of the analogy.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students document their findings, reflections, and answers to review questions in their notebooks.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	Designing a visual or physical model of Earth’s layers involves applying design processes to communicate scientific concepts.

Lesson 10: Plate Tectonics and Earthquakes

Welcome to Your Lesson!

Did you know that Earth's surface is constantly moving? The ground beneath your feet **may seem still**, but it's actually **slowly shifting** because of **plate tectonics**! This movement causes **earthquakes, volcanic eruptions, and even mountain formation**.

By the end of this lesson, you will:

1. Understand the **theory of plate tectonics**.
 2. Learn **why earthquakes and volcanoes happen**.
 3. Discover Bible verses about **God's control over the Earth**.
 4. Complete a **hands-on activity** to see plate movements in action!
-

What You Need

- Bible (for scripture reading)
 - Notebook and pen/pencil
 - A piece of cardboard (or a firm paper)
 - Scissors
 - A dish with water
 - Two crackers (or graham crackers)
 - Whipped cream or peanut butter (for the activity)
-

Step 1: What Does the Bible Say About Earth's Foundations?

The Bible speaks about **earthquakes and God's control over the Earth's foundations**.

Read Psalm 104:32

"He looks at the earth, and it trembles; he touches the mountains, and they smoke."

Read Nahum 1:5

"The mountains quake before him and the hills melt away. The earth trembles at his presence, the world and all who live in it."

Think About It:

- What do these verses tell us about God's power over the Earth?
- Why do you think earthquakes and volcanoes happen?

Write your thoughts in your notebook.

Step 2: The Theory of Plate Tectonics

1. What are Tectonic Plates?

Earth's crust is **broken into large pieces called tectonic plates**. These plates **float on top of the hot, moving mantle** below. They move **very slowly** – only a few centimetres per year – but over time, they **change Earth's surface!**

Fun Fact: If you lived 5,000 years ago, you could most likely travel by land from Australia to Africa or the USA.

All scientists affirm that the continents were once joined together in a single landmass or supercontinent – often called Pangaea. This land likely existed before or during the time of Noah's Flood, around 4,300 years ago, and later broke apart through powerful geological events as part of God's judgment and design."

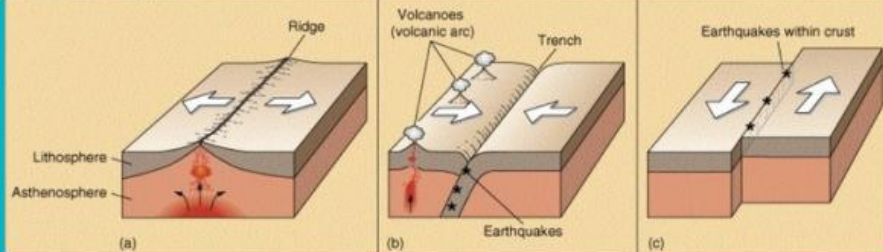
The Bible speaks of the Earth being created as one landmass. In **Genesis 1:9**, God said, "Let the water under the sky be gathered to one place, and let dry ground appear."

This suggests that at the time of creation, the land was united.



Different types of plate boundaries

Type of Margin	Divergent	Convergent	Transform
Motion	Spreading	Subduction	Lateral sliding
Effect	Constructive (oceanic lithosphere created)	Destructive (oceanic lithosphere destroyed)	Conservative (lithosphere neither created or destroyed)
Topography	Ridge/Rift	Trench	No major effect
Volcanic activity?	Yes	Yes	No



Write in Your Notebook:

- How do tectonic plates move?
- What do you think happens when plates crash into each other?

2. The Three Types of Plate Boundaries

There are three main ways plates move:

1. Convergent Boundaries (Colliding Plates)

- **What happens?** Plates push together, forming **mountains or volcanoes**.
- **Example:** The **Himalayas** formed when India crashed into Asia!

2. Divergent Boundaries (Separating Plates)

- **What happens?** Plates move apart, allowing **magma to rise and create new land**.
- **Example:** The **Mid-Atlantic Ridge** is growing as plates pull apart!

3. Transform Boundaries (Sliding Plates)

- **What happens?** Plates slide past each other, causing **earthquakes**.
- **Example:** The **San Andreas Fault** in California causes frequent earthquakes.

Write Down:

- Which type of boundary causes earthquakes?
- Why do volcanoes often form where plates meet?

Step 3: Earthquakes and Volcanoes

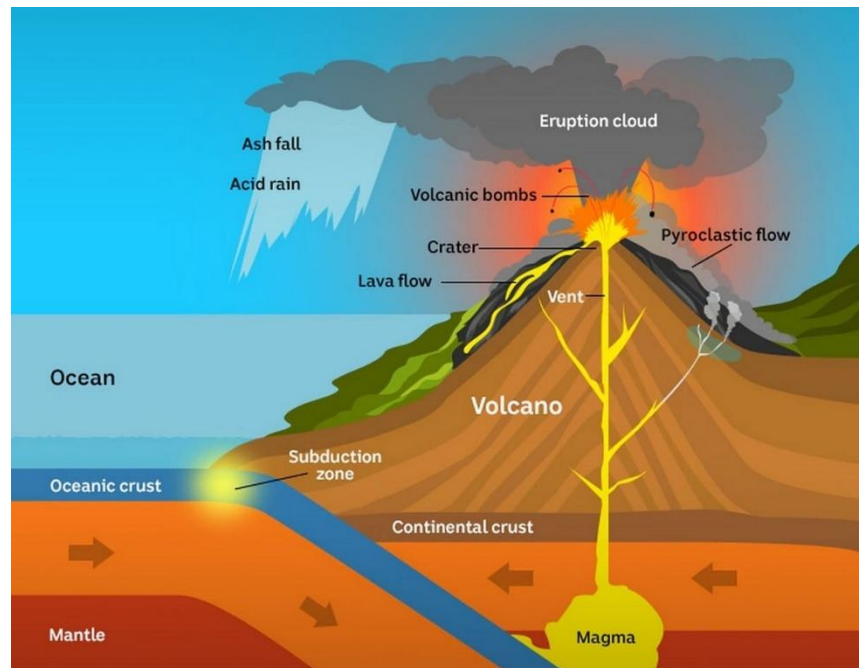
1. What Causes Earthquakes?

Earthquakes happen when **tectonic plates** – the massive sections of Earth’s crust – move against each other. Sometimes these plates get stuck, and pressure builds up. When the pressure becomes too great, the plates suddenly shift, releasing energy in waves that shake the ground. These energy waves travel through the Earth and cause the surface to tremble.

Earthquakes can be mild or extremely destructive, depending on their strength and location. Cities near plate boundaries are especially at risk. Earthquakes can **collapse buildings**, **cause tsunamis**, and leave many people homeless or injured.

Example: The 2011 Japan earthquake, with a magnitude of 9.0, triggered a devastating tsunami and nuclear disaster. Yet even in this, we see the courage and compassion of people helping one another recover.

Write in Your Notebook: • What causes the ground to shake during an earthquake? • How can earthquakes affect people, buildings, and daily life?



2. Why Do Volcanoes Erupt?

Volcanoes form at weak spots in Earth’s crust, often near plate boundaries. Beneath the surface, **magma** (melted rock from the mantle) builds up in chambers. When the pressure becomes too great, the magma forces its way to the surface through cracks and erupts as **lava**, **ash**, and **gas**.

Volcanoes can shape the land by creating new islands or mountains, but they also bring danger. Eruptions can destroy towns, pollute the air, and change weather patterns. However, volcanic soil is very rich, which is why people often live near volcanoes despite the risks.

Example: In 1980, Mount St. Helens erupted violently in the U.S., blasting off the top of the mountain and sending ash 15 miles into the sky. Forests were flattened, and rivers were clogged with mudflows.

Read Exodus 19:18: “Mount Sinai was covered with smoke because the Lord descended on it in fire. The smoke billowed up from it like smoke from a furnace, and the whole mountain trembled violently.”

This dramatic scene reminds us that God’s power can shake the Earth. Volcanoes are a physical picture of both the beauty and danger found in creation – and they point to a God who commands even the elements.

Think About It: • How do volcanoes remind us of God’s power and majesty? • What happens when a volcano erupts near people or cities? • How can we prepare for natural disasters while trusting God?

Write your answers in your notebook.

Step 4: Hands-On Activity – Model Plate Movements

Now, let’s see how plates move with a fun activity!

Option 1: Cracker & Whipped Cream Model

You Will Need:

- **Two crackers** (tectonic plates)
- **Whipped cream or peanut butter** (mantle)

Instructions:

1. **Spread a layer of whipped cream or peanut butter** on a plate – this represents the **mantle**.
2. **Place the crackers on top** – these represent the **tectonic plates**.
3. **Try these movements:**
 - **Push them together** → What happens? (Mountains form!)
 - **Pull them apart** → What happens? (A gap forms!)
 - **Slide them past each other** → What happens? (They scrape and shake!)

Write Down Your Observations.



Option 2: Floating Cardboard Model

You Will Need:

- A dish filled with water
- Two small pieces of cardboard

Instructions:

1. **Place the cardboard pieces on the water** (these are plates floating on the mantle).
2. **Gently push them together, pull them apart, and slide them side to side.**
3. **Observe how they move!**

Write in Your Notebook:

- Which plate movement do you think causes the strongest earthquakes?
- How does this activity help you understand Earth's layers?

Step 5: Review & Reflection

- What are tectonic plates?
- How do earthquakes and volcanoes happen?
- Which type of plate movement creates mountains?
- How does the Bible show God's power over the Earth?

Write your answers in your notebook.

Step 6: Final Thought & Prayer

Read Isaiah 54:10

"Though the mountains be shaken and the hills be removed, yet my unfailing love for you will not be shaken."

Even though **earthquakes and volcanoes are powerful**, God's love **never changes**.

Take a moment to pray:

- Thank God for the amazing way He created the Earth.
- Pray for people who live in places affected by earthquakes and volcanoes.
- Ask God to help you learn **more about His creation**.

Bonus Activities (Optional):

- **Earthquake Research** – Look up the strongest earthquakes in history.
- **Volcano Study** – Find five famous volcanoes and list where they are.
- **Bible Study on Earthquakes** – Read about the earthquake when Jesus died (Matthew 27:51).

You've Completed the Lesson!

Great job! Now you understand **plate tectonics, earthquakes, and volcanoes** – and how **God's power is seen in nature**. Keep exploring **God's amazing creation!**

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S8U03 – Investigate tectonic activity including the formation of geological features at divergent, convergent and transform plate boundaries and describe the scientific evidence for the theory of plate tectonics.	The lesson directly explains plate boundaries, tectonic movement, and how these cause earthquakes, volcanoes, and mountain formation.
AC9S8U04 – Describe the key processes of the rock cycle, including the timescales over which they occur, and examine how the properties of sedimentary, igneous and metamorphic rocks reflect their formation and influence their use.	Volcanic activity is linked to igneous rock formation, connecting tectonic processes to geological change.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson includes biblical references to Earth's creation and God's control over earthquakes and volcanoes, showing how worldview shapes interpretation.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Historical and modern examples (e.g., 2011 Japan earthquake) illustrate how ongoing evidence refines geological understanding.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students are prompted to predict what happens at different plate boundaries and why volcanoes often form there.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses...	The cracker/whipped cream and floating cardboard activities model tectonic plate movements in a reproducible way.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students observe and record model outcomes, representing results visually.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	Students assess how well their models represent real tectonic processes and note limitations.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – Construct arguments based on analysis of evidence to support conclusions or evaluate claims...	Students use model observations to explain which plate movements cause the strongest earthquakes.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students record observations, conclusions, and biblical reflections in their notebooks.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	Building and refining plate movement models involves design thinking and visual communication.

Lesson 11: The Rock Cycle

Welcome to Your Lesson!

Have you ever picked up a rock and wondered where it came from? Every rock has a history – it may have been **melted, crushed, buried, or worn away over thousands of years!** This journey is called **the rock cycle**, and today you'll learn how **God designed Earth's rocks to change and recycle over time.**

By the end of this lesson, you will:

1. Understand **the three types of rocks** (igneous, sedimentary, and metamorphic).
 2. Learn how rocks **change over time** in the rock cycle.
 3. Discover **Bible verses that describe rocks and God's creation.**
 4. Complete a **hands-on activity** to visualize the rock cycle.
-

What You Need

- Bible (for scripture reading)
 - Notebook and pen/pencil
 - Three small rocks (if available)
 - A crayon (or coloured wax)
 - A knife or pencil sharpener (for shaving the crayon)
 - A small foil pan or heat-safe surface
 - A hairdryer (or a sunny spot)
-

Step 1: What Does the Bible Say About Rocks?

The Bible often compares **God's power and faithfulness to rocks** because rocks are **strong, lasting, and unshakable.**

Read Psalm 18:2

"The Lord is my rock, my fortress and my deliverer; my God is my rock, in whom I take refuge."

Read Matthew 7:24-25

"Therefore everyone who hears these words of mine and puts them into practice is like a wise man who built his house on the rock."

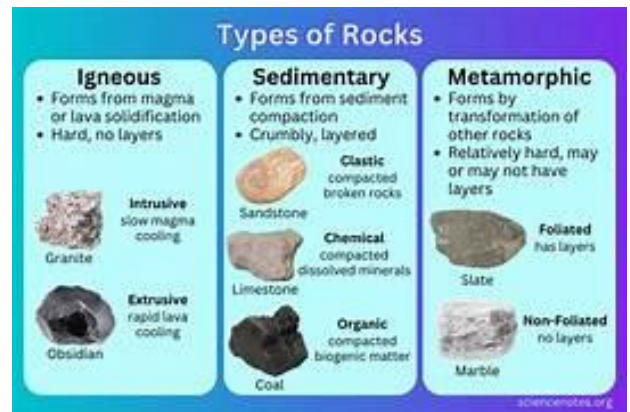
Think About It:

- Why do you think the Bible compares God to a rock?
- How do rocks remind us of God's unchanging nature?

Write your thoughts in your notebook.

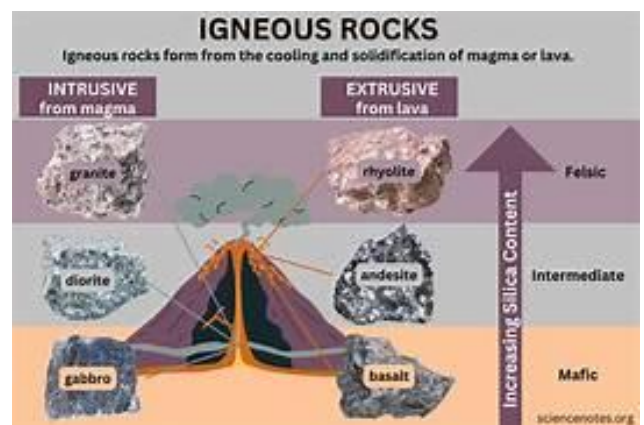
Step 2: The Three Types of Rocks

Every rock on Earth fits into one of three categories. These rocks tell the story of Earth's history, and each one forms in a different way:



1. Igneous Rocks

- Igneous rocks form when **magma** (molten rock from deep underground) cools and hardens. This can happen either beneath the Earth's surface or after magma erupts as **lava** and cools above ground.
- If the rock cools slowly underground, it forms large crystals and becomes **intrusive igneous rock** (like granite). If it cools quickly on the surface, it forms **extrusive igneous rock** (like basalt or obsidian).
- These rocks are often found near **volcanic areas** or ancient lava flows.



Example: Obsidian is a shiny black volcanic rock that forms when lava cools so quickly it turns to glass!

Write in Your Notebook:

- What causes igneous rocks to form?
- Can you think of any volcanoes that produce new igneous rock?

2. Sedimentary Rocks

- These rocks form from **layers of sediment** – tiny pieces of rock, sand, shells, and plant material – that settle in water and are pressed together over time.
- Sedimentary rocks usually form in places like **ivers, lakes, oceans, or floodplains**, where water carries and deposits sediments.
- Over many years, these layers are compressed into rock. Because of this, sedimentary rocks often show **layers or stripes**.
- They are the only type of rock that can contain **fossils**, preserving evidence of past plants and animals.



Example: Sandstone forms from layers of sand that have been compacted together.

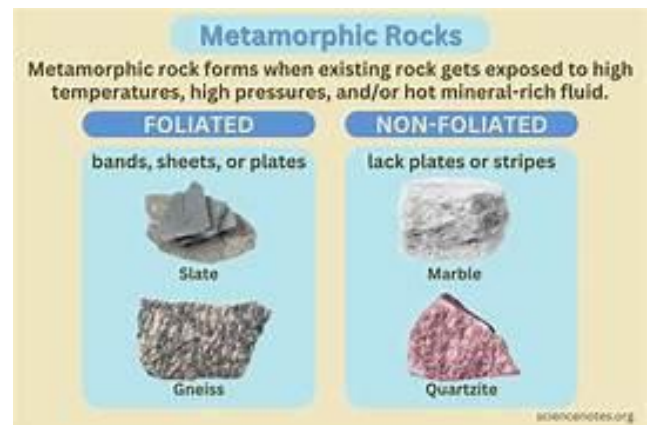
Fun Fact: Many sedimentary rocks were formed rapidly during the global Flood described in Genesis.

Write Down:

- Where do sedimentary rocks form?
 - What do fossils tell us about Earth's history?
-

3. Metamorphic Rocks

- Metamorphic rocks form when existing rocks – either igneous or sedimentary – are buried **deep underground** and changed by intense **heat and pressure**.
- This transformation does not melt the rock but instead **recrystallizes it**, giving it new texture and properties.
- These rocks often appear harder and more sparkly than the original rock.
 - They are commonly found in **mountain ranges**, where plates have collided and pushed rock deep below the surface.



Example: Marble forms when limestone is exposed to great pressure and heat. It becomes smooth, dense, and beautiful – perfect for sculptures and buildings.

Think About It:

- How is marble used in buildings and sculptures?
 - What happens when rocks get buried deep underground?
-

Step 3: The Rock Cycle – How Rocks Change

Rocks don't stay the same forever! Over time, they go through changes caused by heat, pressure, erosion, and melting. This natural process is called the **rock cycle**, and it helps explain how one type of rock can become another. This cycle is a great example of how God created Earth with systems that show both **order and transformation**.

The Rock Cycle Steps:

1. **Igneous rocks** (formed from cooled magma or lava) can be broken down into small particles by wind, water, or ice. These bits of rock, called **sediments**, can be carried away and deposited elsewhere.
2. Over time, **sediments** get packed and cemented together into **sedimentary rocks**. These often contain fossils and form in layers.
3. **Sedimentary rocks** (or even igneous rocks) can get buried deep underground, where **heat and pressure** turn them into **metamorphic rocks**.

4. If a metamorphic rock is heated so much that it melts, it turns back into **magma**. When the magma cools again, it becomes **igneous rock**, and the cycle continues!

This cycle doesn't follow just one path – rocks can change in many different ways, depending on their environment. The rock cycle reminds us that God's creation is always moving and changing, yet always in **orderly patterns**.

Read Ecclesiastes 3:1:

“There is a time for everything, and a season for every activity under the heavens.”

Just like rocks go through a process of change over time, **our lives also go through seasons**. Some seasons feel like pressure (like metamorphic rocks!), while others may be times of growth or rest. But God is working through each one.

Think About It:

- How does the rock cycle show that Earth is always changing?
- Can you think of something in your life that changed for the better over time?
- How does the rock cycle reflect God's design and order?

Write your thoughts in your notebook.

Step 4: Hands-On Activity – Creating a Mini Rock Cycle

Let's **model the rock cycle** using a **crayon**!

You Will Need:

- A **crayon** (any colour)
- A **knife or pencil sharpener** (to create crayon shavings)
- A **small foil pan or heat-safe surface**
- A **hairdryer (or a sunny spot)**

Instructions:

1. **Shave the crayon** into small pieces – this represents **sediments**.
2. **Press the shavings together** with your fingers – this is like a **sedimentary rock** forming.
3. **Apply pressure and heat** (use your hands or a book) to compact it more – this represents **metamorphic rock**.
4. **Gently heat the crayon** with a hairdryer or in the sun – watch it melt and cool. This represents **igneous rock** forming from magma!

Write Down Your Observations:

- What happened to the crayon when it melted?
- How does this model show the **rock cycle in action**?

Step 5: Review & Reflection

- What are the three types of rocks?
- How do sedimentary rocks form?
- What makes metamorphic rocks different from the other two types?
- How does the rock cycle remind us of change and growth in life?

Write your answers in your notebook.

Step 6: Final Thought & Prayer

Read Isaiah 26:4

“Trust in the Lord forever, for the Lord, the Lord himself, is the Rock eternal.”

God **created rocks to last** – and He is our **eternal rock** who never changes!

Take a moment to pray:

- Thank God for creating the Earth and its changing rocks.
 - Ask Him to help you grow and change **just like rocks do in the rock cycle**.
 - Pray for wisdom to build your life **on the solid foundation of God**.
-

Bonus Activities (Optional):

- **Rock Collection** – Find and identify three different types of rocks near your home.
 - **Fossil Research** – Look up famous fossils found in sedimentary rock.
 - **Bible Study on Rocks** – Find more verses that mention rocks (e.g., Exodus 17:6, 1 Samuel 2:2).
-

You’ve Completed the Lesson!

Great job! Now you understand **how rocks change through the rock cycle** – and how **God’s creation is always renewing itself**. Keep exploring and **never stop being amazed by the world God made!**

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S8U04 – Describe the key processes of the rock cycle, including the timescales over which they occur, and examine how the properties of sedimentary, igneous and metamorphic rocks reflect their formation and influence their use.	The lesson directly teaches the three rock types, their formation processes, and how rocks change over time in the rock cycle.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson presents a biblical worldview (e.g., Flood geology) alongside scientific explanations of rock formation, showing how worldview influences interpretation.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Understanding of the rock cycle and fossil evidence has developed over time through new research and observation.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students are prompted to form questions about how rocks change type and to make predictions in the crayon rock cycle activity.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses...	The crayon rock cycle activity is a reproducible investigation simulating rock formation processes.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students create labelled diagrams or visual organisers of the rock cycle.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	Students reflect on the strengths and limitations of the crayon model in representing the real rock cycle.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students write observations and reflections on rock types and the rock cycle in their notebooks.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	Designing and constructing a diagram or model of the rock cycle applies design processes to communicate scientific knowledge.

Lesson 12: Fossils + Reflection & Review

Fossils and What They Tell Us

Fossils are the **preserved remains or impressions** of living things – like plants, animals, or shells – that have been trapped in rock. Most fossils are found in **sedimentary rock**, where layers of mud or sand quickly covered dead organisms and hardened over time.

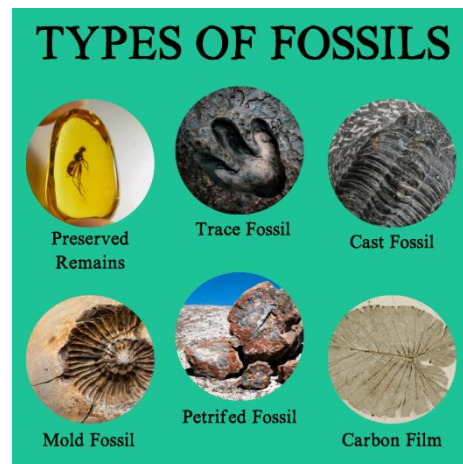
How Are Fossils Formed?

When an animal or plant dies, it usually decays. But if it is quickly buried by sediment – like during a flood – its shape or even its bones can be preserved. Over time, the sediment hardens into rock, leaving behind a **fossil record** of what was once alive.

There are different types of fossils:

- **Body fossils** – bones, teeth, shells, or even whole creatures
- **Trace fossils** – footprints, burrows, or impressions
- **Plant fossils** – leaves, tree trunks, or pollen

Fun Fact: Fossils of sea creatures have been found on mountain tops, suggesting powerful forces once moved water and land around the Earth!



What Can Fossils Tell Us?

- What types of animals and plants lived in the past
- Where those creatures lived (land or sea)
- What the environment was like (wet, dry, warm, cold)
- Evidence of rapid burial – possibly during a global event like **Noah's Flood**
- That animals and people do **not evolve** from one kind into another, but reproduce "after their kind," just as the Bible says in **Genesis 1**

Write in Your Notebook:

- What are fossils, and how do they form?
- Why are most fossils found in sedimentary rocks?
- How might the fossil record support the account of the Flood?

Round Up or Assessment

So now let's round off the week of learning with a reflection and review activity.

Activity: Write a report on the different types of rocks and their formation, reflecting on how geology displays the creativity and order of God.

Australian Curriculum Alignment:

Content Description Code & Full Wording	Rationale
AC9S8U04 – Describe the key processes of the rock cycle, including the timescales over which they occur, and examine how the properties of sedimentary, igneous and metamorphic rocks reflect their formation and influence their use.	Fossils are linked to the formation of sedimentary rocks; the lesson explains how layers of sediment entomb and preserve organisms over time.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson presents a biblical Flood interpretation alongside mainstream paleontology, showing how worldview shapes the interpretation of fossil evidence.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.	Scientific understanding of Earth’s history has evolved as new fossil discoveries have been made and interpreted.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students are prompted to ask questions about fossil formation, locations, and what fossils reveal about past environments.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	In the reflection/report task, students organise rock and fossil information into structured written or visual formats.
AC9S7I07 / AC9S8I07 / AC9S9I07 / AC9S10I07 – Construct arguments based on analysis of evidence to support conclusions or evaluate claims...	Students draw on fossil evidence to support conclusions about geological history from a biblical and scientific perspective.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	The final written report summarising rock types, fossil evidence, and biblical reflection demonstrates purposeful scientific communication.

Lesson 13: Introduction to the Water Cycle

Welcome to Your Lesson!

Today, you'll explore **the water cycle** – one of the most important processes on Earth! Water is a precious gift from God, and He designed an incredible system to keep it moving.

By the end of this lesson, you will:

1. Understand the **four main stages** of the water cycle.
2. Learn how the water cycle helps sustain life.
3. Explore Bible verses that show God's control over water.
4. Complete a hands-on experiment to see the water cycle in action!

What You Need

- Bible (for scripture reading)
- Notebook and pen/pencil
- A **clear glass jar or plastic container** with a lid
- **Warm water** (about ½ cup)
- **Ice cubes**
- **Plastic wrap** (if using a container without a lid)
- **Rubber band** (if using plastic wrap)

Step 1: The Water Cycle and God's Design

What is the Water Cycle?

The **water cycle** is God's amazing system for moving water all around the Earth. It's a continuous process that keeps our lakes full, rivers flowing, clouds forming, and rain falling. Without the water cycle, life on Earth couldn't survive!

Water moves through the cycle by changing **states** – from liquid to gas to solid and back again. It travels between the **atmosphere (sky), land, and oceans**, and nothing is wasted. This cycle purifies, redistributes, and reuses water over and over again in a beautifully designed system.

God created this cycle not just for function, but also for **beauty** and **provision**. It keeps animals hydrated, helps plants grow, and gives us clean drinking water.

Read Psalm 104:10–13

“He makes springs pour water into the ravines; it flows between the mountains. They give water to all the beasts of the field... He waters the mountains from His upper chambers; the land is satisfied by the fruit of His work.”

This verse shows us that the water cycle isn’t just a scientific process – it’s a sign of God’s care for His creation. He designed it with intention.

Think About It:

- Why is water important for life – people, animals, and plants?
- How do you see the water cycle happening in nature (clouds, puddles, streams, rain)?

Write your answers in your notebook.

Step 2: The Four Stages of the Water Cycle

Let’s take a deeper look at the **four main stages** of the water cycle. Each one is essential, and together they show how God’s world works in order and balance.

1. Evaporation

Evaporation happens when the **Sun’s heat warms up water** in oceans, lakes, and rivers. This heat causes the water to change from a liquid into a **gas** called water vapor, which rises into the air.

It’s like when a puddle slowly disappears on a sunny day. The water doesn’t vanish – it’s just gone up into the sky!

Even your **sweat evaporates** to help cool your body – a personal example of God’s design at work.

Read Ecclesiastes 1:7

“All streams flow into the sea, yet the sea is never full. To the place the streams come from, there they return again.”

This verse beautifully describes how water always returns in a never-ending cycle. Long before modern science, the Bible described the water cycle!

Notebook Question:

- What happens to water when it gets warm? Why does it rise into the air?
-



2. Condensation

As the warm water vapor rises into the cooler air high above Earth, it cools down. When this happens, the vapor turns back into tiny droplets of water. These droplets group together to form **clouds**. This is called **condensation**.

You've seen condensation before – like when your cold drink forms water droplets on the outside of the glass. Or when your breath becomes visible on a cold morning. That's the same process happening in the sky!

Without condensation, we wouldn't have clouds – and without clouds, we wouldn't have rain.

Write in Your Notebook:

- How do clouds form in the sky?
 - Why does condensation happen when it's cold?
-

3. Precipitation

When water droplets in clouds get too heavy, gravity pulls them down to Earth. This is called **precipitation**, and it can happen as **rain, snow, sleet, or hail**, depending on the temperature in the clouds and near the ground.

Precipitation refills rivers and lakes, nourishes plants, and provides drinking water. Without it, the land would dry up. This is one way God provides for people, animals, and the Earth!

Read Job 36:27–28

“He draws up the drops of water, which distil as rain to the streams; the clouds pour down their moisture and abundant showers fall on mankind.”

This is a clear description of the water cycle – It is interesting that it was only in the year 1580 that a potter and scientist named Bernard Palissy proposed the theory of the hydrologic cycle. Then Pierre Perrault (1608–1680) made careful observations of rainfall and streamflow in the Seine River basin, confirming Palissy's hunch and thus began the study of modern scientific hydrology. However, thousands of years ago, the Bible indicated this cycle of evaporation (“draws up the drops of water”) into the clouds where it condenses (“distils as rain to the streams”) and then flows out to sea again in a continual cycle. Scientists and archaeologists are continually discovering that the Bible is true.

It shows that God not only understands these processes, but designed them with **care** and **purpose**.

Think About It:

- How does rain help people, animals, and plants?
 - What would happen if the rain stopped for a long time?
-

4. Collection

After precipitation falls to the ground, the water begins to **collect**. Some of it runs off into **streams, rivers, and oceans**. Some soaks into the ground and becomes **groundwater**, stored in underground layers called **aquifers**.

This collected water will eventually **evaporate again**, and the whole water cycle will start over. It's an ongoing loop that never ends – designed by God to keep Earth full of life.

Example: Think of puddles after a rainstorm. Over time, they shrink and disappear. That water didn't vanish – it went back into the air through evaporation or soaked into the soil.

Write in Your Notebook:

- Where does water go after it rains?
 - Why do you think the water cycle is never-ending?
-

Step 3: Hands-On Experiment

Now, let's make a **mini water cycle** inside a jar!

You will need:

- A clear glass jar or plastic container with a lid
- Warm water (about $\frac{1}{2}$ cup)
- Ice cubes
- Plastic wrap (if using a container without a lid)
- Rubber band (if using plastic wrap)



Instructions:

1. **Pour warm water** into the jar (this represents lakes and oceans).
2. **Cover the jar with the lid** (or use plastic wrap and secure it with a rubber band).
3. **Place ice cubes** on top of the lid or plastic wrap (this represents cool air high in the atmosphere).
4. **Watch what happens!**

Observe & Answer:

- Do you see water droplets forming inside the jar? (**Condensation**)
- If you wait a little longer, do the droplets get heavy and fall? (**Precipitation**)

Write down your observations in your notebook.

Step 4: Review & Reflection

- What are the four stages of the water cycle?
- How does the water cycle show God's design?
- Why is precipitation important for life?

Write your answers in your notebook.

Step 5: Final Thought & Prayer

Read Isaiah 55:10-11

“As the rain and the snow come down from heaven, and do not return to it without watering the earth and making it bud and flourish, so that it yields seed for the sower and bread for the eater, so is my word that goes out from my mouth: It will not return to me empty.”

God provides **both physical water and spiritual water** (His Word). Just like the water cycle, **His truth never stops working!**

Take a moment to pray:

- Thank God for His perfect water system.
 - Ask Him to help you appreciate His creation.
-

Bonus Activities (Optional):

- **Rain Journal** – Track rainfall in your area for a week.
 - **Outdoor Observation** – Find a puddle and watch how it evaporates over time.
 - **Bible Study on Water** – Look up other verses about water (e.g., John 4:14).
-

You've Completed the Lesson!

Great job! Now you understand **evaporation, condensation, precipitation, and collection** – and how God designed the water cycle to sustain life. Keep observing nature and remember: **God's creation is amazing!**

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	The lesson integrates biblical descriptions of evaporation, condensation, and precipitation with scientific explanations, showing how worldview can shape understanding of the water cycle.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – <i>Explain how new evidence or different perspectives can lead to changes in scientific knowledge. / Explain how scientific knowledge is validated and refined, including the role of publication and peer review.</i>	The historical accounts of Bernard Palissy and Pierre Perrault discovering and confirming the water cycle demonstrate how scientific knowledge develops and is refined.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – <i>Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.</i>	Students make predictions about what will happen in their jar experiment and connect these predictions to real-world water cycle processes.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – <i>Plan and conduct reproducible investigations to answer questions and test hypotheses...</i>	The jar activity is a reproducible investigation modelling the key processes of the water cycle.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations... to organise and process data and information.</i>	Students can create diagrams of the water cycle and record observations from the experiment.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – <i>Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.</i>	Students evaluate how accurately the jar model represents the natural water cycle and discuss its limitations.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students record written answers, reflections, and experimental observations in their notebooks.
AC9TDE8P02 / AC9TDE10P02 – <i>Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.</i>	Setting up the jar model is a creative design process that communicates a real-world system in miniature.

Lesson 14: The Importance of Water

Welcome to Your Lesson!

Water is one of the most important substances on Earth. Every living thing – people, animals, and plants – needs water to survive. Today, you’ll explore **why water is essential for life and the environment**.

By the end of this lesson, you will:

1. Understand the **role of water in sustaining life** (humans, animals, and plants).
 2. Learn how **water shapes the environment** (rivers, lakes, weather).
 3. Discover **Bible verses about water** and its spiritual meaning.
 4. Reflect on **how we can be good stewards of God’s gift of water**.
-

What You Need

- Bible (for scripture reading)
 - Notebook and pen/pencil
 - Clear glass of water
 - A small plant (or picture of one)
 - Access to water (a sink, outdoor source, or a water bottle)
-

Step 1: Water is Essential for Life

1. Water and the Human Body

Did you know that about **60% of your body is made of water**? You need water to:

- Stay hydrated and healthy.
- Digest food and absorb nutrients.
- Keep your blood flowing and organs working.
- Remove waste from your body.

Activity:

- Take a sip of water.
- Think about how often you drink water every day.
- Write down three reasons why water is important for your health.

Read John 4:13-14

“Jesus answered, ‘Everyone who drinks this water will be thirsty again, but whoever drinks the water I give them will never thirst.’”

Think About It:

- What does Jesus mean by "living water"?
- How is physical water different from spiritual water?

Write your thoughts in your notebook.

2. Water and Plants

Plants need water to:

- Grow and make food through **photosynthesis**.
- Transport nutrients from the soil.
- Stay strong and healthy.

Activity:

- Look at your small plant or a picture of one.
- Imagine what would happen if it didn't get water for a week.
- Write down how water helps plants grow.

Read Isaiah 44:3-4

“For I will pour water on the thirsty land, and streams on the dry ground; I will pour out my Spirit on your offspring, and my blessing on your descendants.”

Think About It:

- How does this verse compare water to God's blessings?
- Why do you think God uses water as a symbol of His Spirit?

Write your answers in your notebook.

Step 2: Water and the Environment

1. Water Shapes the Earth

Water **carves valleys, moves soil, and creates lakes and rivers**. Without it, the land would be dry and lifeless.

Example: The **Grand Canyon** was most likely shaped by the rushing of water as it was flowing out to sea after the flood in Noah's time!



Write in Your Notebook:

- How does water change the land?
 - What happens to deserts that don't get much water?
-

2. Water and the Weather

Water is part of the **water cycle**, which controls our weather.

- **Evaporation** (water turns into vapor).
- **Condensation** (vapor forms clouds).
- **Precipitation** (rain, snow, or hail falls to Earth).

Fun Fact: The same water that Jesus drank 2,000 years ago is still on Earth today because of the water cycle!

Read Job 36:27-28

“He draws up the drops of water, which distil as rain to the streams; the clouds pour down their moisture and abundant showers fall on mankind.”

Write Down:

- How does rain help farmers, animals, and forests?
 - What would happen if it stopped raining for a year?
-

Step 3: Water Stewardship – Caring for God’s Gift

1. Water is Precious

Not everyone has access to clean water. Some countries struggle with droughts, and many people must walk miles to find safe drinking water.

Activity:

- Turn on a sink or open a water bottle.
- Imagine what life would be like if you couldn't easily get water.
- Write down three ways you can **conserve water** at home.

Read Proverbs 25:25

“Like cold water to a weary soul is good news from a distant land.”

Think About It: How can we share both physical water and the “living water” of Jesus with others?

Step 4: Review & Reflection

- How does water help humans, plants, and the environment?
- What are two Bible verses that mention water, and what do they teach us?
- What can you do to take care of God's gift of water?

Write your answers in your notebook.

Step 5: Final Thought & Prayer

Read Revelation 22:17

“Let the one who is thirsty come; and let the one who wishes take the free gift of the water of life.”

God designed water to sustain life – but He also offers **eternal life** through Jesus.

Take a moment to pray:

- Thank God for the gift of water.
 - Ask Him to help you be a good steward of His creation.
 - Pray for people who don't have access to clean water.
-

Bonus Activities (Optional):

- **Water Usage Challenge** – Track how much water you use in a day.
 - **Outdoor Water Exploration** – Visit a river, lake, or stream and observe how water moves.
 - **Bible Study on Water** – Find more verses where God uses water as a symbol (e.g., Psalm 23:2).
-

You've Completed the Lesson!

Great job! You've learned why **water is essential for life**, how it shapes the environment, and what the Bible says about it. Keep thinking about **how you can care for water** – and remember, Jesus is the **Living Water** who gives eternal life!

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	The lesson includes biblical perspectives on water’s purpose and symbolism alongside scientific explanations, showing how worldview can influence our understanding of water’s importance.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students generate questions about how water sustains life and shapes the environment, and predict the outcomes of water scarcity.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students record water’s roles for humans, plants, and environments in tables, diagrams, or written summaries.
AC9S7I06 / AC9S8I06 / AC9S9I06 / AC9S10I06 – Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.	Students consider evidence about water scarcity, conservation methods, and environmental impacts, evaluating the reliability of information.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students complete written reflections and action plans for conserving water.
AC9TDE8P02 / AC9TDE10P02 – Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.	The stewardship section encourages students to design practical, creative water conservation solutions for their home or community.

Lesson 15: How the Water Cycle Affects Climate

Welcome to Your Lesson!

Today, you'll explore **how the water cycle shapes weather and climate**. You already know that water moves through the environment in a cycle of evaporation, condensation, precipitation, and collection. But did you know this cycle plays a major role in **temperature, storms, and even global climate patterns**?

By the end of this lesson, you will:

1. Understand **how the water cycle influences weather** (rain, storms, humidity).
 2. Learn how **ocean currents and precipitation affect climate**.
 3. Discover Bible verses that show **God's control over the climate**.
 4. Complete an **observation activity** to track how water affects temperature.
-

What You Need

- Bible (for scripture reading)
 - Notebook and pen/pencil
 - Two small cups or bowls
 - Water
 - A freezer
 - Access to a window or outdoor space
-

Step 1: How the Water Cycle Influences Weather

1. The Water Cycle and Daily Weather

Every day, the Sun heats water from lakes, rivers, and oceans, causing **evaporation**. This water vapor rises, **cools**, and turns into clouds (**condensation**). When the clouds get heavy, they release water as **precipitation** (rain, snow, hail).

Read Job 37:10-13

“The breath of God produces ice, and the broad waters become frozen. He loads the clouds with moisture; he scatters his lightning through them. At his direction, they swirl around over the face of the whole earth to do whatever he commands them.”

Think About It:

- How does the water cycle show that God is in control of the weather?
- What would happen if the water cycle stopped?

Write your answers in your notebook.

2. How Humidity Affects Temperature

Humidity is the amount of **water vapor in the air**. It makes the air feel hotter because **water traps heat**.

Example: Have you ever noticed that a dry desert feels cooler at night, but humid places stay warm? That's because **water holds onto heat**, keeping humid areas warmer.

Write in Your Notebook:

- Have you ever felt a very humid day? How did it feel?
 - Why do deserts get cold at night?
-

Step 2: The Water Cycle and Climate Patterns

1. Oceans and the Water Cycle

Oceans cover **71% of Earth's surface**. They absorb heat from the Sun and release it slowly, keeping the Earth's temperature **balanced**.

Read Ecclesiastes 1:7

“All streams flow into the sea, yet the sea is never full. To the place the streams come from, there they return again.”

Think About It:

- Why do oceans never run out of water?
 - How does the Sun and ocean work together in the water cycle?
-

2. Rainfall and Climate

Some places get **lots of rain** (rainforests), while others get very little (deserts). This is because of **wind patterns, ocean currents, and the water cycle**.

Fun Fact: The Amazon Rainforest gets nearly **3 metres of rain** each year, while the Sahara Desert gets **less than an 3 centimetres!**

Write in Your Notebook:

- How do you think rainforests and deserts stay in balance?
 - What would happen if rain stopped falling in your area for a year?
-

Step 3: Hands-On Activity – How Water Affects Temperature

Let's do a simple experiment to see **how water holds heat** and affects climate.

You will need:

- Two small cups or bowls
- Water
- A freezer

Instructions:

1. Fill one cup with water and leave the other empty.
2. Put both cups in the freezer.
3. Check them after **20 minutes** and compare:
 - Which one feels colder?
 - Is the cup with water freezing slower?

Write down your observations.

What Does This Teach Us?

- Water **stores heat** and cools more slowly than dry air.
 - This is why **coastal areas stay warmer in winter and cooler in summer!**
-

Step 4: Review & Reflection

- **How does the water cycle affect daily weather?**
- **Why do humid places feel warmer?**
- **How does the ocean help balance Earth's climate?**

Write your answers in your notebook.

Step 5: Final Thought & Prayer

Read Psalm 147:8

“He covers the sky with clouds; he supplies the earth with rain and makes grass grow on the hills.”

God designed the water cycle to **keep life on Earth thriving**. Rain, oceans, and humidity all work together **perfectly** in His plan.

Take a moment to pray:

- Thank God for the gift of water and the weather.
- Ask Him to help you appreciate and care for His creation.

Bonus Activities (Optional):

- **Weather Observation** – Track temperature and humidity for a week.
 - **Outdoor Exploration** – Visit a lake, ocean, or stream and observe how water affects the air.
 - **Bible Study on Water** – Look up verses where God uses water to teach spiritual truths (e.g., Isaiah 55:10-11).
-

You've Completed the Lesson!

Great job! Now you understand how the **water cycle affects weather and climate**, keeping Earth balanced. Keep **observing the world around you**, and remember – **God controls the skies, the seas, and every drop of rain!**

Full List of Australian Curriculum (v9) Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U02 / AC9S8U02 – <i>Explain how the physical and chemical properties of water and its changes of state are linked to its role in natural processes, including the water cycle.</i>	The lesson directly examines evaporation, condensation, precipitation, and collection, linking these processes to weather, humidity, and climate regulation.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	The lesson integrates biblical worldview with scientific explanations, showing how beliefs about creation shape understanding of climate and weather systems.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – <i>Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.</i>	Students are prompted to make predictions about how humidity affects temperature, and how ocean proximity changes climate.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations... to organise and process data and information.</i>	Students represent their observations from the water/freezer experiment in notes or diagrams, linking results to climate effects.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students communicate their findings from the experiment and reflections on climate impacts.
AC9TDE8P02 / AC9TDE10P02 – <i>Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.</i>	The experiment is a practical modelling activity where students design and carry out a small-scale simulation to illustrate how water affects temperature, a skill linked to iterative testing in design contexts.

Lesson 16: Reflection & Review

This lesson is set aside to round off the week of learning with a reflection and review activity.

Activity: Draw a diagram of the water cycle and write a reflection on how God designed this cycle to sustain life.

Lesson 17: Introduction to Plant Classification

Key Concepts: Kingdom, Phylum, Class, Order, Family, Genus, Species

Introduction

Hello! Today, we will explore how scientists classify plants and how this system helps us better understand God's amazing creation. When God created the world, He designed plants in all their diversity. By studying plant classification, we can appreciate the order and wisdom in His creation. Let's get started!

Step 1: What is Classification?

Classification is a way of organizing living things into groups based on shared characteristics. Scientists use a system called **taxonomy** to classify all living organisms, including plants. This system follows a hierarchy of seven major levels:

1. **Kingdom** – The broadest category, dividing all living things into large groups.
2. **Phylum** – A subdivision of a kingdom, grouping organisms with similar traits.
3. **Class** – A further division within a phylum.
4. **Order** – Groups organisms with even more specific similarities.
5. **Family** – A more refined group within an order.
6. **Genus** – Organisms that share a very close relationship.
7. **Species** – The most specific category, identifying a single type of organism.

To remember these in order, use this mnemonic:

"King Philip Came Over for Good Soup." (K.P.C.O.F.G.S.)

Step 2: Applying Classification to Plants

Now, let's classify a common plant: the apple tree (***Malus domestica***). Here is how it fits into the classification system:

- **Kingdom:** Plantae (all plants)

- **Phylum:** Angiosperms (flowering plants)
- **Class:** Eudicots (plants with two seed leaves)
- **Order:** Rosales (rose-like plants)
- **Family:** Rosaceae (rose family)
- **Genus:** Malus (apple trees)
- **Species:** Malus domestica (domesticated apple tree)



This system allows us to categorize plants based on their features and relationships to other plants.

Step 3: The Biblical Connection

In Genesis 1:11-12, we read:

"Then God said, 'Let the earth sprout vegetation, plants yielding seed, and fruit trees bearing fruit in which is their seed, each according to its kind, on the earth.' And it was so."

This reminds us that God created plants with order and purpose. Even though scientists use classification to study plants, we recognize that their diversity is part of God's design.

Step 4: Activity – Classifying a Plant

Now it's your turn to explore God's amazing plant world by choosing a real-life plant and classifying it! This activity will help you understand how scientists organize living things and will remind you of the order and creativity in God's design.

Instructions:

1. Choose a Plant

Go outside to your yard, garden, park, or neighbourhood. Find a plant that catches your interest – it might be a flowering plant, tree, bush, fern, moss, or even a weed.

2. Observe Carefully

Look closely at the plant. Examine its:

- Leaves (shape, size, edge, arrangement)
- Flowers or buds (colour, number of petals, scent)
- Stems or trunk (thick, thin, soft, woody)
- Roots (if visible)
- Size and location (sunlight or shade, wet or dry soil)

Take notes or draw a quick sketch.

3. Identify the Plant

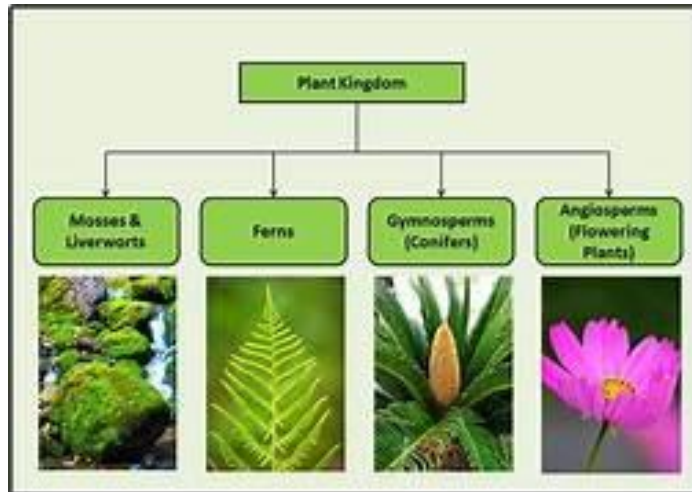
Try to find the plant's common name using one of these tools:

- A plant identification app (like Seek, PlantNet, or Google Lens)

- A plant field guide
- An online plant database (like the Royal Horticultural Society or local botanical site)

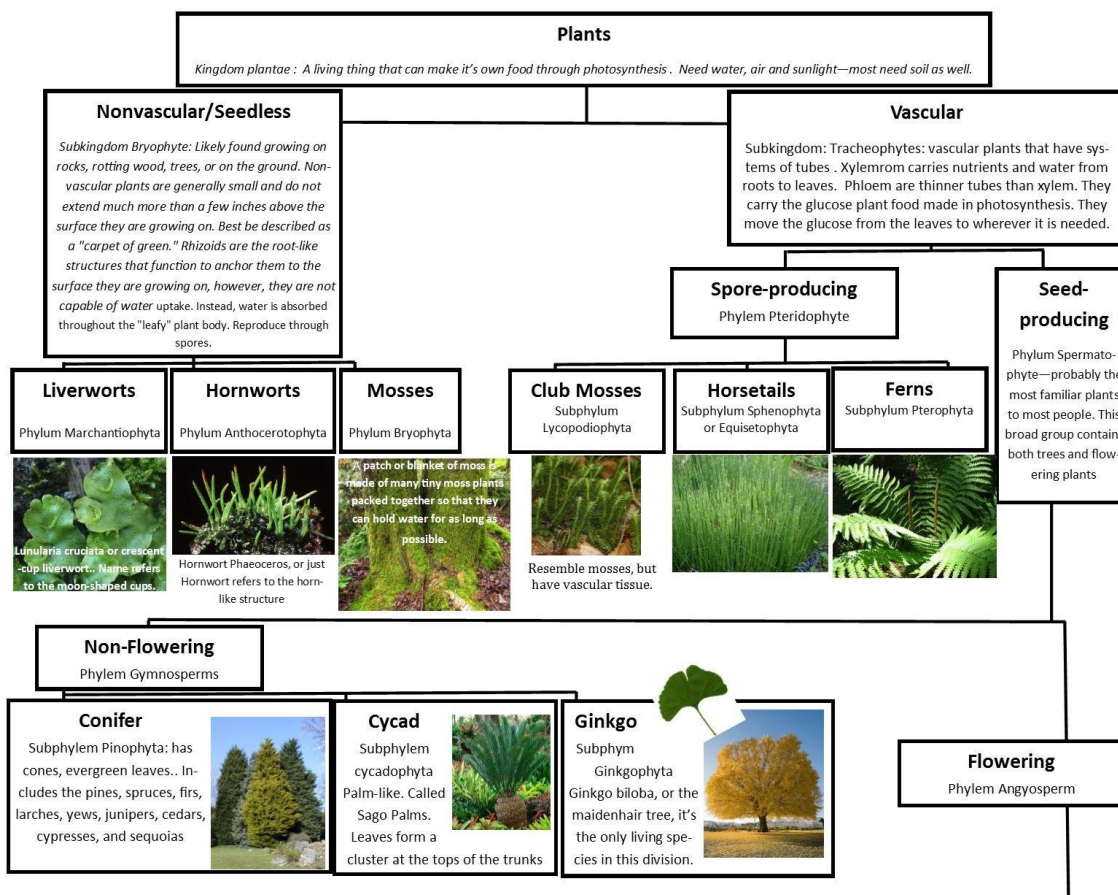
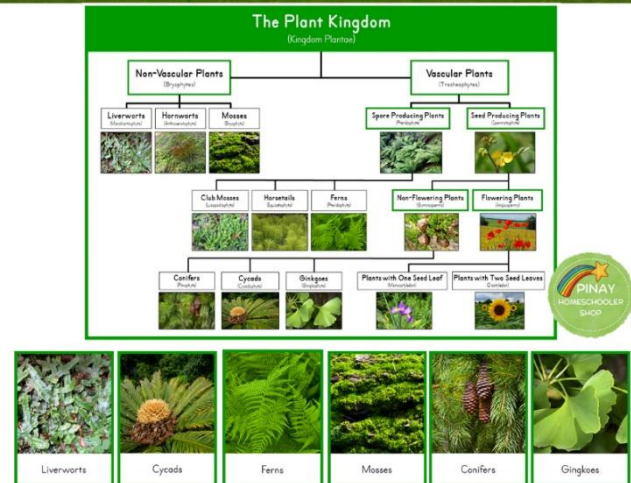
4. Begin Classification

Use what you've found and the information below, to complete the classification chart below. It's quite complicated; so if you can't find all the levels, do your best to classify as far as you can!



PLANT KINGDOM

3 Part Cards, Charts & Information Cards



5. Make Decisions

Based on what you observed, decide:

- Is it a flowering or non-flowering plant?
- Is it more like grass or a shrub?
- Does it have seeds, or does it reproduce with spores?
- What does its structure tell you about where it grows best?

Write a paragraph explaining why you classified the plant the way you did.

Bonus Extension Options:

- **Draw your plant** and label the parts (leaves, stem, roots, flowers, etc.) and include its classification details.
 - **Compare two plants:** Find a second plant nearby and compare their classification. How are they similar or different?
 - **Create a plant profile card** like you'd see in a botanical garden, with name, image, and key facts.
-

Conclusion and Reflection

Great job! Today, you learned how scientists classify plants and how this system reflects the order in God's creation. As you observe plants in nature, remember that every leaf, flower, and tree is part of God's masterpiece.

Think about this:

- How does classification help us appreciate God's creation?
- What would happen if there were no system to organize plants?
- How can we use our knowledge of plants to be good stewards of creation?

End by thanking God for His marvellous creation and the order He has placed in the natural world.

Additional Challenge: If you want to go deeper, research how different types of plants (ferns, mosses, conifers) are classified and compare them with flowering plants.

That's it for today! Keep exploring and appreciating the beauty of the world God has made. Happy learning!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U01 / AC9S8U01 – <i>Analyse and classify different types of living things and understand that classification helps organise our knowledge about them.</i>	The main focus of the lesson is teaching students to classify plants using the taxonomy hierarchy, which is exactly the intent of this descriptor.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	The lesson integrates a biblical worldview of creation with the scientific classification system, showing how worldview influences interpretation of biological diversity.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – <i>Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.</i>	Students generate classification questions about their chosen plant and predict where it belongs in the taxonomy hierarchy.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations... to organise and process data and information.</i>	Students complete a classification chart and may create labelled diagrams or plant profile cards, representing data visually.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students write a paragraph justifying their classification choices and may produce plant profile cards or labelled diagrams.
AC9TDE8P02 / AC9TDE10P02 – <i>Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.</i>	In the extension activities, students design creative outputs such as a botanical profile card or comparative chart, applying design and representation skills.

Lesson 18: Photosynthesis & Growth

Key Concepts: The process of photosynthesis and how plants produce food and oxygen

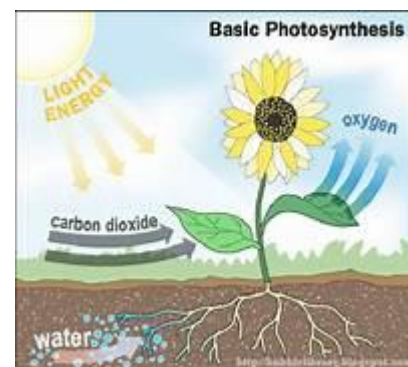
Introduction

Hello! Today, we will learn about one of the most important processes that God designed for plants – photosynthesis. This is how plants make their own food and provide the oxygen that we breathe. When God created the world, He designed plants with an incredible ability to harness the sun’s energy. Let’s explore how it all works!

Step 1: What is Photosynthesis?

Photosynthesis is the incredible process that plants use to make their own food. Unlike animals (including humans), who must eat to get energy, plants can create energy all by themselves – thanks to the **Sun** and the special design God gave them.

Photosynthesis takes place mainly in the **leaves** of plants, inside tiny parts of the cells called **chloroplasts**. These chloroplasts contain a green pigment called **chlorophyll**, which acts like a solar panel, absorbing sunlight. This sunlight provides the energy needed to begin a chemical reaction.

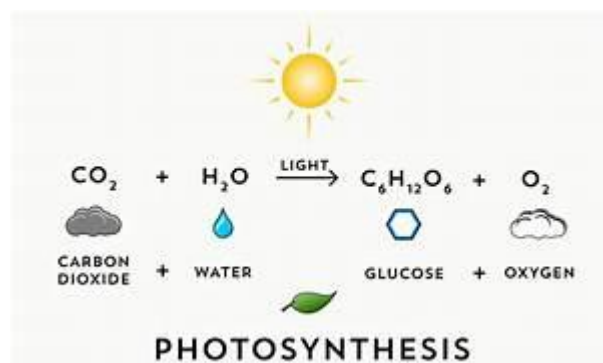


Plants also take in **carbon dioxide (CO₂)** from the air through tiny holes in their leaves called **stomata**, and **water (H₂O)** from the soil through their roots. Using the sunlight’s energy, the plant rearranges these ingredients to make **glucose (C₆H₁₂O₆)** – a type of sugar that serves as food for the plant. As a bonus, oxygen (O₂) is released into the air, which is what we breathe!

Here is the simplified **photosynthesis equation**:

Carbon dioxide (CO₂) + Water (H₂O) + Sunlight → Glucose (C₆H₁₂O₆) + Oxygen (O₂)

This process is one of the most important in all of nature. Without photosynthesis, there would be no food for plants, and since animals (including us) depend on plants for food and oxygen, **life as we know it couldn’t exist**.



Photosynthesis is a powerful example of **God’s wisdom and provision**. He designed a world where plants not only feed themselves but also feed and sustain all other life.

Step 2: Why is Photosynthesis Important?

Photosynthesis is one of the most important processes on Earth. Without it, life as we know it would not exist. Let's look at **three key reasons** why photosynthesis is essential – not just for plants, but for every living thing.

1. Food Production

Photosynthesis produces **glucose**, a type of sugar that plants use as food. This sugar fuels the plant's growth and gives it the energy it needs to make new leaves, flowers, and fruit. But it doesn't stop there!

Plants form the **base of the food chain**. Herbivores eat plants, and carnivores eat those herbivores. That means all the energy that animals – and people – use originally comes from sunlight captured by plants through photosynthesis.

Even the grains we use to bake bread, the vegetables we eat for dinner, and the fruits we enjoy all began with photosynthesis!

2. Oxygen Supply

When plants make glucose, they also release **oxygen** as a by-product. This oxygen is what we breathe. Every breath you take depends on photosynthesis!

Forests, grasslands, and even underwater plants (like algae) produce the oxygen that fills our atmosphere. Trees are often called the “lungs of the Earth” because of how much oxygen they release.

The very air you're breathing right now was likely refreshed by plants not long ago – what an incredible reminder of God's sustaining design.

3. Energy Flow in the Ecosystem

Plants don't just provide food and oxygen – they also store **solar energy** in chemical form. That energy is passed along to animals (and humans) when we eat plants or animals that have eaten plants.

This is called the **energy flow** of the ecosystem. Without photosynthesis, there would be no energy available to sustain life. Everything would stop.

It's amazing to realize that photosynthesis is a key part of the **order and balance** that God designed into the natural world.

Spiritual Reflection:

Think about this: Every time you take a breath, you are using oxygen that was made by plants through photosynthesis. That means your body is constantly benefiting from God's creation!

This is one of the many ways we see God's care for all living things. He didn't just create life – He **sustains** it through systems like photosynthesis, which He designed with wisdom and precision.

Think About It:

- What would happen to life on Earth without photosynthesis?

- How does photosynthesis show God's provision and care for all creation?

Write your answers and reflections in your notebook.

Step 3: The Biblical Connection

In Genesis 1:29-30, we read:

"And God said, 'Behold, I have given you every plant yielding seed that is on the face of all the earth, and every tree with seed in its fruit. You shall have them for food.'"

This verse reminds us that God designed plants not only to sustain themselves but also to provide food and oxygen for all living things. His creation is perfectly balanced, and photosynthesis is a key part of that balance.

Step 4: Activity – Observing Photosynthesis

Now it's time to observe photosynthesis for yourself using a simple experiment. Even though photosynthesis is happening all the time in plants, this activity will help you actually **see evidence of it with your own eyes!**

Materials Needed:

- A clear glass or jar (so you can see inside)
- Clean water
- A **fresh green leaf** (choose a healthy leaf from a plant that has been in sunlight)
- A **sunny spot** (windowsill or outdoor area with direct sunlight)

Instructions:

1. **Fill the glass with water** until it's about three-quarters full.
2. **Place the fresh leaf into the glass**, making sure it's fully submerged but not crumpled. If needed, use a spoon or another object to gently hold it down.
3. **Set the glass in a sunny window or outside** where it will receive strong, direct sunlight.
4. **Wait and observe** closely for 10–15 minutes.
5. **Look for tiny bubbles** forming on the surface of the leaf or rising through the water. These bubbles are **oxygen**, created during photosynthesis!
6. **Take notes** in your notebook. Describe what you see happening to the leaf and the water over time.

What's Happening?

When the leaf is in sunlight, the chloroplasts in its cells begin photosynthesizing – using light energy to turn carbon dioxide and water into glucose (food) and oxygen. The oxygen is released through tiny openings in the leaf (stomata), and when submerged, those oxygen bubbles get trapped on the surface and become visible.

This bubbling is a simple but clear sign that photosynthesis is taking place!

In Your Notebook:

- Describe the leaf you chose and where you placed the glass.
 - Record how many minutes it took before you noticed bubbles (if any).
 - Sketch what the setup looked like and label where you saw bubbles.
 - Write your own explanation of how this proves photosynthesis is real and happening all around us.
-

Bonus Challenge:

Draw and label a diagram of the photosynthesis process in your notebook. Include:

- Sunlight
 - Carbon dioxide entering the leaf
 - Water from the roots
 - Glucose being made
 - Oxygen being released
-

Conclusion and Reflection

Great job! Today, you learned how plants use sunlight, water, and carbon dioxide to create food and oxygen. Photosynthesis is a wonderful process that showcases God's perfect design in nature.

Think about this:

- How does photosynthesis help us understand God's provision for all living things?
- What would happen if photosynthesis stopped?
- How can we be good stewards of God's creation, knowing how important plants are to life on Earth?

End by thanking God for the beautiful world He created and the way He provides for us through plants.

Additional Challenge: If you want to go deeper, research how different environments affect photosynthesis, such as desert plants versus rainforest plants.

That's it for today! Keep exploring and appreciating the beauty of the world God has made. Happy learning!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U02 / AC9S8U02 – <i>Analyse how the structure and function of living things, including plants, contribute to their survival and reproduction.</i>	Directly relevant – students examine the structure of leaves and chloroplasts, and how these enable photosynthesis for plant survival and growth.
AC9S7U04 / AC9S8U04 – <i>Describe how energy flows through ecosystems, including the role of producers, consumers and decomposers.</i>	Photosynthesis is presented as the primary way energy enters ecosystems, with plants as producers supplying food and oxygen to other organisms.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	Lesson integrates biblical worldview with scientific understanding of photosynthesis, showing how faith and science can address the same phenomenon.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – <i>Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.</i>	In the leaf-in-water activity, students form questions about photosynthesis, predict oxygen bubble formation, and test these predictions.
AC9S7I02 / AC9S8I02 / AC9S9I02 / AC9S10I02 – <i>Plan and conduct reproducible investigations... including identification of potential hazards and ethical considerations.</i>	The photosynthesis observation is an investigation planned and conducted by students, requiring consideration of safe handling of glass and water.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations... to organise and process data and information.</i>	Students use labelled diagrams of photosynthesis and annotated sketches of their experimental setup to represent findings.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...</i>	Students communicate their results, diagrams, and explanations in their notebooks.

Lesson 19: Reproduction in Plants

Key Concepts: Sexual and asexual reproduction in plants

Introduction

Hello! Today, we will learn about how plants reproduce and continue their species. God designed plants with incredible variety, allowing them to reproduce in different ways. Some plants reproduce without seeds, while others rely on flowers and pollination. Understanding plant reproduction helps us appreciate the complexity and beauty of God's creation. Let's explore how it works!

Step 1: What is Reproduction in Plants?

Reproduction is the way plants make more of their kind. Just like animals (and people) have babies, plants also grow new individuals – sometimes through flowers and seeds, and sometimes through parts of the original plant. This process ensures that plants continue to fill the Earth, grow in new places, and provide food, shelter, and oxygen to all living things.

There are **two main types of reproduction** in plants:

1. Asexual Reproduction

This happens when a plant makes a copy of itself **without needing a second plant**. The new plant is a **clone** – it has the same DNA as the original.

2. Sexual Reproduction

This involves **two parent parts** – male and female. It usually happens in **flowers**, where **pollen (male)** joins with an **egg cell (female)** to make seeds that grow into brand-new plants.

Both types of reproduction were **created by God** to help plants fill the Earth “according to their kind” (Genesis 1:11). Let's take a closer look at each type!

Step 2: Asexual Reproduction

In asexual reproduction, **only one plant is needed** to grow another plant. The new plant is genetically **identical** to the parent – it's like making a biological photocopy! God designed many different methods of asexual reproduction in plants. Here are some examples:

- **Runners** – Some plants, like **strawberries**, grow long stems above the ground that spread out and take root in the soil. Each new rooted part becomes a new plant.
- **Bulbs** – **Onions** and **tulips** grow from underground bulbs. These bulbs store energy and can sprout into new plants when the season is right.
- **Cuttings** – If you cut off a piece of a plant's stem or leaf and put it in water or soil, it can grow roots and become a whole new plant. **Succulents** and **coleus** are great for this.
- **Tubers** – **Potatoes** have “eyes” or buds that can sprout into new potato plants, even from a single piece!

Why is this helpful?

- Asexual reproduction is **fast** and **efficient** – no seeds or pollinators are needed!
- Farmers and gardeners often use these methods to grow more plants quickly.

Think About It:

Can you find examples of asexual reproduction in your kitchen or garden? Have you ever seen a plant grow from a leftover potato or a broken-off stem?

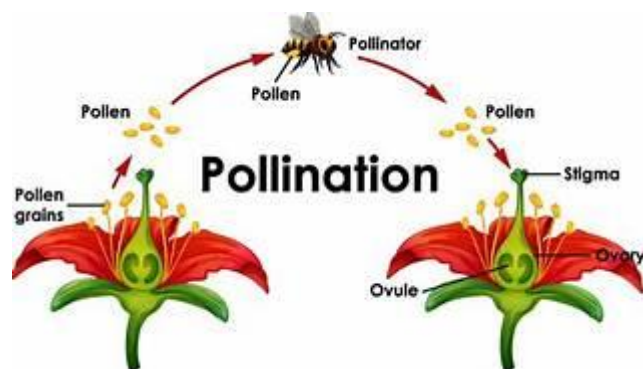
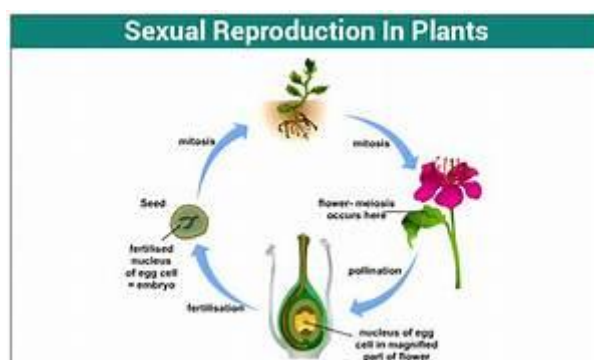


Step 3: Sexual Reproduction

Sexual reproduction in plants is more complex – and it's all about **flowers** and **seeds**. God designed flowers with special parts that work together to allow pollination and seed formation.

Here's how it works:

1. **Flowers** – The colourful part of the plant that holds the reproductive organs.
 - The **stamen** is the male part. It makes **pollen** (like plant sperm).
 - The **pistil** is the female part. It holds the **ovule** (like an egg cell).
2. **Pollination** – Pollen must move from the stamen to the pistil.
 - This can happen through **wind**, **water**, or with help from **pollinators** like bees, butterflies, birds, or even bats!
 - Once pollen reaches the pistil, it travels down to the ovule.
3. **Fertilization** – The pollen and ovule combine to form a **seed**.
4. **Seed Growth** – The seed contains the baby plant (embryo) and food to help it grow. When planted, it can sprout into a new plant!



Why is this important?

- Sexual reproduction creates **genetic diversity**, meaning the new plants are not clones but have unique traits.
- This diversity helps plants adapt to changes in their environment and resist diseases.

Examples of sexually reproducing plants:

- **Apple trees, sunflowers, roses, pumpkin vines, and grasses.**

Fun Fact: Some plants can do both – **strawberries** produce seeds and runners!

Step 4: The Biblical Connection

In Genesis 1:11-12, we read:

"Then God said, 'Let the earth sprout vegetation, plants yielding seed, and fruit trees bearing fruit in which is their seed, each according to its kind, on the earth.' And it was so."

This verse reminds us that God designed plants to reproduce in an orderly way, ensuring they continue to grow and provide for all living things.

Step 5: Activity – Observing Plant Reproduction

Now, let's conduct a simple experiment to observe reproduction in plants.

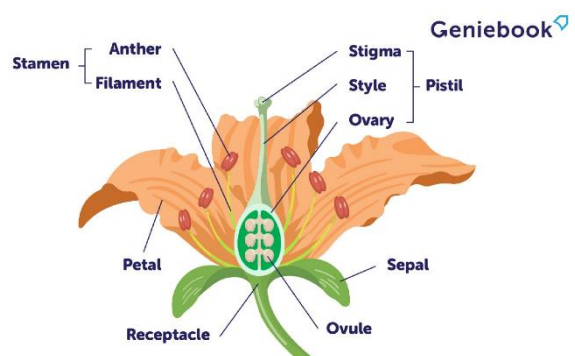
Materials:

- A fresh flower (like a lily or hibiscus)
- A magnifying glass (if available)
- A notebook and pencil

Steps:

1. Examine the flower and identify the stamen (male part) and pistil (female part).
2. Use a magnifying glass to observe the pollen on the stamen.
3. Draw and label the parts of the flower in your notebook.

Bonus: If you have a strawberry or potato plant, look for runners or tubers as examples of asexual reproduction.



Conclusion and Reflection

Great job! Today, you learned about two types of plant reproduction: asexual and sexual. Both methods are part of God's perfect design for creation.

Think about this:

- How does plant reproduction reflect God's order and creativity?
- Why is genetic diversity in plants important?
- How can we care for and protect the plants around us?

End by thanking God for His amazing design in nature.

Additional Challenge: If you want to go deeper, research how different plants depend on pollinators like bees, butterflies, and birds.

That's it for today! Keep exploring and enjoying the wonders of God's creation. Happy learning!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U02 / AC9S8U02 – Analyse how the structure and function of living things, including plants, contribute to their survival and reproduction.	Core fit – students study flowers (stamen, pistil) and other plant structures (runners, bulbs, tubers) and how these enable both sexual and asexual reproduction.
AC9S7U04 / AC9S8U04 – Describe how energy flows through ecosystems, including the role of producers, consumers and decomposers.	Relevant because reproduction ensures producers (plants) continue to supply food and energy into ecosystems.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.	Lesson integrates a biblical worldview with biological knowledge of plant reproduction, showing worldview influence on interpretation and stewardship.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships.	Students generate and explore questions about plant reproduction and predict where and how they might observe each type.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations... to organise and process data and information.	Students create labelled diagrams of flower parts and possibly charts comparing sexual vs. asexual reproduction.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences...	Students write observations from their flower dissection and may explain reproduction processes in their notebooks.

Lesson 20: Investigating Plant Classification and Design Features

Unit Alignment for Credit in Certificate II in General Education for Adults:

VU23832 – *Investigate the characteristics of living things*

Do this activity if you are in Year 10 and needing evidence for Science in the Cert II in General Education.

Learning Objectives

- Identify and classify the main characteristics of a chosen plant species.
- Apply a scientific classification system (taxonomy) to the subject.
- Develop and follow an investigation plan, record observations, and present findings using scientific terminology.

Australian Curriculum Links

- AC9S7U01 – Investigate the role of classification in ordering and organising the diversity of life on Earth and use and develop classification tools including dichotomous keys.
- AC9S7I01 – Develop investigable questions, reasoned predictions and hypotheses.
- AC9S7I02 – Plan and conduct reproducible investigations to answer questions and test hypotheses.
- AC9S7I04 – Select and construct appropriate representations to organise and process data.
- AC9S7I08 – Write and create texts to communicate ideas, findings and arguments.

Resources

- Local plant specimen
- Magnifying glass
- Notebook or Science Journal
- Digital camera (optional)
- Classification chart or dichotomous key
- Access to plant identification app or guide

Activity Steps

1. Introduction

- Discuss why classification is important in biology.
- Review taxonomy hierarchy: Kingdom → Species.
- At the end of this investigation you are going to give a presentation to your family or classroom group. So, prepare some notes you could use as an introduction to your final presentation.

2. Planning

- Students select a plant specimen.
- Write an investigation plan including:
 - Aim: What is it you would like to find out through your investigation

- Hypothesis: Make a statement about your best guess at explaining the phenomenon you are investigating (e.g., “This plant belongs to the Rosaceae family because of its leaf structure.”)
 - Materials: What resources do you need to complete your investigation?
 - Method steps: What steps (actions) do you plan to do - your procedure for the investigation.
 - Confirm plan with teacher/tutor.
 - 3. **Investigation**
 - Observe plant characteristics: leaf shape, flower structure, reproduction method.
 - Record observations in Science Journal using scientific terminology.
 - Apply classification system and identify plant using a dichotomous key or app.
 - 4. **Data Representation**
 - Create a classification chart for the plant.
 - Include labelled diagrams or photos.
 - 5. **Reporting & Discussion**
 - Write a short scientific report with headings: *Introduction, Method, Results, Discussion, Conclusion*.
 - Present findings: i) if you are learning at home, then video your presentation to your family; or ii) orally present to the class or in a small group.
-

Assessment Criteria

- Completeness and clarity of investigation plan.
 - Accurate classification and use of scientific terminology.
 - Quality of data representation (charts, diagrams).
 - Written report structure and oral presentation.
-

Optional Extension Activity:

Reflection & Review

This lesson is set aside to round off the week of learning with a reflection and review activity.

Activity: Draw and label the parts of a plant involved in reproduction, explaining how this process reflects God's purposeful design.

Lesson 21: Animal Classification Overview

Key Concepts: Classification of animals (vertebrates vs. invertebrates)

Activity: Create a chart to classify animals into major groups

Introduction

Hello students! Today, we will explore how scientists classify animals into groups. You will learn about vertebrates and invertebrates and why this classification is important. As you study, remember that God created each animal with purpose and order, and by studying them, we get a glimpse of His incredible design in creation!

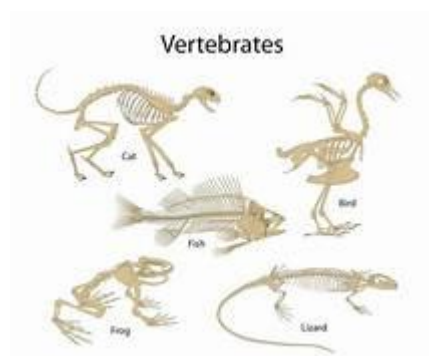
Let's start with the basics. All animals belong to the kingdom **Animalia**, but they are divided into different groups based on their characteristics. The broadest division is into **vertebrates** and **invertebrates**.

- **Vertebrates** are animals with a backbone. Examples: Fish, birds, mammals, reptiles, and amphibians.
- **Invertebrates** are animals without a backbone. Examples: Insects, molluscs, jellyfish, and worms.

Step 1: Understanding Vertebrates

Vertebrates are animals with an **internal skeleton** and a **backbone**. This group includes some of the animals we are most familiar with. Their skeleton gives them structure, helps them move, and protects important organs like the brain, heart, and lungs.

Vertebrates are grouped into **five major classes**, based on features like body covering, how they reproduce, and how they breathe:



1. **Fish** – Fish live in water their entire lives. They breathe through **gills**, have **scales** covering their bodies, and usually lay soft eggs in water. Some are bony (like salmon), while others, like sharks, have cartilage skeletons.
2. **Amphibians** – These animals start life in water and usually go through a **metamorphosis** (change in form). Tadpoles become frogs! They have moist skin and can absorb oxygen through it.
3. **Reptiles** – Reptiles have **dry, scaly skin** and are **cold-blooded**, meaning their body temperature changes with their environment. Most lay leathery eggs on land.

4. **Birds** – All birds have **feathers, beaks, and lay eggs**. Most can fly, though some, like ostriches and penguins, cannot. They are **warm-blooded** and care for their young.
5. **Mammals** – Mammals are also **warm-blooded**, but they give **live birth** (mostly), **nurse their young with milk**, and have **fur or hair**.

Remember: All these animals are **vertebrates** because they have backbones, but they are still very different from each other!



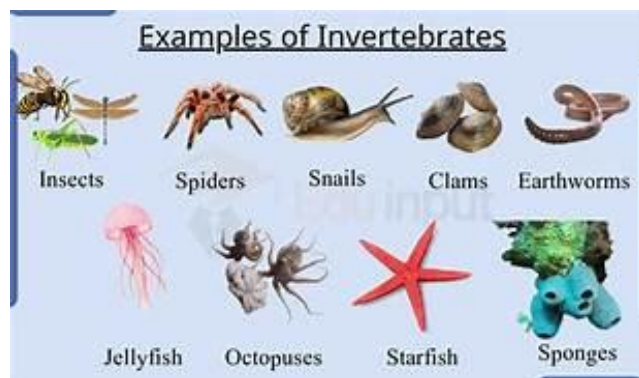
Bible Connection

Psalm 104:24 says, “How many are your works, Lord! In wisdom you made them all; the earth is full of your creatures.” This reminds us that every vertebrate – whether it’s a shark, a horse, or a robin – was designed with purpose and care by God.

Step 2: Understanding Invertebrates

Invertebrates are animals that do **not** have a backbone. You might think they are rare, but in fact, **over 95% of all animals** on Earth are invertebrates! From tiny ants to giant squids, invertebrates fill the skies, oceans, and soil.

Invertebrates are grouped into several major phyla. Here are five key ones:



1. **Arthropods** – These are the largest group of animals. They have **jointed legs, exoskeletons** (a hard outer shell), and segmented bodies. Examples include **insects, spiders, crabs, and lobsters**.
2. **Molluscs** – These have **soft bodies**, and many have **shells** for protection. Think of **snails, slugs, clams, squids, and octopuses**.
3. **Cnidarians** – These are mostly ocean animals with **stinging tentacles**, like **jellyfish, sea anemones, and coral**. They often have simple, jelly-like bodies.
4. **Echinoderms** – These animals live in the ocean and have **spiny skin** and a **radial body pattern** (like a star). Examples include **starfish, sea urchins, and sand dollars**.
5. **Worms** – Worms come in many shapes and sizes. **Earthworms** live in soil and help it stay healthy. Others, like **leeches or flatworms**, live in water or even inside other animals.

Quick Fact: Invertebrates don’t just crawl on the ground – many of them swim, fly, or float in the ocean!

Quick Checkpoint:

Write down the names of five animals you know. Can you figure out whether each is a vertebrate or invertebrate? What clues helped you decide?

Step 3: Activity – Create a Classification Chart

It's time to organize what you've learned and see how well you can group animals by their characteristics. Making your own classification chart will help you remember the differences between vertebrates and invertebrates.

Instructions:

1. **Get your materials ready**
Use a blank sheet of paper or open a document on your computer or tablet.
2. **Draw a two-column chart**
Label one column **Vertebrates** and the other **Invertebrates**.
3. **Create rows for each group**
 - Under **Vertebrates**, create five rows:
 - Fish
 - Amphibians
 - Reptiles
 - Birds
 - Mammals
 - Under **Invertebrates**, create five rows:
 - Arthropods
 - Molluscs
 - Cnidarians
 - Echinoderms
 - Worms
4. **Fill in the chart**
In each row, write at least **three examples** of animals you know that belong in that group. You can use the lesson or your own knowledge. Try to include familiar and unusual animals to make it interesting!
5. **Add drawings or pictures** (optional but fun!)
Decorate your chart with illustrations or pictures from magazines or printed from the internet.

Challenge Question:

Which group has the most animal species in the world?

(Hint: It's an invertebrate group – **arthropods**, especially **insects**, make up the majority of known animal life!)

Closing Thoughts

Great job! You have learned how animals are classified and even created your own chart. Classification helps scientists understand the relationships between animals and their unique roles in God's creation.

As you go through your day, take a moment to observe animals around you – whether it’s a bird flying in the sky or an insect crawling on the ground – and remember the incredible creativity of our Creator!

Final Reflection

Think about this verse: “*The heavens declare the glory of God; the skies proclaim the work of His hands.*” (Psalm 19:1). How does studying God’s creation help us appreciate His power and wisdom?

Well done! You have completed today’s lesson. Keep exploring and learning about God’s wonderful world!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U02 / AC9S8U02 – <i>Analyse how the structure and function of living things, including animals, contribute to their survival and reproduction.</i>	Students identify structural traits (backbone, body covering, skeleton type) that define vertebrates vs. invertebrates and their major groups.
AC9S7U03 / AC9S8U03 – <i>Examine how classification systems are used to organise and analyse relationships between living things.</i>	Core fit – lesson focus is the vertebrate/invertebrate division and further classification into phyla/classes.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	Biblical worldview connection is explicitly integrated with modern taxonomy, illustrating how perspectives influence interpretation.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations, including classification keys, models and diagrams, to organise and process data and information.</i>	Students create their own classification chart with categories, examples, and optional illustrations.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.</i>	Students present their chart and may include written examples, reinforcing accurate scientific vocabulary and organisation.

Lesson 22: Mammals, Birds, Reptiles, Amphibians

Key Concepts: The four main classes of animals: mammals, birds, reptiles, & amphibians

Activity: Create a chart to classify animals into these four major groups

Introduction

Hello students! Today, we will explore four major classes of animals: **mammals, birds, reptiles, and amphibians**. Each of these groups has unique characteristics that help us understand how God designed them for different environments and purposes.

Psalm 104:24 says, “*How many are your works, Lord! In wisdom you made them all; the earth is full of your creatures.*” As we study these animals, we can see God’s creativity and wisdom in their design!

Step 1: Mammals

Mammals are a group of **warm-blooded vertebrates** that share several key traits:

- They have **fur or hair** at some stage of life.
- They **breathe air** through lungs.
- They **give birth to live young** (with a few exceptions like the platypus and echidna).
- Most importantly, **female mammals produce milk** to feed their babies through special glands called mammary glands.

Mammals live in **nearly every environment** – from arctic tundras to deserts, forests, grasslands, and oceans.

Examples:

- **Carnivores** – Meat-eaters like lions, wolves, and bears.
- **Herbivores** – Plant-eaters like cows, deer, and rabbits.
- **Omnivores** – Eat both plants and animals, like raccoons, pigs, and humans.

Quick Reflection:

How do fur, warm-bloodedness, and milk help mammals survive in different climates and care for their young?

Write your answer in your notebook.



Step 2: Birds

Birds are **warm-blooded vertebrates** known for their **feathers**, which are unique to this group. They have **beaks** (no teeth), **lay eggs**, and most can **fly** thanks to their **hollow bones**, which make their skeletons light.

Even birds that don't fly are specially designed for survival. Penguins, for example, are excellent swimmers, and ostriches are built for running.

Examples:

- **Songbirds** – Robins, canaries, blue jays
- **Birds of prey** – Hawks, owls, eagles
- **Flightless birds** – Penguins, ostriches, emus



Bible Connection:

Matthew 6:26 says,

“Look at the birds of the air; they do not sow or reap or store away in barns, and yet your heavenly Father feeds them.”

What can we learn from birds about God's provision and our need to trust Him?

Step 3: Reptiles

Reptiles are **cold-blooded vertebrates** with **dry, scaly skin**. They rely on the **Sun** and their surroundings to regulate body temperature. Unlike amphibians, reptiles don't go through metamorphosis. Most lay eggs with leathery shells on land, though some give birth to live young.

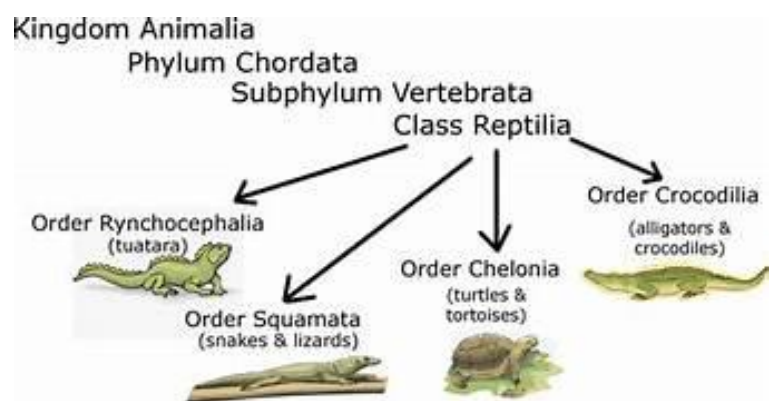
Examples:

- **Snakes** – Rattlesnakes, pythons, cobras
- **Lizards** – Iguanas, chameleons, geckos
- **Turtles & Crocodilians** – Sea turtles, tortoises, alligators

Quick Checkpoint:

Why do reptiles need to bask in the sun?

(Hint: They depend on external heat to become active and digest food.)



Step 4: Amphibians

Amphibians are **cold-blooded vertebrates** that live **part of their life in water** and **part on land**. They start as larvae (like tadpoles) with gills and later develop lungs through a process called **metamorphosis**.

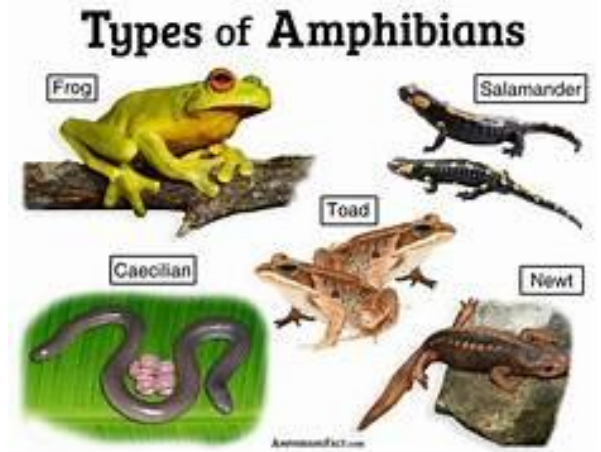
Their **moist skin** helps them breathe, which is why they usually live in damp environments and are sensitive to pollution.

Examples:

- **Frogs & Toads** – Bullfrogs, tree frogs
- **Salamanders & Newts** – Axolotls, tiger salamanders
- **Caecilians** – Worm-like amphibians that live underground

Challenge Question:

How is an amphibian's life cycle different from a reptile's? (Think about metamorphosis and where each group lays its eggs.)



Step 5: Activity – Create a Classification Chart

Now it's time to **organize your learning** into a visual format!

Instructions:

1. **Get your materials** – Use a sheet of paper, whiteboard, or digital document.
2. **Draw a table with four columns** – Label each column:
 - Mammals
 - Birds
 - Reptiles
 - Amphibians
3. **Under each heading, include:**
 - Key characteristics (warm-blooded or cold-blooded, skin covering, egg-laying, etc.)
 - At least **three examples** of animals from each group.
4. **Make it fun!**
 - Add **drawings**, cut-out pictures, or digital images to decorate each category.

Bonus Challenge:

Can you list **an animal from each group that lives in your country or region**? How are they suited to your local environment?

Closing Thoughts

Great work! You have now learned about four major animal classes and how they are uniquely designed. Take a moment to observe nature and notice how different animals fit into these groups.

Final Reflection

Psalm 19:1 says, “*The heavens declare the glory of God; the skies proclaim the work of His hands.*” How does learning about different animals help us praise God for His creation?

Well done! You have completed today’s lesson. Keep exploring and discovering God’s amazing world!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U02 / AC9S8U02 – <i>Analyse how the structure and function of living things, including animals, contribute to their survival and reproduction.</i>	Students compare key traits (body temperature regulation, body covering, reproduction type, respiratory system) of the four vertebrate groups and relate these traits to survival in different habitats.
AC9S7U03 / AC9S8U03 – <i>Examine how classification systems are used to organise and analyse relationships between living things.</i>	Lesson explicitly groups animals into four vertebrate classes, identifying defining features and providing examples, mirroring the function of scientific classification systems.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – <i>Select and construct appropriate representations, including classification keys, models and diagrams, to organise and process data and information.</i>	The activity requires students to produce a classification chart with categories, characteristics, and examples, which is a direct application of this descriptor.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.</i>	Students describe characteristics and examples for each class in written form and may present the chart digitally or on paper using accurate biological vocabulary.

Lesson 23: Animal Design Features for Survival

Key Concepts: How animals are designed specifically for their environments

Activity: Study examples of the design features of animals (e.g., camouflage, types of beaks) and create a report on one design feature

Introduction

Hello students! Today, we will explore how animals have special design features that help them survive in their environments. These design features show God’s incredible wisdom and design in creation.

The more that scientists understand about the structure of organisms and the function of the cells and DNA and RNA that controls the cells, the more they are realising that so many of the organs in living things have such perfectly designed function that they are ‘irreducibly complex’ and cannot have evolved by successive tiny modifications.

In the Origin of Species (1859), Charles Darwin (who invented the theory of evolution) wrote, *"If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down."* And this is exactly what we see at every level of the structure of living things – it is called ‘irreducible complexity’.

Job 12:7-10 says, *"But ask the animals, and they will teach you, or the birds in the sky, and they will tell you... In His hand is the life of every creature and the breath of all mankind."* As we study, think about how each design feature reflects God's perfect planning!

Step 1: What Are Design Features?

Design features are special characteristics or behaviours that help animals survive in the environments God placed them in. These features allow animals to find food, protect themselves from danger, raise young, and cope with different weather and seasons. A scientist with a secular-humanist worldview, (and who believes in the theory of evolution in spite of the growing evidence against it), will call these things ‘adaptations’ rather than ‘design features’.

Design features are grouped into three main types:

1. Structural Design Features

These are **physical traits** of an animal’s body – what you can see or touch.

Examples:

- A polar bear’s **thick fur and layer of fat** keep it warm in freezing temperatures.
- An eagle’s **sharp talons and beak** help it catch and eat prey.
- A giraffe’s **long neck** helps it reach leaves high in trees.

2. Behavioural Design Features

These are **actions or habits** that animals do naturally, often for survival.

Examples:

- Birds **migrating** to warmer places in winter.
- Bears **hibernating** to conserve energy during cold months.
- Meerkats taking turns **standing guard** while others forage for food.

3. Physiological Design Features

These involve the **internal systems and functions** of an animal's body.

Examples:

- A camel can **store fat in its hump** and survive long periods without water.
- Some desert animals produce **very concentrated urine** to save water.
- Certain frogs can **freeze solid** in winter and thaw out in spring!

Quick Reflection:

Can you think of an animal with a unique design feature? What category does it fit into – structural, behavioural, or physiological?

Write your answer in your notebook.

Step 2: Examples of Animal Design Features

Now let's explore more amazing examples of how animals are designed for survival:

• Camouflage

Some animals are perfectly coloured to **blend into their environment**, making them hard to see.

Examples:

- The **Arctic fox** turns white in winter to hide in the snow.
- **Chameleons** can change colour to match their surroundings.
- **Stick insects** look just like twigs!

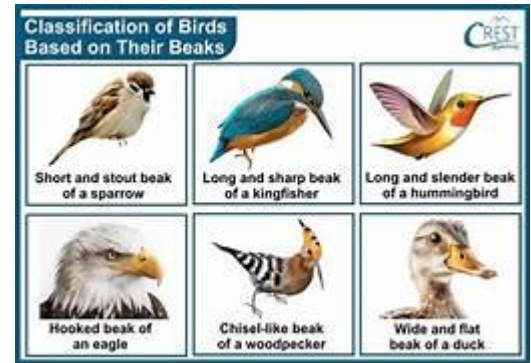


• Beak Shapes

Birds have different shaped beaks based on what they eat. Evolutionists call these differences ‘**adaptations**’, but we will speak of them as ‘**design features**’.

Examples:

- **Hummingbirds** have long, narrow beaks to reach nectar deep in flowers.
- **Eagles** have hooked beaks for tearing meat.
- **Ducks** have flat beaks for scooping up plants from water.



• Body Coverings

An animal’s outer covering protects it and helps it live in its habitat.

Examples:

- **Feathers** insulate birds and allow flight.
- **Fur** keeps mammals warm.
- **Scales** on reptiles and fish protect from drying out or injury.
- **Exoskeletons** (like in insects and crabs) act as armour.



• Defence Mechanisms

God gave many animals clever ways to escape or defend themselves from predators.

Examples:

- **Skunks** spray a foul-smelling liquid.
- **Porcupines** have sharp quills.
- **Cheetahs** rely on speed to run away from danger.
- **Poison dart frogs** have skin toxins that deter predators.

Bible Connection:

Proverbs 30:24–28 talks about small creatures that are “extremely wise” in how they survive. Each design feature points to God’s wisdom, as He equipped animals with everything they need to live in their environment.

AC9S8U01, AC9S9U01, AC9S9H01, AC9S7H02, AC9S9I04

Step 3: Activity – Research and Create a Report

Now it’s your turn to investigate one design feature in more detail. This is a chance to explore how one part of an animal’s body or behaviour helps it thrive in the wild.

Instructions:

1. **Choose a design feature** that interests you.
Here are some ideas:
 - How **owls fly silently**
 - Why **penguins have waterproof feathers**

- How **elephants use their trunks**
 - The way **bats use echolocation**
 - How **geckos climb walls**
2. **Research how this feature works**
Use a science book, a trusted website, or an animal documentary to learn about how this feature helps the animal survive.
 3. **Write a short report** (1–2 paragraphs):
Include the following:
 - The **animal** and the **design feature**
 - How this feature helps with survival
 - A **Bible verse** that connects to God’s design in nature (you can choose one like Job 12:7–10, Proverbs 30:24–28, or Romans 1:20)
 4. **Optional extension:**
Add a **drawing, diagram, or printed picture** of the animal and its feature. Label any important parts.

Tip: Try to choose an animal that lives in an environment very different from your own – like the desert, ocean, or rainforest – so you can explore how God equips all creatures for different conditions.

Closing Thoughts

Great job! You have learned how animals have been uniquely designed for survival. Next time you see an animal, think about how God created it to fit perfectly into its environment.

Final Reflection

Romans 1:20 says, “*For since the creation of the world God’s invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made.*” How does studying animal design features help us see God’s power?

Whenever you read an article by an evolutionist, that refers to ‘adaptations’ in a plant or animal, now you can think of it as a purposeful ‘design feature’ rather than a feature that has evolved so it can adapt to its environment. Well done! You have completed today’s lesson. Keep exploring and marvelling at God’s amazing world!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U02 / AC9S8U02 – <i>Analyse how the structure and function of living things, including animals, contribute to their survival and reproduction.</i>	Students explore structural (fur, beaks, camouflage), behavioural (migration, hibernation), and physiological (water conservation, freezing) features, linking them directly to how animals survive in their environments.
AC9S9U01 / AC9S10U01 – <i>Analyse how biological adaptation as a response of a species to environmental conditions can be explained using scientific theories of natural selection and contemporary knowledge of genetics.</i>	While the lesson frames these as "design features," students still examine how specific features suit environments, which aligns with the descriptor’s focus on relating traits to survival in environmental conditions.
AC9S7H02 / AC9S8H02 / AC9S9H04 / AC9S10H04 – <i>Investigate how cultural perspectives and world views influence the development of scientific knowledge. / Examine how the values and needs of society influence the focus of scientific research.</i>	Lesson integrates a biblical worldview alongside discussion of Darwin’s ideas and irreducible complexity, showing how worldview shapes interpretation of scientific evidence.

Content Description Code & Full Wording**Rationale**

AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – *Select and construct appropriate representations, including classification keys, models and diagrams, to organise and process data and information.*

Students research and present a chosen design feature in a structured report, with optional diagrams or labelled images.

AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – *Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.*

The activity requires producing a short report that explains a design feature, linking it to survival and incorporating scientific vocabulary.

Lesson 24: Reflection & Review

This lesson is set aside to round off the week of learning with a reflection and review activity.

Activity: Create a presentation or report on the diversity of animals, and how they are specifically designed to survive in their environment.

Lesson 25: Introduction to Weather

Key Concepts: What causes weather? Study temperature, humidity, air pressure, and wind.

Activity: Track the weather over the course of a week and chart temperature or precipitation.

Introduction

Hello students! Today, we will explore the fascinating world of weather. Have you ever wondered why some days are sunny and warm while others are rainy and cool? Weather is the result of many different factors working together in the atmosphere, and understanding it helps us appreciate God's design of the world.

Genesis 8:22 says, *"As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night will never cease."* This verse reminds us that God created the cycles of weather to sustain life on Earth. Let's dive in and learn more about how weather works!

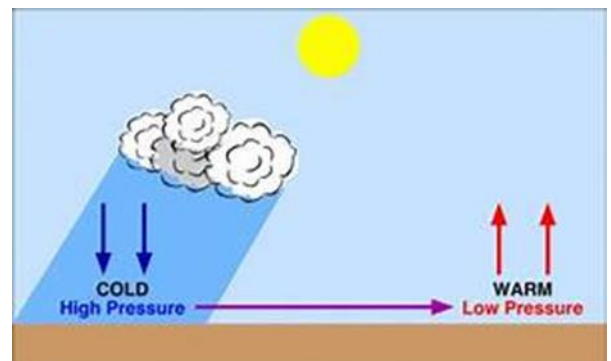
Step 1: What Causes Weather?

Weather is what's happening **right now** in the atmosphere above us. It's what makes a day sunny, rainy, windy, hot, or cold – and it changes often because it's influenced by many **interconnected factors**.

Let's look more closely at the **four key elements** that work together to cause weather:

1. Temperature

The Sun heats the Earth unevenly – some places (like near the equator) get more sunlight, while others (like the poles) get less. This uneven heating causes **warm air to rise** and **cool air to sink**, creating movement in the atmosphere. This movement drives **wind, cloud formation, and storms**.



2. Humidity

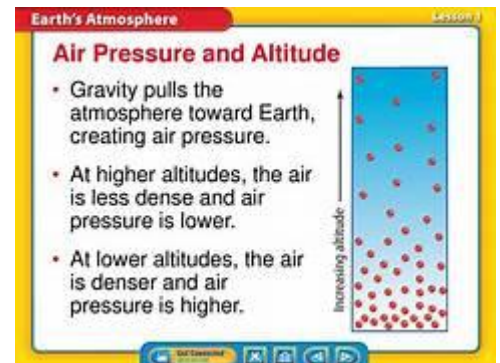
Humidity is the **amount of water vapor** in the air.

- High humidity means the air is full of moisture, often leading to **clouds, fog, or rain**.
- Low humidity means dry air, which might bring clear skies but can also cause **dry skin or drought**.

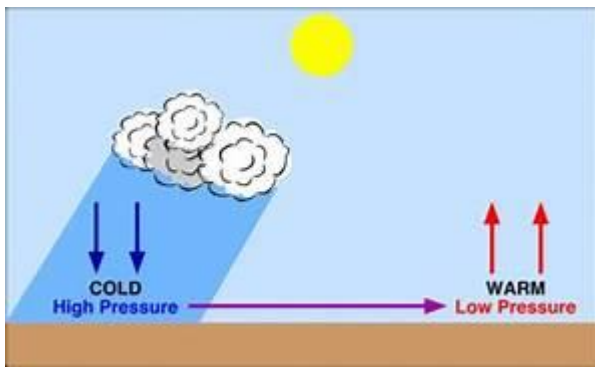
3. Air Pressure

Air pressure is the **weight of air pressing down** on the Earth.

- **High pressure** = heavier air, usually brings **clear, calm weather**.
- **Low pressure** = lighter air, often leads to **clouds, wind, and storms**.



4. Wind



Wind is **air moving** from areas of high pressure to low pressure. It's also influenced by temperature differences. Wind can carry weather systems over long distances, **spreading storms or clearing skies**.

Quick Reflection:

Can you remember a recent day when the weather suddenly changed? Was there a shift in temperature, wind, or rain?

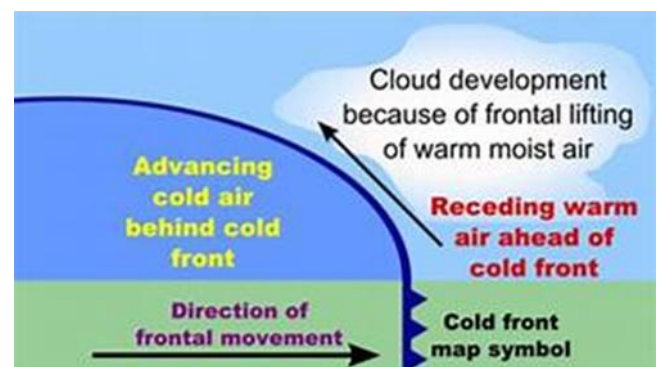
Write down what you think caused that change based on what you've learned so far.

Step 2: Understanding Weather Patterns

Once we understand the basic ingredients of weather, we can start to see how they form **weather patterns** – predictable movements and changes in the atmosphere.

• Cold Fronts and Warm Fronts

- A **cold front** happens when **cold air pushes under warm air**, causing the warm air to rise quickly. This often results in **thunderstorms** or heavy rain, followed by cooler weather.
- A **warm front** is when **warm air slowly slides over colder air**, bringing **light rain or clouds**, followed by warmer temperatures.



• Cloud Formation

When warm air rises, it cools. The moisture in it condenses into **tiny droplets**, forming clouds. Different types of clouds can help us **predict the weather**:

- **Cumulus** (fluffy) clouds may mean fair weather.
- **Stratus** (flat, grey) clouds often bring drizzle.
- **Cumulonimbus** (tall, stormy) clouds bring heavy rain and lightning.

• Precipitation

Rain, snow, sleet, or hail happens when **water droplets in clouds become heavy enough to fall**.

- **Rain** occurs in warmer conditions.
- **Snow or sleet** occurs in cold temperatures.
- **Hail** forms in tall thunderstorm clouds with strong updrafts.

Bible Connection:

Job 37:6 says,

“He says to the snow, ‘Fall on the earth,’ and to the rain shower, ‘Be a mighty downpour.’”

This verse reminds us that even something as common as rain is part of **God’s powerful control over nature**. Weather may seem random, but God’s hand is in every storm and sunshine.



Step 3: Activity – Track the Weather

Now it’s time to become a junior meteorologist! You’ll observe how the weather changes in your area and look for patterns over the course of a week.

Instructions:

1. **Create a simple weather chart.** You can draw it by hand or make one on a computer or tablet. Include these columns:
 - Date
 - **Morning and Afternoon Temperature** (in °C or °F)
 - **Precipitation** (None, rain, snow, etc.)
 - **Wind Conditions** (Calm, breezy, strong)
 - **Cloud Cover** (Clear, partly cloudy, overcast)
2. **Each day, observe the weather** from your window, backyard, or on a walk. If needed, use a weather app or website to help confirm details.
3. **Record your observations daily** in the chart. Try to do this at about the same time each morning and afternoon.
4. **At the end of the week, look for patterns.**
 - Did cooler days tend to have clouds or rain?
 - Were windy days also colder or warmer?

- Did you notice clouds forming before it rained?
- 5. **Write a short summary** (one paragraph) explaining what you noticed about how the weather elements worked together.

Bonus Challenge: Make a simple weather prediction for the next day based on your week's observations!

Closing Thoughts

Great job! You have learned what causes weather and how to track it. By studying the weather, we can see God's perfect design in action. Next time you look at the sky, think about how all these elements work together to sustain life on Earth.

Final Reflection

Matthew 8:26 says, *"Then He got up and rebuked the winds and the waves, and it was completely calm."* How does this verse show us that Jesus has authority over the weather?

Well done! You have completed today's lesson. Keep observing and learning about God's amazing world!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U04 / AC9S8U04 – Explain how scientific knowledge about processes in the atmosphere and hydrosphere is used to predict weather, inform decision making and describe patterns in climate.	Core fit – lesson covers temperature, humidity, air pressure, wind, and weather fronts, linking these to observable patterns and prediction.
AC9S9U04 / AC9S10U04 – Analyse how energy from the Sun drives atmospheric and oceanic circulation, influences weather and climate, and transfers matter and energy through the Earth system.	Students examine how uneven solar heating drives air movement, cloud formation, and precipitation patterns.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Plan and conduct investigations, including fieldwork and controlled experiments, to collect reliable data, using methods that are safe and ethical.	The week-long observation activity is a structured fieldwork investigation to gather primary weather data.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations, including tables, graphs, models and diagrams, to organise and process data and information.	Students create a weather chart and potentially use graphs to display temperature or precipitation trends.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.	Students produce a written weather summary and, optionally, predictions, using correct meteorological terms.

Lesson 26: Seasons and Earth's Tilt

Key Concepts: How Earth's tilt creates the four seasons.

Activity: Create a model using a globe and flashlight to simulate the seasons.

Introduction

Hello students! Have you ever wondered why we have different seasons? Why is it warm in the summer and cold in the winter? The answer lies in the way God designed the Earth to move around the sun. The tilt of the Earth plays a major role in creating the four seasons.

Genesis 1:14 says, "And God said, 'Let there be lights in the expanse of the heavens to separate the day from the night. And let them be for signs and for seasons, and for days and years.'" This verse reminds us that God designed the sun, moon, and stars with purpose, including the way seasons change. Let's explore how this works!

Step 1: Why Do We Have Seasons?

Many people assume we have seasons because the Earth gets closer or farther from the sun. That's actually a common misconception! The **real reason** we experience different seasons is because of the **tilt of the Earth's axis** as it orbits the sun.

Let's break this down:

1. Earth's Tilt

The Earth is tilted at an angle of **about 23.5 degrees**. This tilt is always pointed in the same direction as Earth moves around the sun. Think of it as leaning slightly to the side and staying that way all year long.

2. Changing Sunlight

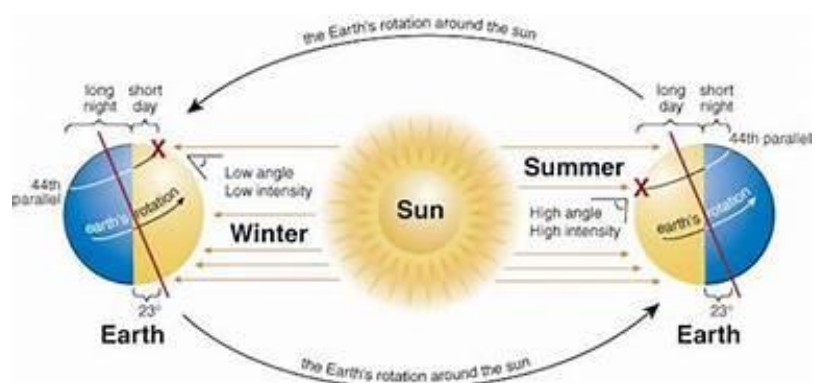
Because of this tilt, **different parts of the Earth get more or less direct sunlight** at different times of the year. When your part of the world is tilted **toward the sun**, you receive more direct light, which makes it **warmer** – this is summer. When it's tilted **away**, you get less direct light, making it **cooler** – that's winter.

3. Orbit Around the Sun

As Earth moves in its **yearly orbit**, the tilt causes each hemisphere to alternate between being tilted toward or away from the sun. This creates a predictable cycle of **seasons** – spring, summer, autumn, and winter.

Quick Reflection:

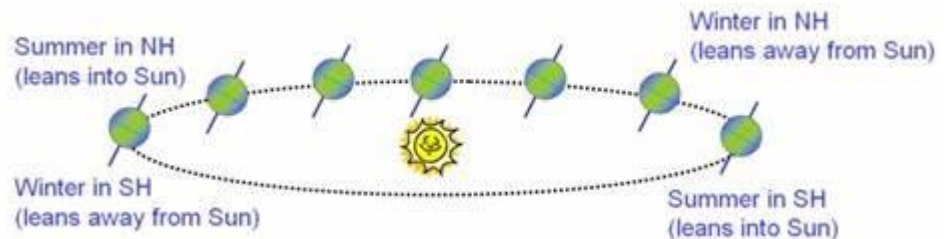
Where do you live – in the Northern or Southern Hemisphere? Think about how your seasons change across



the year. When is it warmest or coldest? When do the days seem longer or shorter?
Write a few thoughts in your notebook about what you notice during each season where you live.

Step 2: How Each Season Occurs

Let's take a closer look at how each season happens, and how God's design in nature provides for both rest and renewal through the yearly cycle:



[NH = Northern Hemisphere; SH = Southern Hemisphere]

• Summer

Occurs when your hemisphere is **tilted toward the sun**.

- Sunlight is **stronger and lasts longer** during the day.
- Temperatures are warmer.
- Plants grow rapidly, and animals are active.

• Winter

Occurs when your hemisphere is **tilted away from the sun**.

- The sun's rays are weaker and more spread out.
- Days are **shorter**, and nights are longer.
- It gets colder, and many animals hibernate or migrate.

• Spring

Happens as your hemisphere **moves from being tilted away toward being tilted toward** the sun.

- Temperatures **begin to rise**.
- Plants start to bloom, and animals become more active.
- It's a season of **new life and growth**.

• Autumn (Fall)

Happens as your hemisphere **moves from being tilted toward the sun to away from it**.

- Temperatures begin to **cool**.
- Leaves change colour and fall.
- Animals prepare for winter by storing food or migrating.

Bible Connection:

Ecclesiastes 3:1 says,

"To everything there is a season, and a time to every purpose under heaven."

The regular, reliable rhythm of the seasons shows God's **perfect order** in creation. Each season serves a purpose – rest, growth, harvest, or preparation – and reminds us that God is faithful in every time and season of life.

Step 3: Activity – Create a Model of the Seasons

This hands-on activity will help you **visualize** how Earth's tilt causes the seasons. It's a great way to see for yourself how God designed a world with built-in order and rhythm!

Materials Needed:

- A **globe** (or a ball with a stick or skewer to represent the tilted axis)
- A **flashlight** (to represent the sun)
- A **darkened room** (to see the light clearly)

Instructions:

1. **Set up your model:**
Place the globe or ball on a table. Tilt it about **23.5 degrees** to one side and keep it tilted in the same direction throughout the activity.
2. **Turn on the flashlight:**
Shine it directly at the tilted globe. This represents the sun's light shining on Earth.
3. **Move the globe around the flashlight:**
Slowly rotate the globe around the flashlight in a circle to represent Earth's orbit. **Keep the tilt constant** as you move. Watch how different parts of the globe are lit more directly at different positions.
4. **Observe the light:**
Notice how the **Northern Hemisphere gets more light** at one point (summer in the north) and **less light** at another (winter in the north). The **Southern Hemisphere** experiences the opposite!
5. **Identify the seasons:**
Stop at four points around the orbit to mark:
 - Summer (tilted toward the light)
 - Winter (tilted away from the light)
 - Spring and Autumn (when tilt is sideways relative to the light)
6. **Write an explanation:**
In your notebook, write a few sentences describing what you saw. Answer the question:
How does Earth's tilt and orbit create seasons?

Optional: Draw your model and label the sun, Earth's tilted axis, and the four seasons.

Closing Thoughts

Great job! You have learned how the tilt of the Earth creates seasons. Every year, we experience this cycle of changing temperatures and daylight, which allows plants to grow, animals to migrate, and people to enjoy different weather patterns.

Final Reflection

Psalms 74:17 says, *"It was you who set all the boundaries of the earth; you made both summer and winter."* How does this verse remind us of God's control over creation?

Well done! You have completed today's lesson. Keep exploring and marvelling at God's amazing design!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U04 / AC9S8U04 – Explain how scientific knowledge about processes in the atmosphere and hydrosphere is used to predict weather, inform decision making and describe patterns in climate.	Seasons are part of predictable climate patterns influenced by solar energy, tilt, and atmospheric processes.
AC9S9U04 / AC9S10U04 – Analyse how energy from the Sun drives atmospheric and oceanic circulation, influences weather and climate, and transfers matter and energy through the Earth system.	The lesson examines how solar energy distribution changes with Earth's tilt, affecting seasonal temperature and climate differences between hemispheres.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Plan and conduct investigations, including fieldwork and controlled experiments, to collect reliable data, using methods that are safe and ethical.	The globe-and-flashlight activity is a controlled experiment modelling seasonal change.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations, including tables, graphs, models and diagrams, to organise and process data and information.	Students create and label a physical model of Earth's tilt and orbit, a direct application of this skill.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.	Students explain in writing how Earth's tilt and orbit cause the seasons, using correct terminology.

Lesson 27: Extreme Weather Events

A Self-Tutorial Lesson for Grades 7-10

Key Concepts: Cyclones, Tornadoes, and Thunderstorms

Introduction

Hello students! Today, we will explore some of the most powerful weather events on Earth: cyclones, tornadoes, and thunderstorms. Have you ever seen dark storm clouds forming or felt strong winds before a storm? These extreme weather events show the power of nature, reminding us of God's might and control over creation.

Psalm 135:7 says, *"He makes clouds rise from the ends of the earth; He sends lightning with the rain and brings out the wind from His storehouses."* This verse reminds us that God is in control of the weather, even during extreme storms. Let's learn more about these incredible weather events!

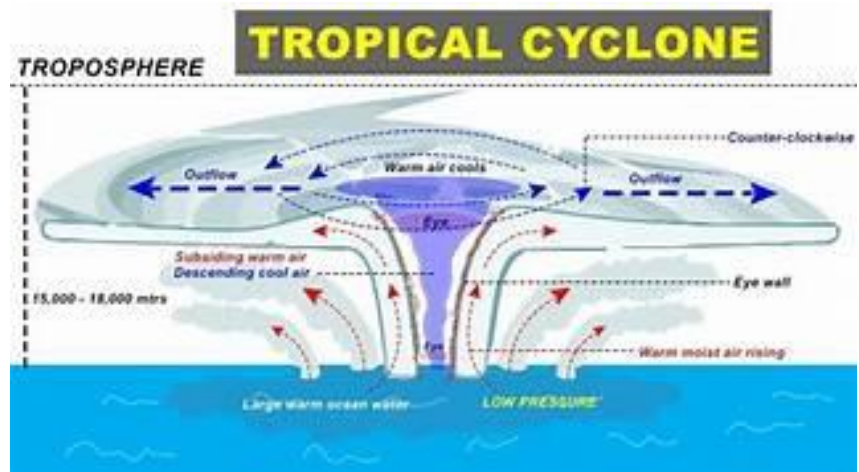
Step 1: Understanding Extreme Weather Events

Extreme weather events are powerful, sometimes dangerous, natural phenomena that happen when certain atmospheric conditions come together. These events remind us just how **dynamic and powerful** Earth's weather system is – and how **small and dependent** we are on God's protection and wisdom.

Let's explore three major types of extreme weather:

1. Cyclones (Hurricanes & Typhoons)

- Cyclones are **massive rotating storm systems** that form over warm ocean waters.
- They are called **hurricanes** in the Atlantic and **typhoons** in the Pacific.
- These storms can cover hundreds of kilometres and bring:
 - **Strong winds** (119 km/h or more)
 - **Heavy rain**
 - **Storm surges** (rising seawater that causes coastal flooding)
- At the centre is the **"eye" of the storm**, which is calm – but the surrounding winds are extremely intense.



Example: Hurricane Katrina (2005) devastated parts of the U.S., especially New Orleans, causing massive flooding and loss of life.

2. Tornadoes

- A tornado is a **rotating column of air** that extends from a thunderstorm to the ground.
- They often form in flat areas, like the central United States (known as “Tornado Alley”).
- Tornadoes can destroy homes, uproot trees, and toss vehicles.
- They are ranked on the **Enhanced Fujita Scale (EF0 to EF5)** based on damage and wind speed.



Example: The Joplin, Missouri tornado in 2011 (EF5) was one of the deadliest in U.S. history.

3. Thunderstorms

- Thunderstorms form when **warm, moist air rises** quickly and cools in the upper atmosphere, forming large cumulonimbus clouds.
- They can include **lightning, thunder, heavy rain, and strong winds**.
- Some thunderstorms become **severe**, producing hail, flash floods, or even tornadoes.

Quick Reflection:

Have you ever experienced a thunderstorm, seen a weather warning on TV, or watched news coverage of a hurricane or tornado?

- What did it feel like?
- Did it make you think about how powerful nature – and God – can be?

Step 2: How These Storms Form

Although cyclones, tornadoes, and thunderstorms may look different, they share some **core ingredients**. These ingredients work together to create the **energy and instability** that lead to extreme weather.

Key Ingredients for Storm Formation:

1. Warm, Moist Air

- This is the “fuel” for most storms. Warm ocean water or humid land air rises into the atmosphere, providing energy for cloud formation and storm growth.

2. Atmospheric Instability

- When **warm air rises quickly** and **cold air sinks**, the atmosphere becomes unstable. This vertical movement of air creates clouds and sometimes leads to violent updrafts and downdrafts.

3. Wind Shear and Wind Patterns

- **Wind shear** is when winds blow at different speeds or directions at different heights. This helps tornadoes spin and determines the size and movement of thunderstorms and cyclones.

4. Moisture and Condensation

- Rising warm air **cools** and forms clouds as moisture **condenses**. When enough moisture builds up, it can lead to heavy precipitation (rain, snow, hail).

Bible Connection:

Mark 4:39 says,

“He got up, rebuked the wind and said to the waves, ‘Quiet! Be still!’ Then the wind died down and it was completely calm.”

Jesus' authority over the wind and waves reminds us that even the most terrifying storms are not beyond His control. As we study these powerful forces, we remember the greater power of the One who made them.

Step 3: Activity – Extreme Weather Research Project

Now it's time to take what you've learned and **apply it through research**. You'll choose a real-life extreme weather event and create a short report to show how it formed, what impact it had, and what it teaches us about God's power and design.



Instructions:

1. Choose an Event to Research

Pick one real-world example of an extreme weather event:

- A specific hurricane or cyclone (e.g., Hurricane Katrina, Typhoon Haiyan)
- A tornado outbreak (e.g., Joplin Tornado, 2013 Moore Tornado)
- A powerful thunderstorm (e.g., derechos, hailstorms, lightning storms)

2. Research These Key Facts:

- **When and where** did the event happen?
- What was its **intensity** (wind speeds, storm category, size, etc.)?
- What were the **effects on people and the environment** (destruction, flooding, evacuations, wildlife)?
- Were there any **personal stories** or survivor accounts? Include a short quote or summary if you find one.

3. Write a One-Page Summary

Include all the above information in your own words. Use bullet points or paragraphs as needed. End your summary with:

4. Reflection:

- How does this storm reveal the **power of nature**?
- How does it remind you of **God's greatness and protection**?

- Choose a **Bible verse** (like Psalm 135:7, Nahum 1:3, or Mark 4:39) that connects with your understanding.

Optional Bonus: Create a presentation, timeline, or visual display to go with your report!

Closing Thoughts

Great work! You've learned about cyclones, tornadoes, and thunderstorms, and how they form. Studying extreme weather helps us appreciate the power of nature and reminds us of God's control over His creation.

Final Reflection

Nahum 1:3 says, *"His way is in the whirlwind and the storm, and clouds are the dust of His feet."* How does this verse remind us that even the most powerful storms are under God's control?

Well done! You have completed today's lesson. Keep learning and observing the amazing world around you!

Full List of Australian Curriculum v9 Content Descriptions Used

Content Description Code & Full Wording	Rationale
AC9S7U04 / AC9S8U04 – Explain how scientific knowledge about processes in the atmosphere and hydrosphere is used to predict weather, inform decision making and describe patterns in climate.	The lesson examines the atmospheric processes that create cyclones, tornadoes, and thunderstorms, and how understanding them supports forecasting and decision-making for safety.
AC9S9U04 / AC9S10U04 – Analyse how energy from the Sun drives atmospheric and oceanic circulation, influences weather and climate, and transfers matter and energy through the Earth system.	Students explore how warm, moist air, wind patterns, and energy transfer create and fuel extreme weather events.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – Investigate how scientific knowledge has changed over time and is used to evaluate claims, inform policies and decisions, and explain events and phenomena.	Extreme weather events provide case studies where scientific understanding has evolved (e.g., improved cyclone tracking, tornado warning systems) and informs safety policy.
AC9S7I01 / AC9S8I01 / AC9S9I01 / AC9S10I01 – Plan and conduct investigations, including fieldwork and controlled experiments, to collect reliable data, using methods that are safe and ethical.	The research project on a real extreme weather event models an investigation, requiring data collection from reliable sources.
AC9S7I04 / AC9S8I04 / AC9S9I04 / AC9S10I04 – Select and construct appropriate representations, including tables, graphs, models and diagrams, to organise and process data and information.	Students may present their findings using tables, maps, storm path diagrams, or timelines of events.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.	Students write a research report on an extreme weather event, using accurate scientific terminology.

Lesson 28: Reflection & Review

This lesson is set aside to round off the week of learning with a reflection and review activity.

Activity: Write a reflection on how understanding the weather and seasons shows God's order and provision in creation.

Lesson 29: The Human Body – God’s Masterpiece of Design

Objective: Learn how the body’s systems work together and explore how this reflects God’s intelligent design.

Lesson Content

After completing the lesson, you will be asked to do a ‘narration’. This is where you retell everything you can remember to your parent or tutor.

Hello student! Today we’re diving into an incredible subject – **your body!**

Your body is one of the most amazing things in all of creation. It is made up of **over 200 bones**, **about 600 muscles**, **trillions of cells**, and many **interconnected systems** that work together – **nonstop**, even while you're sleeping. Every blink, every breath, every heartbeat is the result of a masterfully designed process, created by God.

Let’s start by looking at **five key systems** that help your body function each day:

1. **Skeletal System** – This is the sturdy framework of your body. It gives your body shape and protects vital organs like your brain and heart. Without bones, you would be a squishy blob on the floor!
2. **Muscular System** – Muscles work closely with your bones to help you move. Some muscles work automatically (like your heart), while others you control (like when you jump or wave).
3. **Circulatory System** – Your heart pumps blood through an incredible network of veins and arteries. The blood carries **oxygen** and **nutrients** to every part of your body.
4. **Respiratory System** – Every time you breathe in, you’re taking in **oxygen**, which your body needs to survive. Your lungs and airways are part of this system. They also help remove **carbon dioxide**, a waste gas, when you breathe out.



5. **Digestive System** – When you eat food, your body doesn't just let it sit there! It breaks it down into nutrients your body can use for energy, growth, and repair. From your mouth to your stomach and intestines, this system is always working.

Each of these systems is important – but **they don't work alone**. They depend on each other in an incredible web of cooperation. For example, your **muscles** need **oxygen** from the **lungs**, which is delivered by the **circulatory system**. Your **digestive system** provides the **energy** your heart and brain need. If even one system fails or becomes damaged, it affects the others too.

This level of **coordination and precision** shows how thoughtfully God designed the human body. It's not random – it's a reflection of **His wisdom and order**.

Instructional Story: “Micah’s Orchestra”

Micah loved music. More than just a hobby, music was his passion. He played the **violin** in the youth orchestra and practiced every afternoon after school. He knew how each instrument added something special to the performance – the deep rumble of the basses, the light fluttering of the flutes, the bold sound of the trumpets.

One Friday afternoon, the orchestra had a full rehearsal for an upcoming concert. Everyone was excited – but things didn't go as planned.

The **percussion came in too early**, the **trumpets missed their cue**, and one flute kept playing slightly out of tune. The once-beautiful music turned into confusion and frustration. Even Micah, usually calm, winced at the clashing notes.

After the rehearsal, Micah sat down beside his mum and said, “That was a disaster! When even one section is out of sync, the whole orchestra feels off.”

His mum nodded and smiled. “That’s a perfect picture of how **your body works**, Micah. Every system in your body is like a section in an orchestra. When all the systems are working together, it’s like a beautiful symphony. But when one part is out of tune – like if your lungs don’t take in enough oxygen or your heart beats too fast – everything else has to struggle to keep up.”

Micah blinked. “So... my body is like an orchestra, and God is the conductor?”

“Exactly,” she said. “God didn’t just throw together bones, muscles, and organs. He designed them to work together in harmony. And He’s always overseeing it – just like a conductor keeps all the instruments in time.”

Micah thought about that all the way home. As he practiced his violin that evening, he imagined each bow stroke like a heartbeat, each breath like the lungs, each pause like a moment for the digestive system to refuel. He smiled, amazed that **his own body was living proof of God’s perfect design** – a masterpiece working quietly and faithfully every day.

Biblical Connection

1 Corinthians 12:12 says,

“Just as a body, though one, has many parts, but all its many parts form one body, so it is with Christ.”

God created our physical bodies with purpose and precision, and He compares the **Church** to a body – **each part unique, yet needed**. Just like our body systems, we are called to **work together in unity** for a greater purpose.

Thinking Questions (Write answers in your journal):

1. What are the main jobs of the five body systems?
 2. How do these systems rely on one another?
 3. Why is it important that each system stays “in order”?
 4. What does the Bible say about our bodies and their value?
 5. What could happen if one system stopped working?
 6. How can we reflect the orderliness of God in how we care for our bodies?
 7. What does the story of “Micah’s Orchestra” teach you about God’s design?
-

Activity – Create a Human Body Diagram

Materials: Large paper, pencil, markers

Instructions:

1. Lie down on the paper or ask someone to trace your body shape.
 2. Inside your outline, **draw and label** the 5 major systems: skeletal, muscular, circulatory, respiratory, digestive.
 3. Next to each system, **write one sentence** explaining what it does.
 4. Title your poster: “**God’s Masterpiece – My Body**”
 5. Display your poster or present it to a parent or sibling. Try to **retell the story of Micah’s Orchestra** and explain what you learned.
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Narration: When your parent/tutor is available (either now or at lunch-time), ask him/her to listen while you retell the story and what you learnt in this lesson.

Australian Curriculum (v9) Content Descriptions Addressed

Content Description Code & Full Wording	Rationale
AC9S7U02 – <i>Investigate the relationship between the structure and function of cells, tissues and organs in multicellular organisms, including how they work together in systems.</i>	The lesson explains the skeletal, muscular, circulatory, respiratory, and digestive systems, showing how their parts interact to keep the body functioning.
AC9S8U02 – <i>Examine the specialised functions of cells and organs in multicellular organisms and how they are coordinated to sustain life.</i>	Students consider how each system contributes to life processes, using the orchestra analogy to illustrate coordination.
AC9S9U02 – <i>Analyse how body systems work together to respond to changes in the internal and external environment to maintain optimal functioning.</i>	The content addresses how interdependence between systems is essential and how problems in one system affect others.
AC9S10U02 – <i>Evaluate the impact of factors such as disease, injury and lifestyle on the functioning of body systems, and how medical interventions support health.</i>	Thinking questions and reflections encourage students to consider what happens if a system stops working and how caring for the body reflects God's orderliness.
AC9S7H01 / AC9S8H01 / AC9S9H01 / AC9S10H01 – <i>Investigate how scientific knowledge has changed over time and is used to evaluate claims, inform policies and decisions, and explain events and phenomena.</i>	The lesson draws on biological knowledge about organ systems to explain the body's design and function in a way that connects to decision-making about health.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.</i>	Students create a labelled diagram and poster explaining the body systems using accurate scientific terms.

Lesson 30: The Five Senses – Experiencing God’s World

Objective: Understand how the five senses connect us with the world and reflect God’s goodness and design.

Lesson Content

After completing the lesson, you will be asked to do a ‘narration’. This is where you retell everything you can remember to your parent or tutor.

Hi there! Today, we’re going to explore an amazing part of how God made you – **your five senses**. These are the gifts God gave you to connect with the world: **sight, hearing, taste, touch, and smell**. Each sense helps you understand what’s happening around you, whether it’s enjoying a delicious meal, listening to music, watching a sunset, or smelling fresh flowers.

Many older people (of your parents’ and grandparents’ age) begin to lose their hearing and eyesight, and it can feel like their world is shrinking when they can’t see so well and can’t quite understand what people are saying. People who go through cancer treatment often lose their sense of touch in their fingers and toes. Then it becomes difficult to do up your buttons on your shirt. These problems can also happen to anyone, through illness or accidents at any age – and some people are born with damaged senses.

Now imagine a world without your senses. What if you couldn’t see a rainbow, hear a loved one’s voice, feel a hug, taste your favourite dessert, or smell fresh-baked bread? Life could feel empty and disconnected. Your five senses bring colour, sound, texture, and joy to everyday life – and they are part of how you experience God’s creation.

God didn’t create your senses by accident. They are **intricately designed**, working together with your brain and body systems. Just like tools in a toolbox, each one has a specific job, but together, they make you aware of the world and help you enjoy it. We mostly take our senses for granted, until something goes wrong. If we thought about it, maybe we could be more thankful and appreciative of how well our senses work at this time in our lives.

Instructional Story: “Elena’s Walk”

Elena sighed as she stared at her broken science project. The clay volcano she’d spent hours making had collapsed when her little brother knocked over the table. On top of that, he’d spilled grape juice on her sketchbook – the one with all her drawings for the school art competition.

Tired, frustrated, and near tears, Elena pulled on her shoes and stepped outside. “I just need to get away,” she muttered, walking quickly to the edge of the neighbourhood woods.

At first, everything felt dull. Her shoulders were tense, her thoughts loud and tangled. But as she slowed her pace, something changed.

The **sunlight peeked** through the leafy canopy above, casting golden patches on the path. She looked up and saw how the light danced through the leaves like stained glass.

She stopped walking.

She could **hear** something now – birds chirping cheerfully back and forth. A woodpecker tapped rhythmically in the distance. The gentle rustle of leaves stirred by the wind filled the quiet spaces between.

Elena inhaled deeply. The **smell** of fresh-cut grass and damp earth met her nose. There was a hint of something sweet too – **honeysuckle**, maybe? She followed the scent to a bush blooming with tiny white flowers.

Next, she reached down to pick a mint leaf from her mum’s garden, just off the path. She placed it on her tongue and smiled at the **burst of flavour** – cool, sharp, refreshing. “Mmm,” she murmured.

Then she paused again. She stretched out her hands and let the **breeze brush against her fingers**, noticing how it felt soft but full, like the world breathing.

Her eyes took in more – the veins in each leaf, the blue of the sky, the ants marching along the edge of a rock. It was as if the whole world had slowed down so she could see what had always been there.

In that moment, Elena whispered, “Thank You, God. Even when life feels messy, Your world is still full of beauty.”

She stood for a while longer, just **experiencing** – not fixing anything, not doing anything, just being still and aware. Her anger faded. Her shoulders relaxed. Her thoughts cleared.

Later, when she got home, her little brother was waiting with a shy apology. Elena smiled. “It’s okay,” she said. “I went for a walk and remembered that the world is still good.”

Her senses had guided her back to peace – and reminded her that even on the hardest days, **God’s beauty and order are all around us**.

Biblical Connection

Proverbs 20:12

“Ears that hear and eyes that see – the Lord has made them both.”

God designed your senses with intention. They aren’t random or meaningless. They were created so you can connect with the world **and with others**, and even more, so you can **experience God’s goodness and give Him praise**.

Thinking Questions (Write answers in your journal):

1. What are the five senses, and what does each one help you do?
2. Which of your senses do you rely on most in your daily life? Why?

3. How can you use your senses to glorify God and enjoy His creation?
4. What does your ability to see, hear, smell, taste, and touch say about God’s attention to detail?
5. How do your senses help you discover truth, beauty, and goodness in the world?
6. How did Elena’s walk help her change her perspective?
7. In what ways can slowing down and noticing your senses help you grow closer to God?

Activity – Sensory Observation Journal

Materials Needed:

- A notebook
- A pen or pencil
- Five small items (suggestions: a textured fabric, a spice, a small snack, a sound recording, and a colourful object)

Step-by-Step Instructions:

1. Choose one item for each sense:
 - **Touch:** Feel the fabric. Describe the texture (Is it soft? Rough? Bumpy?).
 - **Smell:** Smell the spice. Describe what it reminds you of.
 - **Taste:** Eat the snack slowly. Describe the flavours.
 - **Hearing:** Listen to the sound recording (or find natural sounds outside). What do you notice?
 - **Sight:** Look carefully at the colourful object. What details stand out?
2. For each sense, write your observations in your notebook. Use rich, descriptive words.
3. Then write one sentence for each sense starting with:
“God gave me this sense so I can...”
 (For example: “God gave me this sense so I can taste delicious fruit and thank Him for it.”)
4. End your page with a short prayer of thankfulness to God for giving you senses to experience His creation.

Wrap-Up

Retell the story of Elena’s walk to a parent or sibling. Share how each sense helped her shift her focus from frustration to gratitude. Explain what you discovered through your sensory observations and how they helped you notice God's care and order in the world.

Full Australian Curriculum (v9) Content Descriptions Used in This Lesson

Content Description Code & Full Wording	Rationale
AC9S7U02 – Investigate the relationship between the structure and function of cells, tissues and organs in multicellular organisms, including how they work together in systems.	The lesson introduces sensory organs (eyes, ears, nose, tongue, skin) and links them to their roles in detecting stimuli and sending information to the brain.
AC9S8U02 – Examine the specialised functions of cells and organs in multicellular organisms and how they are coordinated to sustain life.	Students learn how each sense has a specific organ structure and works with the nervous system to respond to the environment.
AC9S9U02 – Analyse how body systems work together to respond to changes in the internal and external environment to maintain optimal functioning.	The senses are shown as part of an integrated system where sensory input leads to responses, influencing emotions, decisions, and well-being (e.g., Elena’s mood change in the story).

Content Description Code & Full Wording

AC9S10U02 – *Evaluate the impact of factors such as disease, injury and lifestyle on the functioning of body systems, and how medical interventions support health.*

AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – *Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.*

Rationale

The lesson invites students to reflect on what life would be like without one or more senses, leading into discussions about sensory impairments and adaptations.

Students produce a **Sensory Observation Journal**, recording descriptive observations and linking them to the purpose of each sense, using clear language and scientific vocabulary.

Lesson 31: Growing Up – Physical, Emotional & Spiritual Maturity

Objective: Reflect on how God designed us to grow in body, heart, and spirit – just like Jesus did. Learn to recognise and celebrate signs of maturity with purpose and direction.

Lesson Content

After completing the lesson, you will be asked to do a ‘narration’. This is where you retell everything you can remember to your parent or tutor.

Let’s talk about something we all experience: **growing up**. It’s not just about getting taller or outgrowing your shoes – though that definitely happens! Growing up also includes changes in your **thinking, emotions, relationships, responsibilities**, and most importantly, your **faith**.

In the Bible, we read that **even Jesus grew up**. Luke 2:52 tells us, “*Jesus grew in wisdom and stature, and in favour with God and man.*” That means He grew **intellectually, physically, spiritually, and socially**. He developed **orderly**, not all at once, but steadily and with purpose.

As you grow, you may feel a mix of excitement and uncertainty. Some days you feel more mature, and other days you may struggle with emotions, choices, or friendships. That’s normal. But remember: **growth is a process**, and with God’s help, you can grow in the right direction – toward wisdom, grace, and strength.

Instructional Story: “Logan’s Letter”

Logan had been having one of those weeks. Nothing particularly bad had happened – but everything felt a little off. He couldn’t concentrate during math, his basketball team had lost again, and he’d gotten into a silly argument with his best friend.

He sat in his room one afternoon, half-heartedly cleaning out his desk drawer, when he found a **folded piece of paper** tucked beneath some old pens and string. Curious, he opened it.

In big, slightly crooked handwriting it read:

“Dear Me, age 13. I hope you are brave. I hope you are kind. I hope you know lots of stuff. – Logan, age 8.”

Logan stared at the letter. He remembered writing it. His third-grade teacher had assigned it as a “future message,” but he hadn’t thought about it in years.

Am I brave? he wondered.

Am I kind?

Do I know anything useful?

That weekend at youth group, Logan brought it up with his youth leader, Daniel.

“I found a note I wrote to myself when I was eight,” Logan explained. “I said I wanted to be brave, kind, and smart. I don’t know if I’ve really grown into that.”

Daniel smiled. “Sounds like a pretty solid goal. You know what’s cool? That’s almost exactly how the Bible describes how Jesus grew up.”

He opened his Bible to Luke 2:52 and read:

“Jesus grew in wisdom and stature, and in favour with God and man.”

Daniel continued, “That verse covers all kinds of growth. Jesus grew in:

- **Wisdom** – that’s learning and thinking clearly,
- **Stature** – physical strength and health,
- **Favour with God** – His relationship with the Father,
- **Favour with man** – how He treated others.”

Logan sat with that for a moment. “So... growing up isn’t just about getting older. It’s about **who I’m becoming**, right?”

“Exactly,” Daniel said. “And it doesn’t just happen by accident. Growing in maturity means making **intentional choices** – like developing good habits, caring for others, praying and reading the Bible, taking care of your body, and listening when God speaks.”

Later that evening, Logan sat down at his desk and took out the letter again. Then he wrote a new one.

“Dear Me, age 18. I want to keep growing – smarter, stronger, kinder, and closer to God. I know I won’t be perfect, but I want to keep becoming the person God made me to be.”

He folded the letter and tucked it away in the drawer. This time, he knew exactly what kind of person he was becoming – and he was ready to grow.

Biblical Connection

Luke 2:52

“And Jesus grew in wisdom and stature, and in favour with God and man.”

Jesus didn’t skip over the hard parts of growing up. He went through all the stages – learning, making decisions, serving others, and obeying God. He is our **perfect example** of what it means to grow **with order, purpose, and maturity**.

You’re not expected to have everything figured out right now – but like Jesus, you are invited to **grow steadily and faithfully** in every area of life.

Thinking Questions (Write your answers in your journal):

1. In what ways have you grown over the past year – physically, emotionally, mentally, or spiritually?

2. What do you admire most about how Jesus grew, according to Luke 2:52?
3. How can you grow in “favour with God” this week? What habits or choices help?
4. What does “spiritual maturity” look like in a teenager?
5. What area of your life feels “out of order”? How could you bring more balance to it?
6. Write one small goal you have for growth this month. Why is it important?

Activity – Create a Personal Growth Timeline

Materials:

- Ruler
- Blank paper or poster
- Coloured pens or markers

Instructions:

1. Draw a **horizontal timeline** starting at your birth and ending at your current age.
2. Along the line, **mark personal milestones**:
 - First steps, first time you read a book, a family trip, baptism, learning a skill, joining a team, etc.
3. Leave space at the end to add “**future growth goals**”. What do you want to learn, improve, or grow in – spiritually, emotionally, or physically?
4. Choose a **Bible verse** to write at the top of your timeline. Suggestions:
 - Luke 2:52
 - Philippians 1:6
 - Proverbs 4:18
5. Decorate your timeline with symbols or small drawings that represent the events.

Wrap-Up: Share your timeline with a parent, tutor, or friend. Retell **Logan’s story** and talk about the difference between just growing older and growing with purpose. End with a short prayer asking God to guide your growth.

Full AC v9 Content Descriptions (Grouped by Sub-Strand)

Content Description Code & Full Wording	Rationale
AC9S7U02 – Investigate the relationship between the structure and function of cells, tissues and organs in multicellular organisms, including how they work together in systems.	Physical maturity is addressed when students reflect on body growth and health, connecting how body systems develop and function together as they age.
AC9S8U02 – Examine the specialised functions of cells and organs in multicellular organisms and how they are coordinated to sustain life.	Students consider how ongoing body development (e.g., muscle growth, hormonal changes) is coordinated across systems to support maturity.
AC9S9U02 – Analyse how body systems work together to respond to changes in the internal and external environment to maintain optimal functioning.	Growth in adolescence involves changes in physical, emotional, and social environments; students explore how the body adapts and responds to these changes.
AC9S10U02 – Evaluate the impact of factors such as disease, injury and lifestyle on the functioning of body systems, and how medical interventions support health.	Students are encouraged to think about lifestyle choices (sleep, nutrition, exercise, spiritual habits) that influence healthy growth and maturity.

Content Description Code & Full Wording

AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – *Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.*

Rationale

Students create a **Personal Growth Timeline**, combining factual milestones with personal goals, and presenting them in a visual and written form.

Lesson 32: Created for a Purpose – Why Your Life Matters

Objective: Understand that God created each person with intention, value, and purpose – and how discovering that purpose brings order and meaning to life.

Lesson Content

After completing the lesson, you will be asked to do a ‘narration’. This is where you retell everything you can remember to your parent or tutor.

Have you ever stopped to ask yourself, “**Why am I here?**”
It’s a big question – and the answer is important.

Some people believe life is just a random series of events, but the Bible tells a different story. You are **not an accident**. You are **not a mistake**. You were **made on purpose** by a loving Creator.

Psalms 139:14 says, “*I praise you because I am fearfully and wonderfully made.*” You were **designed** by God, with a unique blend of **personality, abilities, experiences, and dreams**. Your life is a vital part of God’s

Instructional Story: “Zoe’s Puzzle Piece”

Zoe loved visiting her grandma’s house. It always smelled like cinnamon and tea, and there were quiet corners full of books, board games, and crafts. But her favourite part? The giant wooden puzzle table in the sunroom.

One afternoon, her grandma pulled out a brand-new puzzle – a **1,000-piece landscape**, full of mountains, forests, and a river that wound through a little town.

“Want to help?” Grandma asked, smiling.

Zoe nodded eagerly. “Let’s do the edge first!”

For hours, they sorted colours and shapes, laughing when pieces looked like they’d fit – but didn’t. Near the middle of the table, Zoe picked up a **very strange-looking piece**. It had a curved side, a jagged notch, and didn’t match anything nearby.

“This one’s weird,” she said. “It probably doesn’t even belong.”

Her grandma paused and chuckled. “It may look odd now, but trust me – it matters. Every piece has a place, even if we don’t see it right away.”

Zoe shrugged and set it aside. Over the next few days, they worked on the puzzle together. Slowly, the picture began to take shape – the forest, the river, the little town.

Then, on the last day, they reached the centre of the puzzle... and there was a gap. A very specific, odd-shaped gap.

Zoe blinked. “Wait! That weird piece!”

She dug through the bowl of unused pieces and found it – the jagged, curved one she’d nearly given up on.

It fit perfectly. Not just anywhere – in the **centre**.

She smiled. “I guess even the weird ones matter.”

Grandma looked at her with a twinkle in her eye. “Just like you.”

Zoe blinked. “You mean I’m weird?”

“I mean you’re wonderfully made,” Grandma said. “Sometimes we don’t understand how we fit. But God does. He sees the whole picture. And He made you for a reason.”

Zoe looked down at the finished puzzle and nodded slowly. Maybe her talents, her quiet personality, her unique dreams – they weren’t random. Maybe they were part of something bigger. **Just like that puzzle piece.**

Biblical Connection

Extract from ‘Vision Word for Today’ November 12, 2025

‘We are God’s masterpiece...planned...long ago.’ Ephesians 2:10 NLT

A minister wrote this message: ‘To the average eye, it was a mutilated piece of marble. The aborted sculpture had been abandoned a half century earlier... but a young artist named Michelangelo saw something in that stone others did not. Chiselling the eighteen-foot block of marble would consume nearly four years of his life, but that seemingly worthless stone was destined to become what many consider the greatest statue ever sculpted...

Michelangelo resurrected a dead stone and, breathing his artistry into it, brought David into existence. As he chiselled... he believed the masterpiece was already inside the stone. All he had to do was remove the excess stone so David could escape. He didn’t see what was. He saw what could be... He didn’t see the imperfections in the stone. He saw a masterpiece of unparalleled beauty. And that is precisely how the Artist [God] sees you. *‘We are God’s masterpiece. He has created us anew in Christ Jesus, so we can do the good things he planned for us long ago.’* (Ephesians 2:10 NLT)

Every work of art originates in the imagination of the artist. And so you originated in the imagination of God. You were conceived by God long before you were conceived by your parents. You took shape in the imagination of the Almighty before you took shape in your mother’s womb. Regardless of what others think of you, or what you think of yourself, God sees you as a potential masterpiece. To see yourself as anything other than that is to devalue and alter your true identity. And it’s in discovering your true identity that you discover God has a plan for your life.

“‘For I know the plans I have for you,’ declares the Lord, ‘plans to prosper you and not to harm you, plans to give you a future and a hope.’”

God knows your whole story – even the parts that feel uncertain or unfinished. He has a plan for you that includes **hope, meaning, and purpose**. When you trust that you’re part of His design, your life gains focus and peace. **Purpose brings order** to how we live, make decisions, and treat others.

Thinking Questions (Write answers in your journal):

1. What are three things you enjoy doing or feel passionate about?
 2. How could those things be used to **serve God or bless others**?
 3. Why is it important to know that your life has meaning and purpose?
 4. In what ways does **knowing your purpose bring order** to your choices and habits?
 5. What is one thing you could do this week to live out your purpose – at home, school, or church?
 6. What part of Zoe’s story reminded you of your own journey or feelings?
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Activity – Create a Purpose Vision Board

Materials:

- Paper or poster board
- Old magazines or newspapers
- Scissors and glue
- Bible or printed Bible verses
- Markers, pens, stickers (optional)

Step-by-Step Instructions:

1. Flip through magazines or print out images that represent your **interests, talents, dreams, and values**.
 - For example: a guitar for music, hands helping others, books, art supplies, sports, or nature.
 2. Cut out **words or phrases** that inspire you, such as “joy,” “courage,” “lead,” or “shine.”
 3. Paste the images and words onto your board to create a collage.
 4. Choose one or two **Bible verses** that speak to your identity and purpose. (Suggestions: Jeremiah 29:11, Psalm 139:14, Ephesians 2:10)
 5. Title your board: **“God’s Purpose for Me”**
 6. Display your board in a visible place to remind you that you were made with **intention and design**.
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Wrap-Up

Retell the story of Zoe’s puzzle piece to a parent or sibling. Talk about what stood out to you – was there a time when you felt like you didn’t “fit” or questioned your importance? How did Zoe’s discovery help you think differently?

Take a moment to reflect on your own life as a puzzle piece – **uniquely shaped, carefully crafted, and essential** to the beautiful picture God is putting together.

End your lesson by praying something like this:

“God, thank You for creating me with purpose. Even when I don’t always understand my place, I trust that You do. Help me grow into the person You designed me to be. Amen.”

Australian Curriculum (v9) Content Descriptions Used in This Lesson

Content Description Code & Full Wording	Rationale
AC9S7H03 – <i>Investigate how advances in science and technology have contributed to finding solutions to contemporary issues and how these solutions are influenced by and can influence society.</i>	Students explore how understanding human uniqueness and purpose can guide decisions in life and careers. While the focus is biblical, they are also recognising how scientific study of human abilities, skills, and aptitudes can inform purposeful choices in society.
AC9S8H03 – <i>Examine how proposed scientific responses to contemporary issues may impact on people, places and environments and can be influenced by cultural, ethical and societal considerations.</i>	Students consider ethical and personal dimensions of life purpose and how values (including biblical worldview) influence life decisions – mirroring the societal and cultural dimensions considered in science ethics discussions.
AC9S9H03 – <i>Analyse how cultural, ethical and societal considerations influence the development of scientific knowledge, technologies and applications.</i>	The lesson’s emphasis on God-given purpose links to the broader discussion of how different worldviews influence personal and societal goals – including in scientific careers and fields.
AC9S10H03 – <i>Evaluate how proposed scientific responses to contemporary issues and opportunities are influenced by and can influence ethical, cultural, economic and social considerations.</i>	Students reflect on life purpose in a way that aligns with evaluating how personal decisions (including career and community contributions) are shaped by values, which parallels how science-based decisions are made within an ethical and cultural framework.
AC9S7I08 / AC9S8I08 / AC9S9I08 / AC9S10I08 – <i>Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, using scientific language and digital tools as appropriate.</i>	The Purpose Vision Board is a creative communication task where students visually and textually present their personal purpose, goals, and values – using design and presentation skills that align with communicating ideas for a set audience and purpose.

Optional Extra Lesson:

End of Unit Reflection: Write a 1-page journal entry titled *"Why I Am Wondrously Made."* Include a summary of what you learned from each lesson, and how it has helped you understand your identity, purpose, and God's beautiful order in creation.

Assessment:

This term, submit your Science Journal with answers and reflections from the lessons. Include photographs of any practical activities or creative projects.

Send these samples into the Homeward Academy Office 2226 Murphys Creek Rd., Ballard, Qld 4352 or via email at info@hesupport.com.au