

Unit 11

**“Australian Federation to
World War II”**

(& Cooperation)



Grades
7-10

**SCIENCE, DESIGN TECHNOLOGY
& HEALTH**



Science, Technology & Health (Grades 7-10)

(& the character trait of Cooperation)”

SUMMARY:

The Science, Technology and Health topics this term are integrated through an underlying theme of the character trait of ‘cooperation’. We will explore examples of cooperation in nature (ecosystems, symbiotic relationships, companion planting and guilds); plus systems in the human body that are intricately designed to work together. Students learn how natural (God-designed) systems and human-designed systems produce a benefit through synergism. While learning about the human body, we discuss identity, gender roles and developing safe practices in interpersonal relationships.

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...

- To be advised

Prior to starting each week, review the recommended resources.

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WEEK 1

GOD'S DESIGN IN THE ENVIRONMENT – COOPERATION IN CREATION.

Lesson 1: Cooperation in Creation

Character Trait Focus: *Cooperation*

Curriculum Links (Australian Curriculum v9)

Science

- **Year 7: AC9S7U03**
Classify and organise a variety of organisms based on observable differences, and represent flows of matter and energy in ecosystems.
- **Year 8: AC9S8U01**
Recognise cells as the basic units of living things, compare plant and animal cells, and describe functions of specialised cell structures.
- **Year 9: AC9S9U03**
Represent the carbon cycle and examine how key processes—including combustion, photosynthesis and respiration—rely on interactions between Earth's spheres (geosphere, biosphere, hydrosphere and atmosphere).
- **Year 10: AC9S10U01**
Analyse how systems can be used to structure and model scientific relationships and concepts, including inputs and outputs.

Design and Technologies

- **Years 7 - 8: AC9TDE8K01**
Analyse how people in design and technologies occupations consider ethical and sustainability factors to design and produce products, services and environments.
- **Years 9 - 10: AC9TDE10K01**
Analyse how people in design and technologies occupations consider ethical, security and sustainability factors to innovate and improve products, services and environments.

A) Introduction

Have you ever noticed how everything in nature works together? From the bee that pollinates a flower to the tree that shades the soil and feeds the fungi underground, God's creation is filled with systems of cooperation. Today, you'll learn how ecosystems and environmental systems function, how cells play a role in sustaining life, and how humans can learn from creation to design sustainable environments.

B) Teaching of Terminology

Write these definitions in your Science Journal and review them aloud.

- **Ecosystem** - A community of organisms interacting with each other and their physical environment.
- **Biotic factors** - Living components of an ecosystem (e.g. plants, animals, fungi).

- **Abiotic factors** - Non-living parts of the environment (e.g. sunlight, soil, air, water).
- **System** - A group of interacting or interrelated parts that function as a whole.
- **Sustainability** - The ability to maintain processes or resources long term.
- **Photosynthesis** - The process by which plants convert sunlight into food using carbon dioxide and water.
- **Cell** - The basic unit of structure and function in living organisms.
- **Ethical design** - Creating products or environments with moral, sustainable, and responsible goals.

Curriculum Links Addressed in Section B:

AC9S7U03, AC9S8U01, AC9S9U03, AC9S10U01

AC9TDE8K01, AC9TDE10K01

C) Informational Story: “The Living Garden”

On the edge of a small town, a family decided to start a garden, but not an ordinary one. Instead of planting in neat rows with chemical fertilisers, they studied how natural systems worked together. They planted *guilds*: a tall sunflower for light and beauty, beans to put nitrogen back into the soil, garlic under the fruit tree to protect it from bugs, and pumpkins to protect the ground from weeds.



Under the surface, fungal threads known as **mycorrhizae** formed connections between the plant roots. These fungi helped plants absorb water and minerals, while receiving sugar in return. It was a mutual exchange, a kind of **symbiosis**, a cooperation God designed into creation.



In one corner, worms turned compost into nutrient-rich soil. In another, bees visited flowers and spread pollen as they gathered nectar. The children observed, recorded, and wondered. They noticed how *every part had a role*, like cells in a body, or like a well-planned machine.

Then their father opened his Bible and read from Genesis 1:

“And God saw everything that He had made, and indeed it was very good.”

“God didn’t just create things randomly,” he explained. “He made living systems (such as cells, bodies, gardens) that all work together. And He calls us to work with His creation, not against it.”

Inspired, the family continued to design their garden, using what they learned about God’s sustainable, ethical design. Over time, it became not just a place to grow food - but a living example of God’s wisdom and the power of cooperation.

D) Thinking Questions

Write answers in your Science Journal.

Years 7 - 8

1. What is an ecosystem? List two living and two non-living parts.
2. How do cells contribute to cooperation in a body or plant?
3. What did you observe about how the plants and fungi helped each other?

Years 9 - 10

1. How does the carbon cycle reflect systems thinking in nature?
2. In what ways can humans design environments that mimic nature's cooperation?
3. What ethical or sustainability issues must be considered in environmental design?

Curriculum Links Addressed in Section D:
AC9S7U03, AC9S8U01, AC9S9U03, AC9S10U01, AC9TDE8K01, AC9TDE10K01

E) Hands-on Practical Activities

Choose one of the following activities to complete today.

Option 1 - "Mini Ecosystem in a Bottle" (*All Levels*)

Build a sealed terrarium with soil, moss or small plants, and a bit of water. Watch how the system maintains balance over time.

Option 2 - "Cooperation Sketch" (*Years 7 - 8*)

Draw a diagram of a natural ecosystem (e.g., pond, forest floor) and label how each part supports another.

Option 3 - "Sustainable Design Plan" (*Years 9 - 10*)

Create a design plan for a school garden, farm, or urban green space that imitates natural systems and considers sustainability, ethics, and cooperation.

Curriculum Links Addressed in Section E:
AC9S7U03, AC9S8U01, AC9S9U03, AC9S10U01, AC9TDE8K01, AC9TDE10K01

F) Biblical Connection & Wrap-up

In Romans 12:4 - 5, Paul writes:

"For as we have many members in one body... so we, being many, are one body in Christ."

Just like in a natural ecosystem (or even within a single cell) every part plays a role in something bigger. God designed creation to reflect His wisdom and His love for **cooperation**. He made systems that support each other, and He calls us to imitate that design—in our gardens, homes, and communities.

Reflection Prompt:

What is one way you can imitate God’s cooperative design in something you create or build this term?

Curriculum Links Addressed in Section F:

Ethical & biblical reflection on AC9TDE8K01, AC9TDE10K01

G) Narration

Now or at lunch-time, retell to your parent or tutor:

- What is an ecosystem?
- How do cells and systems work together?
- What did you build or draw today?
- How does this reflect God’s design and cooperation?

Curriculum Links Addressed in Section G:

Supports oral reasoning, systems thinking, and comprehension (related to general capabilities and science literacy)

Lesson 2: Systems in Balance - Food Webs and Earth's Design

Theme: *Cooperation in Ecosystems and the Earth's Spheres*

Character Trait Focus: *Cooperation*

Curriculum Links (Australian Curriculum v9)

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.
 - **AC9S7I05** - Analyse data and information to describe patterns, trends and relationships and identify anomalies.
 - **AC9S9U03** - Represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere).
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A) Introduction

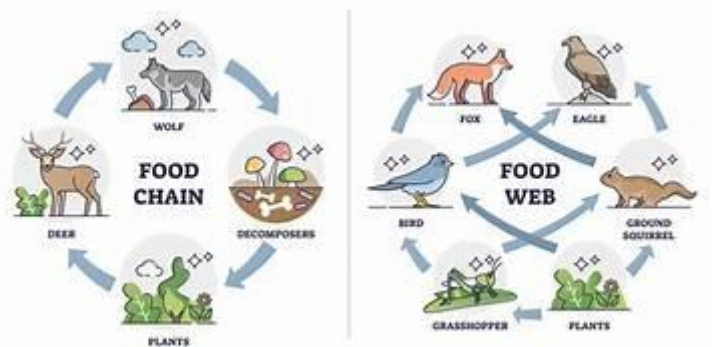
Have you ever wondered what happens when one part of nature changes, like a drought or the extinction of a species? God created a world where living and non-living parts cooperate to sustain life, but when something is thrown out of balance, there are ripple effects.

In this lesson, we'll explore food webs, energy flow, and the **carbon cycle**, and see how God designed these complex systems to work together. You'll also practise modelling and analysing how ecosystems can be disrupted, and how understanding these systems helps us care for God's creation.

B) Teaching of Terminology

Write these terms in your Science Journal and study their meanings:

- **Food chain** - A simple model showing how energy flows from one organism to another.
- **Food web** - A complex network of food chains showing all the feeding relationships in an ecosystem.
- **Producers** - Organisms (usually plants) that make their own food through photosynthesis.
- **Consumers** - Animals that eat plants or other animals.
- **Decomposers** - Organisms like fungi and bacteria that break down dead material and recycle nutrients.
- **Carbon cycle** - The process by which carbon moves between the atmosphere, plants, animals, soil, and oceans.
- **Photosynthesis** - The process by which plants use sunlight to make energy from carbon dioxide and water.
- **Abiotic factors** - Non-living environmental elements (e.g., temperature, sunlight, water).



- **Biotic factors** - Living elements of the ecosystem (e.g., plants, animals, microbes).

Curriculum Links Addressed in Section B:
AC9S7U02, AC9S9U03

C) Informational Story: “The Disappearing Otters”

In a remote estuary on the coast of British Columbia, a community of sea otters played a key role in the health of the ecosystem. These furry animals fed on sea urchins, keeping their numbers in balance. The urchins, in turn, fed on kelp. And the kelp forests sheltered fish, absorbed carbon dioxide, and slowed ocean currents to prevent erosion.



But when hunters removed otters for their fur, the food web began to collapse. Sea urchins exploded in number, devouring the kelp forests. Fish lost their habitat. Carbon uptake slowed. Beaches began eroding faster.

Scientists noticed that although the change started with the loss of one predator, the effects touched every part of the ecosystem - including **abiotic** parts like the atmosphere (carbon) and the geosphere (shoreline).

By modelling the food web and tracking carbon changes, researchers realised that each part of the system was **interconnected**. And when otters were reintroduced, slowly the kelp returned, fish flourished, and balance was restored.

This story shows us how **God’s design includes cooperation** even across different “spheres” of the Earth: biosphere (living things), atmosphere (air), hydrosphere (water), and geosphere (land). Each system affects the others.

Just as in the body of Christ, where “if one member suffers, all suffer,” ecosystems remind us that **everything is connected**, and caring for creation requires understanding these connections.

Curriculum Links Addressed in Section C:
AC9S7U02, AC9S9U03

D) Thinking Questions

Answer in your Science Journal.

Years 7 - 8

1. What is a food web, and how is it different from a food chain?
2. What happened when sea otters were removed?
3. Name one abiotic and one biotic factor that were affected.

Years 9 - 10

1. Describe how this story reflects the operation of the carbon cycle.
2. How do changes in the biosphere (e.g., predator loss) affect the other spheres?
3. What Christian principle can we learn from how these systems rely on each other?

Curriculum Links Addressed in Section D:
AC9S7U02, AC9S7I05, AC9S9U03

E) Hands-on Practical Activities

Choose one of the following:

Option 1 - “Build a Food Web” (*All Ages*)

Create a food web using string, paper labels, or drawings. Choose a real ecosystem (e.g., forest, reef). Show arrows for energy flow from producers to consumers to decomposers.

Option 2 - “Carbon Cycle Model” (*Years 7 - 8*)

Draw or build a model of the carbon cycle. Include plants, animals, atmosphere, and human activities (e.g., burning fossil fuels). Use arrows to show how carbon moves.

Option 3 - “Earth Sphere Interactions Analysis” (*Years 9 - 10*)

Pick one real-world environmental issue (e.g., deforestation, coral bleaching). Describe how it affects the biosphere, hydrosphere, geosphere, and atmosphere. Present your findings in a diagram or brief report.

Curriculum Links Addressed in Section E:
AC9S7U02, AC9S9U03, AC9S7I05

F) Biblical Connection & Wrap-up

In Genesis 1:28, God instructed humans to “fill the earth and subdue it; have dominion... over every living thing.” But this dominion does not mean domination. It means stewardship, which is caring for the systems God put in place.

Psalms 104:24 says:

“O Lord, how manifold are Your works! In wisdom You have made them all. The earth is full of Your possessions.”

When we study food webs and carbon flows, we are uncovering that wisdom. We learn how even abiotic and biotic elements “cooperate,” and how humans can join the harmony or disturb it.

Reflection Prompt:

How can you reflect God’s wisdom by protecting a part of His creation?

Curriculum Links Addressed in Section F:
Spiritual and ethical reflections on AC9S7U02, AC9S9U03

G) Narration

Tell a parent or tutor what you learned:

- What is a food web?
- What happens when one species is removed?
- What are the Earth's spheres and how do they interact?
- What did you build or model today?

Curriculum Links Addressed in Section G:
AC9S7I05 (patterns, relationships, oral reflection)

Lesson 3: Ecosystem Interactions & Data Analysis

Theme: *Analysing God's Patterns in Creation*

Character Trait Focus: *Cooperation*

Curriculum Links (Australian Curriculum v9)

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.
 - **AC9S7I05** - Analyse data and information to describe patterns, trends and relationships and identify anomalies.
 - **AC9S9U03** - Represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere).
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A) Introduction

God created a world filled with patterns, balance, and connections. The more we study ecosystems, the more we realise how each organism is part of a system, and how these systems respond to change.

In this lesson, you'll learn how to use data and models to study changes in ecosystems. You'll examine real-world environmental data and apply your understanding of food webs, carbon flow, and abiotic/biotic relationships to identify patterns and consequences. God has called us not only to observe creation, but to understand it and care for it.

B) Teaching of Terminology

Write and define these words in your Science Journal:

- **Model** – A representation (diagram, physical, or digital) used to explain how systems work.
- **Photosynthesis** – The process plants use to make food from sunlight, carbon dioxide, and water.
- **Respiration** – The process by which organisms break down food to release energy.
- **Anomaly** – A result or pattern that does not fit the expected data.
- **Prediction** – A scientific estimate based on trends and evidence.
- **Feedback loop** – A system where the output feeds back into the input (e.g. carbon levels influencing climate).
- **Biotic factor** – Any living part of an environment.
- **Abiotic factor** – A non-living environmental component like temperature or rainfall.

Curriculum Links Addressed in Section B:
AC9S7U02, AC9S7I05, AC9S9U03

C) Informational Story: “The Lake That Turned Green”

In a rural farming region, a peaceful lake once sparkled with clear water and supported many species. Fish swam in its cool depths, frogs croaked in the reeds, and birds nested nearby. Beneath the surface, a microscopic community of algae, bacteria, and zooplankton helped keep the water clean and oxygen-rich.

But over several years, farmers in the area began using more chemical fertilisers. Rain washed these excess nutrients into the lake. Slowly, something changed.

A type of algae began to grow in large quantities. At first, it just made the water look cloudy. Then it turned green. The algae formed thick mats on the surface, blocking sunlight from reaching deeper. Plants died. Oxygen levels fell. Fish suffocated. Frogs disappeared. The ecosystem collapsed.



Scientists were called in to investigate. They used **models and graphs** to show the flow of **nitrogen and phosphorus** (abiotic factors) from the farms into the water. They analysed years of rainfall and fertiliser application data to see patterns. Then they compared species counts before and after the algae bloom to find **trends and anomalies**.

The evidence was clear: one small change (an increase in fertiliser) had triggered a **chain reaction** across the entire system. They recommended new farming practices and buffer zones of native plants to filter runoff. Over time, the water began to heal.

This story shows that **God's creation is delicately balanced**, and humans have the responsibility to **observe patterns, interpret data**, and make decisions that help, not harm, the systems He has made.

Curriculum Links Addressed in Section C:
AC9S7U02, AC9S7I05, AC9S9U03

D) Thinking Questions

Write your answers in your Science Journal.

Years 7 - 8

1. What caused the algae bloom in the lake?
2. How did a change in abiotic factors affect biotic ones?
3. What did the scientists do to understand the problem?

Years 9 - 10

1. Identify the Earth spheres affected in this story (biosphere, hydrosphere, etc.) and explain how they interacted.
2. What type of feedback loop was present in the algae bloom?
3. Why is it important for Christians to analyse and respond to environmental data?

Curriculum Links Addressed in Section D:
AC9S7U02, AC9S7I05, AC9S9U03

E) Hands-on Practical Activities

Choose one of the following:

Option 1 - “Food Web Impact Chart” (*All Ages*)

Draw a food web based on a freshwater lake (include fish, frogs, insects, plants). Then cross out one organism (e.g., algae or frogs) and predict what happens to the others. Use arrows to show the changes.

Option 2 - “Water Quality Data Analysis” (*Years 7 - 8*)

Look up sample water quality data online (or use provided figures in a textbook). Graph the changes in nitrate levels and fish population over time. Describe the trend and any anomalies.

Option 3 - “Sphere Interaction Case Study” (*Years 9 - 10*)

Choose an environmental event (e.g., volcanic eruption, coral bleaching, or algae bloom). Write a short report showing how the geosphere, biosphere, hydrosphere, and atmosphere were affected. Include diagrams or models.

Curriculum Links Addressed in Section E:
AC9S7U02, AC9S7I05, AC9S9U03

F) Biblical Connection & Wrap-up

Proverbs 27:23 says:

“Be diligent to know the state of your flocks, and attend to your herds.”

This verse reminds us that **responsible stewardship** requires careful observation and action. In the same way, we must observe the state of God’s creation. Anomalies in nature, patterns in climate, or data about pollution are not just numbers – they are **indicators of what needs our care**.

Jesus called us to be servants and caretakers, not destroyers. The more we study creation, the better equipped we are to protect it.

Reflection Prompt:

What can you do to help monitor or improve the health of your local environment?

Curriculum Links Addressed in Section F:
AC9S7I05, AC9S9U03

G) Narration

Now or during lunch, retell this to your parent or tutor:

- What caused the lake ecosystem to collapse?
- How did scientists find the patterns?
- What models or graphs did you build today?
- What does this teach us about our role in creation?

Curriculum Links Addressed in Section G:
AC9S7I05, AC9S7U02

Lesson 4: Introduction to Ecosystems - Designed for Cooperation

Theme: *Ecosystems as God's Balanced Design*
Character Trait Focus: *Cooperation*

Curriculum Links (Australian Curriculum v9)

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.
 - **AC9S7I05** - Analyse data and information to describe patterns, trends and relationships and identify anomalies.
 - **AC9S9U03** - Represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere).
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A) Introduction

Welcome to Week 2! This week we begin exploring **ecosystems** in detail. An ecosystem is more than just a collection of plants and animals. It is a system, that has been designed by God, where every part has a role, and cooperation is essential for life to flourish.

Whether it's a forest, a coral reef, or a backyard garden, ecosystems include both **biotic** (living) and **abiotic** (non-living) parts. In this lesson, you'll discover how God's intelligent design is revealed through these systems and how we can learn to live cooperatively within them.

B) Teaching of Terminology

Write the following words in your Science Journal with definitions:

- **Ecosystem** - A community of interacting living organisms and their physical environment.
- **Interdependence** - A mutual reliance between two or more groups or things.
- **Producer** - An organism (usually a plant) that makes its own food using sunlight.
- **Consumer** - An organism that eats other organisms to get energy.
- **Decomposer** - An organism that breaks down dead matter and recycles nutrients.
- **Energy flow** - The movement of energy through a food chain or food web.
- **Carbon cycle** - The continuous movement of carbon among the Earth's spheres.
- **Abiotic factor** - A non-living component of an ecosystem, such as sunlight or soil.
- **Biotic factor** - A living component, such as plants, animals, or fungi.

C) Informational Story: “The Forest That Heals Itself”

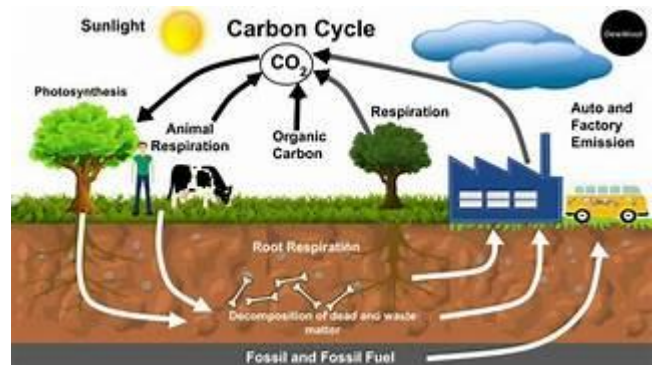
In a national park in Queensland, a bushfire swept through thousands of hectares of dry eucalyptus forest. At first glance, it seemed like everything had been destroyed. Trees were blackened, the soil was scorched, and animals had fled.

But God had designed this forest with **resilience** in mind.

Within days, green shoots began to emerge from the blackened trunks. Many eucalyptus species have thick bark to protect vital tissues and contain seeds that only germinate after fire. Insects returned to pollinate the flowers, birds followed to feed on insects, and marsupials came back to forage.

Under the soil, fungi worked with plant roots to distribute nutrients. Rain fell and flowed into creeks, which carried sediment and nutrients downstream. Small changes in abiotic factors like sunlight, soil nutrients, and temperature triggered new cycles of **photosynthesis** and **carbon exchange**.

Scientists who monitored the forest used **data models** to track energy flow, carbon movement, and population changes. They saw patterns of **interdependence** and **recovery**, and confirmed what God’s Word had already declared:



“He makes grass grow for the cattle, and plants for people to cultivate—bringing forth food from the earth.” (Psalm 104:14)

This story shows how ecosystems, when undisturbed by careless human activity, can heal and restore because of their **divinely built systems**.

D) Thinking Questions

Write your answers in your Science Journal.

Years 7 - 8

1. What are the key components of an ecosystem?
2. How did the forest recover after the fire?
3. What abiotic and biotic factors influenced recovery?

Years 9 - 10

1. Describe the carbon cycle interactions in the story (e.g., fire, regrowth, respiration).
2. How did cooperation between species and environmental factors lead to restoration?

3. How does this reflect God’s wisdom and design?

Curriculum Links Addressed in Section D:
AC9S7U02, AC9S7I05, AC9S9U03

E) Hands-on Practical Activities

Choose one of the following activities:

Option 1 - “Mini Ecosystem Construction” (*All Ages*)

Create a small terrarium or outdoor micro-ecosystem using soil, plants, stones, and water. Observe how the components interact over time.

Option 2 - “Ecosystem Mapping” (*Years 7 - 8*)

Go outside and map a local ecosystem (garden, park, or bushland). Identify at least 5 biotic and 3 abiotic components. Draw a diagram and label energy flow arrows.

Option 3 - “Carbon Cycle Case Study” (*Years 9 - 10*)

Select an environmental change (e.g., bushfire, drought, deforestation). Describe how it affects the carbon cycle and multiple Earth spheres. Create a systems model or annotated flowchart.

Curriculum Links Addressed in Section E:
AC9S7U02, AC9S7I05, AC9S9U03

F) Biblical Connection & Wrap-up

Isaiah 55:10 – 11 says:

“As the rain and the snow come down from heaven, and do not return to it without watering the earth... so is my word that goes out from my mouth.”

This verse reminds us that God sustains creation through **purposeful systems**. He designed the Earth to work in harmony with the sun, rain, soil, and life all cooperating. Ecosystems are one of His masterpieces.

When we study them, we’re doing science – and we’re also uncovering **His fingerprints**. And when we care for ecosystems, we’re honouring His command to steward what He’s made.

Reflection Prompt:

What is one part of creation you want to help restore or protect this year?

Curriculum Links Addressed in Section F:
Spiritual and environmental reflections on AC9S7U02, AC9S9U03

G) Narration

Retell to your parent or tutor:

- What is an ecosystem?

- What helped the forest recover?
- What patterns or cycles did you observe or model today?
- How does God’s design show cooperation?

Curriculum Links Addressed in Section G:
AC9S7I05, AC9S7U02

Lesson 5: Ecosystem Case Study – Tropical Rainforests

Theme: *God's Mastery in Interconnected Systems*

Character Trait Focus: *Cooperation*

Curriculum Links (Australian Curriculum v9)

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.
- **AC9S7I05** - Analyse data and information to describe patterns, trends and relationships and identify anomalies.
- **AC9S9U03** - Represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres.

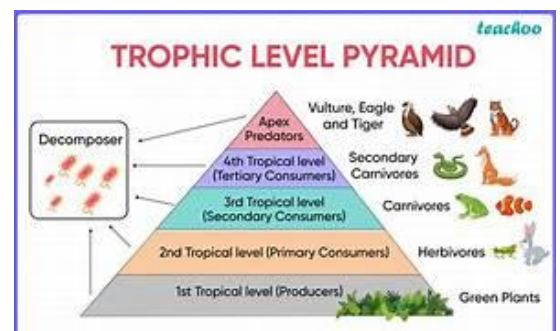
A) Introduction

Today we deeply explore a specific ecosystem: the tropical rainforest. Known for its high biodiversity and rapid nutrient cycles, this ecosystem provides a powerful example of God's design where everything works together in layers and processes.

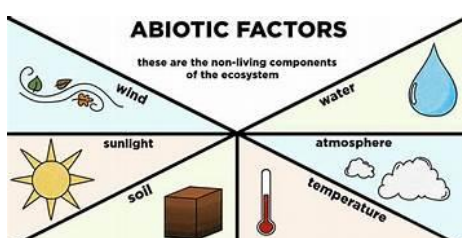
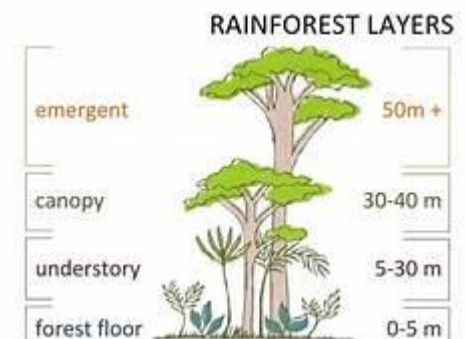
B) Terminology

Add to your Science Journal:

- **Trophic levels** - The levels in a food chain: producers, primary consumers, secondary consumers, etc.
- **Biomass** - The total mass of organisms in a given area.

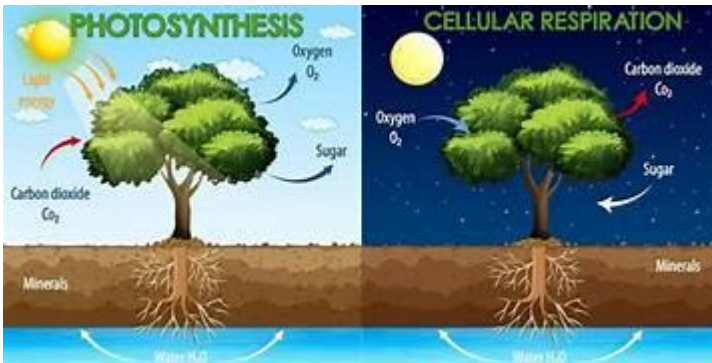


- **Canopy** - The top layer of a forest where light is captured.
- **Understory** - The layer beneath the canopy.
- **Nutrient cycle** - Movement of nutrients like nitrogen, carbon, and phosphorus through living and non-living parts.
- **Biodiversity** - The variety of life in an ecosystem.



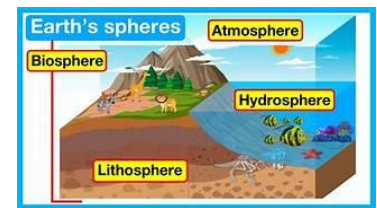
- **Abiotic factors** - Abiotic factors are non-living factors that impact an ecosystem. Abiotic factors are part of the ecosystem and can impact the associated living things, but they are not living

- **Water Cycle** - the cycle of processes by which water circulates between the earth's oceans, atmosphere, and land, involving precipitation as rain and snow, drainage in streams and rivers, and return to the atmosphere by evaporation and transpiration.



- **Photosynthesis** – the process (during the day) by which green plants and some other organisms use sunlight, water and carbon dioxide (CO_2) to make glucose-sugar, and it release Oxygen (O_2) into the atmosphere. Photosynthesis in plants generally involves the green pigment chlorophyll and generates oxygen as a by-product.
- **Respiration** – the process by which plants use oxygen to break down glucose so it can use the energy and nutrients to for growth and life processes.

- **Earth's Spheres** – i) Lithosphere (or Geosphere) is the solid earth; ii) Hydrosphere is the water/lakes/rivers/oceans; iii) Biosphere is all the living plants and animals; iv) Atmosphere is the envelope of gases surrounding the earth (the air). All four spheres interact with each other.

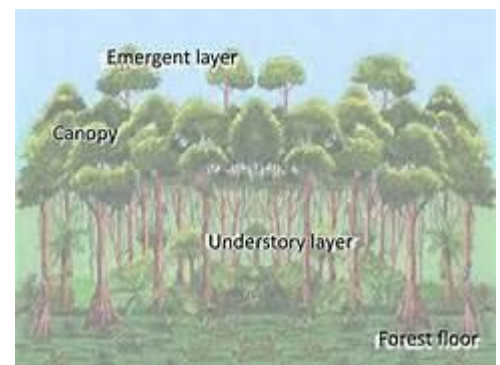


Curriculum Links Addressed:
AC9S7U02, AC9S9U03

C) Informational Story: “The Great Canopy Challenge”

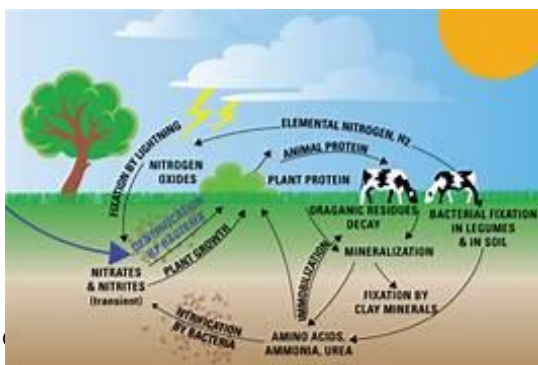
In the Amazon rainforest, towering trees form a thick canopy that captures sunlight. Underneath, vines, shrubs, and young trees anchor the forest. Jaguars hunt monkeys, toucans eat fruit and spread seeds, and decomposing plants enrich the ground.

Scientists measured **biomass** (the total mass of plants and animals) and found it was one of the richest on Earth.



They tracked carbon stored in trees, soil, and animals. Photosynthesis during growth locked carbon; decomposition and respiration released it again in a balanced carbon cycle.

They showed models of nutrient flow – how every drop of rain, shaft of sunlight, and rustle of an animal connected in God’s design.



When small-scale deforestation occurred, they charted changes in rainfall, canopy cover, species loss, carbon storage, and soil degradation. The data revealed surprising anomalies and opportunities for restoration.

D) Thinking Questions

Years 7 - 8

1. What are the main trophic levels in a rainforest food web?
2. How do plants and decomposers help recycle nutrients?

Years 9 - 10

1. Which abiotic factors would change if the canopy was removed?
2. How does this affect the carbon cycle and other spheres?

Curriculum Links Addressed:
AC9S7U02, AC9S7I05, AC9S9U03

E) Hands-on Practical Activities

All Ages:

- Create a layered diagram of the rainforest including abiotic and biotic factors.
- Label trophic levels and illustrate energy or carbon flow with arrows.

Years 7 - 8:

- Build a 3D model or diorama of the rainforest layers using recyclables.

Years 9 - 10:

- Draw a model of a forest that includes the carbon cycle and make notes showing how photosynthesis and respiration rely on interactions between Earth's spheres.

Curriculum Links Addressed:
AC9S7U02, AC9S7I05, AC9S9U03

F) Biblical Connection & Wrap-up

Psalm 96:12 – 13 speaks of creation rejoicing and renewal before God. Rainforests, with their dynamic cycles, echo this beauty – creation celebrating its Creator. When we steward ecosystems, we are partners with God's original design.

G) Narration

Retell:

- How does the rainforest cycle energy and carbon?
- What trophic levels did you include?
- What did your data show?

Lesson 6: When Ecosystems Are Disrupted - Case of Coral Reefs

Theme: *Understanding the Fragility and Resilience of God's Systems*

Character Trait Focus: *Cooperation*

Curriculum Links (Australian Curriculum v9)

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.
 - **AC9S7I05** - Analyse data and information to describe patterns, trends and relationships and identify anomalies.
 - **AC9S9U03** - Represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere).
-

A) Introduction

God designed ecosystems to be complex, beautiful, and resilient. But even resilient systems can be disrupted – especially when they are overwhelmed by changes in abiotic or biotic conditions. In this lesson, we will focus on **coral reefs**, one of the most cooperative and biologically rich ecosystems in God's creation, and examine what happens when that balance is disturbed.

B) Teaching of Terminology

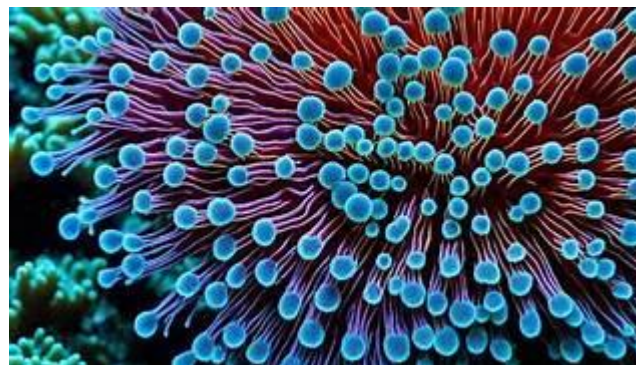
Add these terms and definitions to your Science Journal:

- **Coral bleaching** - A phenomenon where corals lose their symbiotic algae due to stress (e.g., heat), turning white and often dying.
- **Symbiosis** - A close, often long-term interaction between two different biological species.
- **Zooxanthellae** - Algae that live inside coral tissues and provide them with energy through photosynthesis.
- **Ocean acidification** - The reduction in pH of ocean water due to absorption of atmospheric CO₂.
- **Threshold** - A tipping point at which a system can no longer maintain balance.
- **Mitigation** - Actions taken to reduce the severity of an environmental problem.

Curriculum Links Addressed in Section B:
AC9S7U02, AC9S9U03

C) Informational Story: “The Bleached Reef”

Off the coast of Queensland lies the Great Barrier Reef. It is one of the largest and most complex ecosystems in the world. Its colourful corals are made from thousands of tiny animals called **polyps**, which rely on microscopic algae called **zooxanthellae** to survive.



This partnership is a perfect example of **cooperation in nature**: the algae photosynthesise and provide food, while the coral provides protection and nutrients. But this relationship is fragile.

In 2016, rising sea temperatures stressed the coral. The zooxanthellae were expelled, and the reef turned ghostly white. Scientists called it **coral bleaching**. Some corals died, and many fish lost their habitats.



Marine ecologists studied the data. They mapped **sea surface temperatures**, measured pH changes, and recorded the loss of biomass. Their models showed that just a 1 - 2°C rise over several weeks could trigger mass bleaching.

They also measured changes in **carbon cycling**, respiration, and photosynthesis rates in the reef system. La Nina weather events, cyclones plus excess carbon and pollution from flooding events were identified as possible key abiotic factors disrupting the balance. The biosphere, hydrosphere, and atmosphere were once again found to be deeply **interconnected**.

Still, hope remained. Areas with better local water quality, stronger biodiversity, and protected zones showed faster recovery. God had built resilience into creation, and at the same time community action to limit pollution may support that recovery.

Curriculum Links Addressed in Section C:
AC9S7U02, AC9S9U03

D) Thinking Questions

Record your responses in your Science Journal.

Years 7 - 8

1. What causes coral bleaching?
2. How do biotic and abiotic factors interact in coral reef systems?
3. What are examples of cooperation in a coral reef?

Years 9 - 10

1. How is coral bleaching an example of a tipping point in ecosystems?
2. Describe how changes in the atmosphere can affect marine ecosystems.
3. How might Christian stewardship principles apply to reef conservation?

E) Hands-on Practical Activities

Choose one of the following:

Option 1 - “Model a Coral Ecosystem” (*All Ages*)

Use paper, clay, or digital tools to model the relationships between coral, fish, algae, and ocean conditions. Include arrows showing carbon and energy flow.

Option 2 - “Sphere Impact Report” (*Years 9 - 10*)

Write a short report describing how coral bleaching could affect at least three of the Earth’s spheres (biosphere, hydrosphere, atmosphere, geosphere). Include a proposed Christian-based action plan for reef care.

Curriculum Links Addressed in Section E:
AC9S7U02, AC9S7I05, AC9S9U03

F) Biblical Connection & Wrap-up

Genesis 2:15 says:

“Then the Lord God took the man and put him in the garden of Eden to tend and keep it.”

This verse reveals our calling as stewards. The reef is beautiful to behold, and it is also a testimony to God's creativity and design. Yet, it is vulnerable. As followers of Christ, we must take responsibility not just in word but in action, protecting ecosystems, reducing pollution, and advocating for wise environmental policies.

Reflection Prompt:

What can you do (individually or as a family) to reduce harm to ecosystems like coral reefs?

Curriculum Links Addressed in Section F:
Spiritual reflection and ethical application to AC9S7U02, AC9S9U03

G) Narration

Retell what you learned today:

- What is coral bleaching?
- What relationships exist within the reef?
- What role do abiotic factors play?
- What does this teach us about God's design and our responsibility?

Curriculum Links Addressed in Section G:
AC9S7I05, AC9S7U02, AC9S9U03

Lesson 7: God's Garden Design - An Introduction to Companion Planting

Curriculum Links

- **AC9S7U02** – Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.
- **AC9TDE8K04** – Analyse how food and fibre are produced in managed environments and how these can become sustainable.

A) Introduction

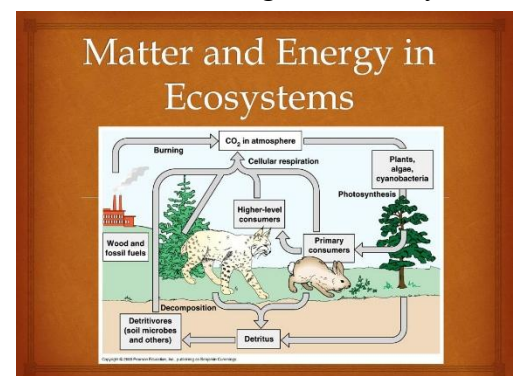
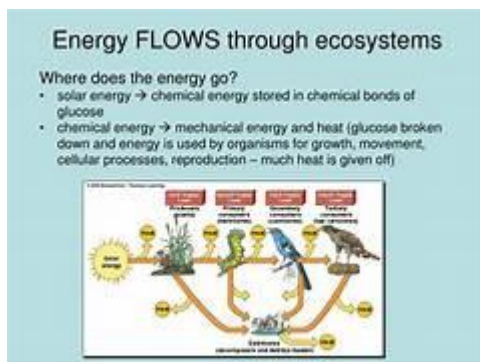
Did you know that some plants grow better when they're placed near certain other plants? This is called **companion planting** – and it's one of the best ways to work with God's design, not against it. Just like people work better in teams, plants too can support one another, protect one another, and even feed one another. Today you'll discover how companion planting reveals God's wisdom in creation.

B) Terminology

Add these words to your Science Journal:

- **Companion planting** - Growing certain plants near each other because they help one another grow.
- **Guild** - A group of plants (and sometimes animals) that work together in a beneficial relationship.
- **Pest deterrent** - A natural way of discouraging pests (e.g., marigolds repelling nematodes).
- **Nitrogen fixing** - The process by which certain plants (like legumes) add nitrogen to the soil.
- **Pollinator-attractor** - A plant that draws bees or butterflies to pollinate nearby crops.
- **Energy flow** – Energy flows through an ecosystem starting from the sun and being absorbed by

producers (like plants). The energy stored in the plant is consumed by animals, and then the animal uses the energy from the plants for heating and movement etc, so the energy then flows out as body heat and is lost in the atmosphere.



C) Informational Story: “The Garden That Worked Together”

Anna and her brother Joel were helping their grandparents set up a garden. Their grandma handed them a diagram with odd groupings: carrots and onions, tomatoes with basil and marigolds, corn with beans and pumpkin.

Joel frowned. “Shouldn’t we put all the carrots together?”

Grandpa smiled. “Not necessarily. God didn’t design plants to grow in perfect rows. He designed them to grow in systems. When plants are near companions, they help each other.”



Anna and Joel began to learn:

- Onions keep bugs away from carrots.
- Basil improves the flavour of tomatoes.
- Beans fix nitrogen into the soil for corn.
- Marigolds keep bad insects away altogether.

They built their garden with guilds, layering plants in a way that mimicked nature. Over time, they saw fewer pests, healthier soil, and bigger harvests. Joel said, “It’s like they’re working together!”

Grandma said, “Just like God designed the body of Christ, each part with its role. Even plants were made to cooperate.”

Curriculum links: AC9S7U02, AC9TDE8K04

D) Thinking Questions

Years 7 - 8

1. What is companion planting, and why is it beneficial?
2. Name two plants that make good companions.
3. How does this reflect God's intelligent design?

Years 9 - 10

1. How does companion planting relate to matter and energy flow in an ecosystem?
2. What are some sustainability benefits of using companion planting instead of chemical inputs?
3. Reflect on how this mirrors spiritual cooperation in the Church or community.

Curriculum links: AC9S7U02, AC9TDE8K04

E) Activities

All Ages:

- Design a companion planting chart for 4 vegetables. Show which ones help each other, and add arrows showing their interactions.

Years 7 - 8:

- Create a planting plan for a small garden bed (1m x 1m) with at least 3 companion pairs. Explain why you chose each pair.

Years 9 - 10:

- Research one traditional agricultural system (e.g., the “Three Sisters” from Native American cultures) and explain how it models companion planting and sustainable design.

Curriculum links: AC9S7U02, AC9TDE8K04

F) Biblical Connection & Wrap-up

Romans 12:4 - 5 says:

“Just as each of us has one body with many members... so in Christ we, though many, form one body, and each member belongs to all the others.”

God’s design in creation echoes His design in His people. Cooperation is not a human invention. It is a divine principle.

G) Narration

Tell your parent or tutor:

- What is companion planting?
 - Give one example of a good plant partnership.
 - How does this relate to God’s wisdom and cooperation?
-

Lesson 8: Designing a Plant Guild

Theme: *From Ideas to Ecosystem Models*
Character Trait: *Cooperation in Design*

Curriculum Links

- **AC9S7U02** - use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations
- **AC9TDE8K04** - analyse how food and fibre are produced in managed environments and how these can become sustainable
- **AC9TDE10P01** - Analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutions.

A) Introduction

Now that you know about companion planting, it's time to design a **guild** – a cooperative planting system. You'll act like a designer, planning a garden that's not only beautiful and productive but also reflects God's wisdom in ecology.

B) Terminology

Add these to your Science Journal:

- **Design brief** - A written plan that outlines the purpose and constraints of a design project.
- **Client need** - The goals or problems the design is meant to address.
- **Functional planting** - Choosing plants for their role (e.g., pest control, nutrient cycling, soil coverage).
- **Zone** - An area in the garden used for a specific purpose.

Curriculum links: AC9TDE10P01

C) Informational Story: “The Orchard Guild”

At a Christian homeschool support group based on the outskirts of a rural town, a group of Year 9 and 10 students met with their tutor at a struggling school farm orchard. The apple trees, though mature, were showing signs of stress. Many of the leaves were spotty or wilted, and the fruit yields had declined over the past few seasons. The soil under the trees had become compacted and dry, and grass grew right up to the trunk of each tree. Pests - especially aphids and codling moth - had become more common, and the group was told that chemical sprays had only made limited improvements.

The students had recently completed lessons on ecosystems, companion planting, and the flow of matter and energy. They knew that ecological balance, when achieved through design rather than chemicals, could lead to sustainability. Their challenge now was to put that knowledge into action by designing a **plant guild** around each apple tree.

They were introduced to the idea of a **guild** by a local permaculture designer named Mr Andrews. He explained that in nature, plants rarely grow in isolation. Forests thrive because of their **diversity and**

cooperation – plants, fungi, animals, and insects all contribute something to the whole. In the same way, a plant guild is a group of species selected for how well they function together in supporting a central plant, such as a fruit tree.

“Think of it as a **designed ecosystem**,” he explained. “Each species is chosen for a **function** – one might attract pollinators, another might deter pests, and another might improve the soil. Together, they form a system that is more resilient and productive than the tree on its own.”

Step 1: The Design Brief

Mr Andrews asked the students to begin by writing a **design brief**, just like professional designers would. They were to consider:

- **Client need** – In this case, the goal of improving tree health, reducing pest pressure, and making the system low-maintenance and chemical-free.
- **Design constraints** – The existing trees couldn’t be moved. The budget was limited. The design had to work in a hot-summer/cool-winter climate with limited irrigation.
- **Functionality** – Each species they selected needed to serve a function that contributed to the health and productivity of the system.

The students worked in small groups, listing out the problems: pest infestation, poor soil, lack of biodiversity, and low yield. Then they listed potential solutions. From there, they began to plan.

Step 2: Choosing Functional Plants

One group focused on **soil health**. They learned that **comfrey**, with its deep taproots, could mine nutrients from deep in the soil and bring them to the surface in its leaves. When chopped and dropped around the tree as mulch, comfrey would break down quickly and feed the topsoil. Its flowers also attracted pollinators.

Another group chose **garlic and chives** as a pest-repelling border. These alliums released sulphur-containing compounds that discouraged aphids and beetles.

A third group planted **nasturtiums** as a sacrificial crop. These cheerful orange and yellow flowers attracted aphids away from the fruit tree and created a ground cover that cooled the soil and suppressed weeds. Their peppery leaves were edible too – a bonus for the students who were learning to harvest from their garden.



Some students suggested **herbs like dill and fennel**, which attract parasitic wasps and hoverflies – natural enemies of aphids and caterpillars. Others recommended **legumes**, like lupins or clover, to fix nitrogen in the soil and reduce the need for fertiliser.

They carefully recorded the **function** of each plant in a table:

Plant	Function	Benefit to the System
Comfrey	Dynamic accumulator	Feeds soil, attracts pollinators
Garlic	Pest deterrent	Repels insects
Nasturtium	Trap crop + ground cover	Distracts pests, cools soil
Clover	Nitrogen fixer	Improves soil fertility
Dill	Attracts beneficial insects	Reduces pests through natural predators

Step 3: Mapping Zones and Patterns

Next, the students drew **zone maps** around the apple tree. Mr Andrews explained that the way plants were **spatially arranged** mattered. Some plants needed full sun, while others could handle the shade beneath the tree canopy. Some should be in a ring close to the trunk to act as living mulch; others could be planted further out in a spiral to attract beneficial insects from the surrounding landscape.

They also thought about **vertical layers** – ground covers, herbaceous layers, shrubs, and the central tree. By occupying multiple layers, they were mimicking the structure of natural ecosystems, which capture more sunlight and use space more efficiently.



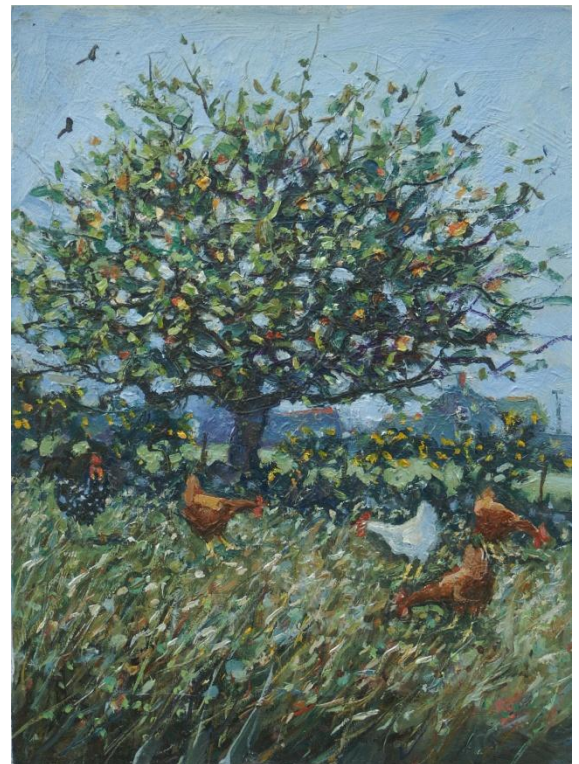
This was the science of **ecological design** – looking at how energy (sunlight), matter (nutrients, water), and organisms (plants, animals, microbes) interact. The students had studied **food webs** before, but now they were building one. While thinking about predators and prey, they were modelling how **energy flowed** from the sun to producers (plants), and how **nutrients were cycled** through decomposition, animal droppings, and nitrogen-fixing bacteria.

Step 4: Adding Animals and Microorganisms

One group asked if they could add **chickens** to the system. Mr Andrews was delighted. “That’s a great example of a multifunctional component,” he said. Chickens could scratch the ground to reduce compaction, eat fallen fruit (breaking pest cycles), fertilise the soil with their droppings, and even help manage weeds.

The students researched **how often to rotate** chickens through the orchard so that they didn’t damage the roots or overgraze the understory. They learned that **timing** was crucial – letting chickens in after harvest, but before new blossoms emerged, helped maintain balance.

Another student mentioned **mycorrhizal fungi**, which live in the soil and form partnerships with tree roots. “Fungi are the hidden network that connects the system,” Mr Andrews said. “They help trees absorb more water and nutrients – especially phosphorus. Without healthy fungi, your trees will always be missing something.”



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This led to a discussion on **abiotic factors** such as temperature, water availability, sunlight, and soil pH – all of which affect how the guild functions. If one factor changed, such as a drought or heatwave, the whole system might shift. This reflected the **interdependence** that God wove into creation, and it reminded the students that their design had to be **resilient and adaptable**.

Step 5: Evaluation and Observation

Over the next few months, the students monitored the orchard guilds. They collected data on:

- Leaf health and insect damage
- Soil moisture and mulch breakdown
- Presence of pollinators and bird species
- Tree growth and fruit production

They noticed that aphid populations declined without the need for chemical sprays. More bees and butterflies visited the orchard, and the mulch helped retain moisture during the summer. Some guilds needed adjustment – nasturtiums had spread too far in one area, and some garlic had died in heavy clay soil. But instead of giving up, the students made **iterative design changes**. [‘iterative’ = continuously improving a concept].

They wrote reports reflecting on their **design decisions**, what worked, and what didn’t. They learned that ecosystems are not machines – they are living, dynamic systems that respond to change. Design is never finished – it is a cycle of **observe, evaluate, adapt**.

God’s Wisdom in Design

As they stood under the apple trees, watching a family of blue wrens dart through the branches, one student commented, “This feels like a little forest now.” Mr Andrews smiled. “That’s exactly the point. You’ve designed something that reflects how God made the world to work through relationships, cycles, diversity, and cooperation.”

Another student added, “And it doesn’t just help the trees. It helps everything – the soil, the bugs, the birds – even us.”

Their final report concluded: “Our guild design helped restore health to the orchard. But more than that, it taught us that stewardship means working with God’s design, not against it.”

Curriculum links: AC9S7U02, AC9TDE8K04, AC9TDE10P01

D) Thinking Questions

Years 7 - 8

1. What is a plant guild?
2. What role did each part of the guild play in the orchard?
3. Why was it better than just using fertilisers or pesticides?

Years 9 - 10

1. Write a short design brief for a small edible garden. Include purpose, needs, and your goals.
2. What are the benefits of analysing systems before planting?
3. Reflect on how thoughtful design mirrors God’s wisdom in creation.

Curriculum links: AC9S7U02, AC9TDE10P01

E) Hands-on Practical Activities

All Ages:

- Draw a diagram of a simple fruit tree guild (tree + 3 to 5 supporting plants). Label each part's function.

Years 7 - 8:

- Write a basic design brief for a vegetable guild garden. Include a simple sketch and a short list of plant companions.

Years 9 - 10:

- Create a full garden design plan including zones, plant species, functions, and justification. Use real or proposed measurements.

Curriculum links: AC9S7U02, AC9TDE10P01

F) Biblical Connection & Wrap-up

Genesis 1:11:

“Then God said, ‘Let the land produce vegetation... plants bearing seed...’ and it was so.”

God’s design for plants was both creative and functional. When we design gardens that reflect that cooperation, we are learning to be godly stewards and co-creators in His image.

G) Narration

Tell your parent or tutor:

- What is a guild?
 - How does each plant in your design support the system?
 - Why is a good design brief important?
-

Lesson 9: Analysing Real-World Companion Planting Systems

Theme: *From Observation to Application*

Character Trait: *Cooperation in Stewardship*

Curriculum Links

- **AC9S7U02** - use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations
 - **AC9TDE8K04** - analyse how food and fibre are produced in managed environments and how these can become sustainable
 - **AC9TDE10P01** - Analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutions.
-

A) Introduction

Today you'll observe real-life examples of companion planting and analyse them like a designer or ecologist would. God invites us not only to enjoy creation but to study and learn from it. Observation leads to wise design.

B) Terminology

Add these to your journal:

- **Evaluation** - Judging the effectiveness of a system.
- **Observation journal** - A record of what you see, measure, or experience in a system.
- **Input/output** - What goes into a system (labour, water, fertiliser) and what comes out (yield, beauty, biodiversity).

Curriculum links: AC9S7U02, AC9TDE10P01

C) Informational Story: “Backyard Diversity”

Ella stood at the edge of Garden A with a clipboard in hand. The sun was already warm, and the rows of silverbeet, beans, and broccoli were neatly aligned, all in tidy monoculture beds. To the casual observer, this garden might have looked well-organised. Ella's goal was more than just to admire the layout - she was here to evaluate it.

This school term, her Science and Technology project required her to *observe*, *record*, and *analyse* three different backyard gardens. She would look at how different systems used companion planting



(or didn't), how matter and energy flowed through the systems, what pests or pollinators were present, and whether the gardens showed signs of sustainability or stress. She wanted to report her findings - but more than that, she was excited about applying what she learned to a real-world design.

Her first stop: **Garden A.**

Garden A: The Conventional Layout

Ella jotted down a few notes.

- *Input: sprinkler irrigation system; synthetic fertiliser spread recently; evidence of recent pesticide use (white residue).*
- *Output: moderate crop yield, visible pest damage on brassicas, minimal bee activity.*

As she crouched near the broccoli, she noticed tiny white moths fluttering up. On closer inspection, caterpillars had chewed through several leaves. She counted only two bees in ten minutes of observation. The soil looked dry and crusted where it wasn't mulched.

Ella sketched a quick diagram of the garden layout: all single crops, planted in long straight rows with bare ground between.

"This system seems high in input and low in biodiversity," she wrote. "No flowering plants for pollinators. Heavy reliance on chemicals. Probably vulnerable to pests."

Then she moved on.

Garden B: The Companion Patch

Garden B belonged to a local family who grew food for their own household. It looked less orderly than Garden A, but as Ella stepped through the rustic gate, a very different scene met her eyes.

Tomato plants sprawled up bamboo stakes, surrounded by marigolds with bright orange blooms. Basil and thyme peeked from under the tomato foliage. Carrots pushed up feathery tops nearby, and lettuce formed a soft border. Bees buzzed from flower to flower, and ladybugs dotted the tomato stems. A tiny lizard darted into the mulch as she walked past.

Ella smiled and began her record.

- *Input: compost and worm tea; rainwater from tanks; mulch; manual weeding.*
- *Output: high yield; low pest presence; visible pollinator and predator insects; fragrant, rich soil.*

She crouched and examined the soil. "Crumbly, dark, full of life," she muttered. "Smells earthy, not dry."

This garden had used *companion planting* principles intentionally. Tomatoes and basil not only grew well together but enhanced each other's flavour and growth. Marigolds are known to repel nematodes and other soil pests. Lettuce, growing low and leafy, helped reduce weed growth and kept the soil shaded. Every plant had a role.

“Pollinators are thriving,” she added. “And I see ladybugs and spiders - good biological pest control. Low chemical use, high biological cooperation.”

She drew a map of the garden and made arrows showing how energy (sunlight), water, and nutrients cycled through the system. She also noted how decomposing leaves, food scraps turned to compost, and root debris all returned to the soil - *a semi-closed loop*.

“This garden uses *biological inputs* and supports its own pest control network,” she wrote. “Sustainable, balanced, efficient.”

Garden C: Raised Bed Ecosystem

Her final stop was **Garden C**, a rooftop vegetable garden at her aunt’s apartment building. At first glance, it looked like a mosaic of raised beds filled with herbs, vegetables, and edible flowers. But as Ella stepped closer, she noticed something special—each bed was a little *system* of its own.

One bed had beans climbing up a trellis, with strawberries growing at the base. Another mixed kale, chives, and calendula. The soil was thickly mulched with sugarcane mulch and coconut fibre. She saw drip lines tucked beneath the mulch, providing water directly to the roots. In a shady corner, ferns and mint thrived under the canopy of eggplants.

- *Input: captured rainwater; organic matter; slow-release organic fertilisers; hand weeding.*
- *Output: consistent harvest; minimal pest damage; rich soil; visual beauty and community engagement.*

Ella recorded that Garden C’s main design principle was *microclimate management*. By planting densely and mixing plants with different heights and needs, the garden shaded its own soil, reduced evaporation, and maximised space. The shade-tolerant herbs grew under taller crops, while exposed beds had sun-lovers like zucchini and rosemary.

She was especially impressed with how the system reduced water use. Instead of watering everything from above, the drip irrigation system sent water straight to the roots where it was needed most. With thick mulch, water loss through evaporation was minimal.

“This garden uses *design thinking* to manage abiotic factors like sunlight, heat, and water,” she noted. “It mimics a natural forest floor in miniature.”

The Final Report: Patterns of Sustainability

Back at home, Ella sat at her desk with all three garden diagrams spread out. She’d added symbols for sunlight, water flow, insect traffic, and energy sources. She could now clearly compare them using a model of *inputs* and *outputs*.

- **Garden A:**
High artificial input, low biological diversity, fragile system, chemical-dependent.
Abiotic factors (heat, water) poorly managed. Lacked natural pest control. High vulnerability.
- **Garden B:**
Moderate input, high biodiversity, natural pest resistance, low water use.
Biotic factors (predators, pollinators) actively supported. Plant guilds well-structured.

- **Garden C:**

High design complexity, efficient water use, strong cooperation between species.

Used space creatively; abiotic and biotic elements considered in tandem. Very sustainable.

She labelled each diagram with symbols for matter flow (compost, nutrients, biomass) and energy flow (sunlight capture, growth, decay).

As a Year 9 student, she was especially interested in the **systems thinking** behind Garden C. She began drafting a *design brief* that would combine the best of Garden B's biological interactions with Garden C's thoughtful spatial and water management.

Lessons from Observation

In her final written reflection, Ella wrote:

“The more diverse the garden, the more stable and productive it becomes. Gardens that imitate natural ecosystems require fewer synthetic inputs and support a greater range of living organisms. Companion planting works because it enhances cooperation between plants, insects, soil microbes, and the gardener.

In science, real-world observation is a foundation for accurate models. In design, real-world examples help us see what works and why. Through observing, recording, and evaluating actual systems, we learn how to build new ones that reflect sustainability, beauty, and the wisdom of creation.

Stewardship means we don't just consume - we study, plan, and create solutions that honour the complexity and harmony God has built into nature.”

She included graphs of water use, pest observations, and pollinator counts. She even built a simple **food web diagram** to show how the creatures in Garden B formed an interdependent system - plants, herbivores, predators, decomposers - all part of the same flow of matter and energy.

Curriculum links: AC9S7U02, AC9TDE8K04, AC9TDE10P01

D) Thinking Questions

Years 7 - 8

1. What did Ella observe in Garden B that helped reduce pests?
2. How did Garden C save water and increase productivity?
3. What can you learn from her observations?

Years 9 - 10

1. How would you evaluate the inputs/outputs in each garden?
2. How would you improve Garden A using a guild or design system?
3. Why is real-world observation important in science and stewardship?

Curriculum links: AC9TDE10P01, AC9S7U02

E) Hands-on Practical Activities

All Ages:

- Visit or watch a video about a diverse garden. Record plant types, visible insects, and layout. Sketch what you observe.

Years 7 - 8:

- Choose a companion planting system (e.g., tomato + basil) and try it in a small container or bed. Record your process.

Years 9 - 10:

- Conduct a mini field study of your own garden or a public site. Create a report or presentation analysing its sustainability and cooperation.

Curriculum links: AC9S7U02, AC9TDE10P01

F) Biblical Connection & Wrap-up

Ecclesiastes 4:9 - 10:

“Two are better than one, because they have a good return for their labour.”

Even in gardening, this proves true. Diversity, cooperation, and intelligent design mirror God's heart for fruitful, sustainable living.

G) Narration

Tell your parent or tutor:

- What differences did Ella find between gardens?
- What makes a planting system sustainable?
- How can observation guide better design?

WEEK 4

ORGANIC GARDEN DESIGN PRINCIPLES

Lesson 10: What Makes a Garden ‘Organic’?

Theme: *Working with Creation, Not Against It*

Character Trait: *Cooperation*

Curriculum Links

- **AC9TDE8K04** - Analyse how food and fibre are produced in managed environments and how these can become sustainable.
- **AC9TDE8P01** - Analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes to create designed solutions.

A) Introduction

What does it mean for a garden to be “organic”? In an ‘organic’ system, we try to minimise chemicals such as pesticides and artificial fertilisers, in favour of natural methods. It involves working with creation as God designed it. Organic gardens rely on **natural cooperation** between soil, plants, animals, and the gardener to produce food sustainably and ethically.

B) Teaching of Terminology

Write these terms in your Science Journal:

- **Organic gardening** - A method that uses natural processes and avoids synthetic chemicals.
- **Sustainability** - Producing food without depleting natural resources or harming the environment.
- **Inputs** - What goes into a system (e.g., compost, mulch, labour).
- **Outputs** - What comes out of a system (e.g., vegetables, weeds, waste).
- **Soil fertility** - The ability of soil to provide nutrients for plant growth.
- **Closed loop** - A system where waste is reused instead of thrown away.

Curriculum links: AC9TDE8K04, AC9TDE8P01

C) Informational Story: “Grandma Ruth’s Garden”

Liam stepped carefully over the stone path into Grandma Ruth’s garden, the early morning sun slanting through grapevines and over the tops of corn stalks. He had come to stay with Grandma for the winter school holidays and was hoping for some quiet time with video games. Instead, he was quickly drafted into helping in her garden.

It wasn’t just any garden. Grandma Ruth had a reputation in town for producing baskets of vegetables that tasted better than anything from the shops. “Organic,” she always said with a twinkle. “The way God made it to be.”

But Liam didn’t know exactly what *organic* meant.

As they stood beneath an apricot tree with a compost bucket in hand, Liam asked, “Why do you call it ‘organic’ gardening? Is it just about not using chemicals?”

Grandma smiled. “That’s part of it. But it’s much more. It’s a way of cooperating with creation - God’s creation. It’s about designing a little ecosystem where the soil, the plants, the animals, and even the waste all work together. It’s a bit like a team sport. Every player has a role.”

Liam frowned. “What kind of team has worms and weeds?”

“The kind that feeds you!” she laughed.

Designing a Living System

Grandma Ruth began to walk Liam through the garden. “Let’s start with the soil,” she said. “People often think plants just need water and sunlight. But soil is where the real magic happens.”

She scooped up a handful of dark earth and held it out. “This isn’t just dirt. It’s alive. There are billions of microbes in a single teaspoon—bacteria, fungi, protozoa, and more. They help break down organic matter and release nutrients in a form that plants can absorb.”



“So it’s like... little factories?” Liam asked.



“Exactly,” she said. “But they need fuel. That’s where *inputs* come in. In an organic garden, we don’t use synthetic fertilisers. We feed the soil with compost, worm castings, rotted manure, leaf litter—things that came from life and return to it. It’s a *closed loop system*—what goes out eventually comes back in.”

She showed him a corner where last season’s garden scraps were piled up. “That’s our compost. It’s full of carbon-rich ‘browns’ like straw and dried leaves, and nitrogen-rich ‘greens’ like food scraps and grass clippings. Mixed properly, the microbes heat it up and

break it down.”

Liam peered at the steaming pile. “Looks gross. But it smells like the forest.”

“That’s how you know it’s working,” said Grandma. “Healthy compost smells earthy, not rotten. And when it’s ready, it’s black gold for the soil.”

Inputs and Outputs: The Design Loop

Liam sat under a lemon tree while Grandma fetched a notebook. “Now let’s think like scientists. Every system has *inputs* and *outputs*. In a conventional garden, inputs might include chemical fertilisers, pesticides, treated water, and fuel for machinery. The outputs might be vegetables—but also pollution, degraded soil, and chemical runoff.”



“In an organic garden,” she continued, “our inputs are natural and mostly renewable. Things like compost, mulch, rainwater, physical labour, chicken manure, and natural pest deterrents. Our outputs? Vegetables, yes - but also seed-saving, enriched soil, and biodiversity. And we aim to return the outputs back into the system wherever possible.”

She drew two columns in her notebook and labelled one “Inputs” and the other “Outputs.”

Inputs: Compost, mulch, rainwater, sunlight, labour, chicken manure, companion plants

Outputs: Vegetables, fruit, weeds, food waste, seeds, excess plant matter

“You see,” she said, “this design mimics what happens in the wild. There are no rubbish bins in the forest. Everything has a purpose, and nothing is wasted.”

Cooperation in Creation

As they weeded the strawberry patch, Liam asked about bugs. “Why don’t you use spray to kill the aphids?”

“Because that kills more than just aphids,” said Grandma Ruth. “It wipes out beneficial insects too - like ladybugs and bees. Instead, I plant flowers like marigolds and nasturtiums that naturally repel pests or attract the good bugs.”



She pointed to a nearby patch. “Those sunflowers bring in predatory wasps that help control caterpillars. And basil confuses pests who want to chew on my tomatoes.”

Liam looked puzzled. “So some plants help others?”

“That’s called *companion planting*,” she explained. “God designed plants to cooperate. Just like people, they can support each other when they’re planted wisely. Corn provides support for beans to climb, and beans return nitrogen to the soil for the corn.”

Liam blinked. “That’s smart. Like teamwork.”

“Exactly. It’s a design based on cooperation, not domination. We don’t just force things to grow; we work with what’s already designed to function together.”

Natural Fertility, No Chemicals

Later, they visited a raised garden bed where green leafy vegetables thrived.

Liam pointed to a row of kale. “What’s that white powder on the leaves?”

“That’s diatomaceous earth—just crushed fossil shells. It scratches the skin of soft-bodied insects like slugs. It’s not poisonous. It’s a *physical deterrent*. That’s another principle of organic gardening: instead of poisoning pests, we manage them in ways that don’t harm everything else.”

She gestured to a row of broad beans. “And these fix nitrogen into the soil with the help of bacteria in their roots. When I cut them down, I leave the roots in place. It feeds the next crop.”

“Why not just use fertiliser?” asked Liam.

“Because artificial fertilisers may give fast results, but they weaken the soil’s natural biology. Over time, the soil becomes dependent and degraded. Then you need more and more chemicals. It’s like giving sugar to a child instead of healthy food.”

She added, “God gave us natural systems that renew themselves. It’s our job to keep them balanced.”

Diversity and Resilience

They walked past a tiny pond where frogs croaked under lily pads.

“Why the pond?” Liam asked.

“For frogs. And frogs eat slugs and mosquitoes,” said Grandma. “The more diversity you have, the stronger the system. If one thing goes wrong, others can fill the gap. That’s called *resilience*.”

“In a monoculture - a garden with only one type of crop - one pest can wipe out everything. But here, because we plant many kinds of vegetables, flowers, and herbs, there’s always something thriving.”

Liam nodded. “So a healthy garden is kind of like a healthy church body - lots of different parts working together.”

“Beautifully said,” Grandma smiled.



Designing with Ethics and Care

That afternoon, Grandma and Liam sat at the table designing a new section of garden.

“Let’s apply some design principles,” she said. “In organic gardening, we think carefully about:

1. What are the needs and opportunities?
2. What materials and tools will we use?
3. What processes will help us meet the need sustainably?”

They decided to build a raised bed for root vegetables. Liam listed what they needed: untreated timber, compost, mulch, seeds, and hand tools. Grandma helped him think through the placement to ensure it got morning sun, wasn’t too close to the chicken coop, and could be watered with rain runoff from the shed.

“This is what *designing solutions* means,” she said. “It’s not just making something - it’s thinking about long-term impacts, ethics, sustainability, and stewardship.”

Faithfulness in the Small Things

That evening, they sat down to a dinner of roast vegetables - all from the garden.

“This tastes amazing,” Liam said. “Like, *really* fresh.”

“Because it’s full of life,” said Grandma. “And because we cooperated with God’s design, not worked against it. This garden is more than food. It’s a way of showing obedience to God’s command to ‘tend and keep’ the earth. Even the smallest compost pile is part of a bigger story.”



Liam thought back on the day - worms, bugs, sunflowers, compost, and cooperation. It hadn’t been the holiday he expected. But somehow, it felt like it mattered.

“I think I want to try this at home,” he said.

Grandma smiled. “That’s the spirit. That’s how good design grows - one faithful gardener at a time.”

Curriculum links: AC9TDE8K04, AC9TDE8P01

D) Thinking Questions

Years 7 - 8

1. What are the key differences between organic and conventional gardening?
2. How does compost help plants grow?
3. What role do living organisms play in soil health?

Years 9 - 10

1. Analyse the inputs and outputs of Grandma Ruth’s system. What makes it sustainable?
2. How could synthetic chemicals disrupt the natural balance in her garden?

3. How can working with God's creation be an act of obedience?

Curriculum links: AC9TDE8K04, AC9TDE8P01

E) Hands-on Practical Activities

All Ages

- Create a compost jar or pile. Track what organic materials you add and observe changes.

Years 7 - 8

- Create a table listing inputs and outputs of an organic garden. Label each as renewable/non-renewable.

Years 9 - 10

- Write a short analysis comparing organic and conventional gardening in terms of sustainability, ethics, and cooperation.

Curriculum links: AC9TDE8K04, AC9TDE8P01

F) Biblical Connection & Wrap-up

Genesis 2:15:

“Then the Lord God took the man and put him in the Garden of Eden to tend and keep it.”

To “keep” the garden means to guard, protect, and nurture it. Organic gardening is a way to reflect that calling, preserving life, reducing harm, and working with God's processes, not against them.

G) Narration

Tell your parent or tutor:

- What is organic gardening?
 - What makes it sustainable?
 - How does it reflect God's original design?
-

Lesson 11: Designing an Organic Garden System

Theme: *From Principles to Plans*

Character Trait: *Cooperation in Planning* –

Curriculum Links

- **AC9TDE8P01** - analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes to create designed solutions
 - **AC9TDE8P02** - Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools.
 - **AC9TDE10P01** - analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment to create designed solutions
-

A) Introduction

Designing a garden involves more than merely digging and planting. It starts with a **plan**, and that plan must reflect your purpose, needs, and God’s natural systems. Today you’ll practise creating a garden design that uses organic methods and works with the land.

B) Terminology

Add to your journal:

- **Design plan** - A visual and written plan showing how a system will be built.
- **Iteration** - Repeating a process to improve a solution.
- **Function-based layout** - Organising a space based on purpose (e.g., compost zone, planting zone).
- **Edge effect** - In ecosystems, edges between systems (e.g., garden to bush) are often the most productive. Designers use this principle to increase biodiversity.

Curriculum links: AC9TDE8P01, AC9TDE8P02, AC9TDE10P01

C) Informational Story: “The School Garden Blueprint”

At Hope Christian School, nestled at the edge of farmland and bush, a group of Year 7 to 10 students stood staring at an empty, weed-covered corner of the school grounds. It wasn’t much to look at – uneven ground, patchy soil, a scattering of wild grass and stones – but their science and technology tutor, Mrs Horne, saw potential.

“Designing an organic garden isn’t just digging holes and dropping in seeds,” she told them. “It requires us to understand needs, choose materials carefully, plan how space is used, and above all, to cooperate with God’s creation.”



With that, she introduced their new design project: to transform this neglected area into a thriving, **function-based organic garden** – a space that would be productive, beautiful, and educational.

Step 1: Understanding Needs and Writing a Design Brief

Before they drew a single line on paper, the students had to define their **design brief**. What was the purpose of this garden? Who would use it? What would it grow?

They began by interviewing teachers, the school cook, and the groundskeeper. The cook requested herbs and greens for school lunches. The science teacher hoped it could become a living lab. Students wanted somewhere peaceful to learn outdoors. From this, they defined several key needs:

- Provide fresh produce for meals.
- Be a habitat for pollinators and small wildlife.
- Require minimal chemicals and external inputs.
- Be easy to access and maintain.
- Incorporate features for learning and observation.
- Make it a beautiful relaxing place to sit and ponder

They recorded these needs in a shared design document, identifying their **clients** (the school community), the **goals**, and the **constraints** (limited funding, school bell schedules, and exposure to wind from the adjacent paddock).

Step 2: Site Analysis and Base Mapping

The next step was a **site analysis**. They went outside with clipboards, taking notes on sunlight patterns, water runoff, soil quality, and existing vegetation. Using compasses and measuring tapes, they drew a **base map** showing boundaries, paths, and structures. They marked out where shadows fell during morning and afternoon. This data helped them plan **where to place each element**.

For example, the southern corner was shaded most of the day. That will be perfect for a compost station and worm farm. The north-facing side had full sun so it will be ideal for vegetable beds. A windbreak of native shrubs could shelter delicate plants from the westerly winds.

As they observed and measured, they learned how to read the **landscape as a system** – just like in ecosystems, each part of the garden would affect the others.

Step 3: Applying Organic Design Principles

With their base map and brief complete, the students began designing. Mrs Horne introduced them to key organic gardening principles:

1. **Function-Based Layout** – Every part of the garden should have a purpose. They defined “zones” like the **planting area**, **compost system**, **tool storage**, and **pollinator habitat**. These were more than merely random choices – they were based on practical movement and ecological flow. Tools needed to be near the beds. Compost needed to be central but shaded. Water tanks needed to sit at the highest point for gravity-fed irrigation.

2. **Edge Effect** – They learned that **edges**, where two ecosystems meet (like garden to bush, or path to bed), are often the most productive and diverse. Their design increased edges by including curved beds, a herb spiral, and borders of mixed plants. This would support more species and mimic the richness found in nature.
3. **Iterative Design** – “Don’t aim for perfection in your first draft,” Mrs Horne said. “Designers test and revise.” After drawing their first garden plans, they walked the site again and discovered errors: a compost bin would block the morning sun; a proposed path crossed where water pooled after rain. So they adjusted. They tested small sections first, like building a mini raised bed to see how the soil mix would perform. Then they revised the main plan again.

This **iteration** – planning, testing, evaluating, revising – is central to good design.

Step 4: Selecting Materials and Tools

Next came the **materials and tools list**. Students researched options for raised beds. Would they use timber, bricks, or repurposed containers? Which materials were cost-effective, durable, and safe for organic food growing?

For soil, they learned about the importance of **organic matter** such as compost, worm castings, and mulch. “Healthy soil is alive,” one student noted. “It’s more than dirt – it’s a whole ecosystem.” They studied **soil amendments** like lime to balance pH, rock dust to replenish minerals, and seaweed solution for root growth.

They also researched **tools** – choosing between hand tools or larger shovels depending on user size and strength. They even calculated how many wheelbarrow loads would be needed to move compost across the site, and how wide the paths between beds would need to be to allow the wheelbarrow to pass through.

Each group created a **material justification chart**, explaining why each component had been chosen based on function, cost, availability, and sustainability.

Step 5: Planning for Sustainability

From early on, students were taught to view **sustainability as a core goal** of their design - not just environmental but also **social and economic sustainability**.

They designed water-saving systems such as **drip hoses**, **mulch layers**, and **rainwater tanks**. They planned for ongoing nutrient cycles through **composting**, **worm farms**, and **green manure** crops. They also considered **crop rotation** and **plant diversity** to reduce pests without synthetic chemicals.

To make the garden socially sustainable, they created wide, accessible paths for younger students and people with mobility challenges. They labelled each zone in clear lettering, so the garden could also teach others.

Step 6: Digital Representation

For their final task, students turned their hand-drawn plans into digital designs using tools like Google Slides or Canva. They added:

- A **legend** showing each zone or plant type

- Annotations describing the **function** of each feature
- Measurements to scale
- Images or symbols for clarity

This helped them communicate their ideas clearly – a key skill in any design process.

Step 7: Construction and Reflection

When it came time to build the garden, the students worked in rotating teams – digging, hauling compost, planting, and installing signs. As they worked, they saw their plans come to life – but also encountered unexpected challenges.

Some soil was rockier than expected. One path was too narrow for the wheelbarrow. A water tap leaked. But instead of giving up, they **adapted their design**, widening the path and moving the compost station slightly.



After a few weeks, the garden had become more than just a school project – it was a **collaborative achievement**. The leafy greens and herbs were thriving. Bees buzzed between nasturtiums and lavender. The students stood back, dirty and proud.

In their journals, they wrote reflections:

“Designing the garden taught me how every part affects the others – just like in the body of Christ.”

“Planning first made everything smoother. If we’d just started digging, we would’ve made so many mistakes.”

“It was exciting to see our plan grow into something real. And we did it without harming the land.”

Honouring God through Design

The final verse on their garden sign read:

“Prepare your work outside; get everything ready for yourself in the field...” – Proverbs 24:27

Through this project, the students saw how **planning, design, and cooperation** can be an act of worship. As they learned to work with creation instead of against it, they glimpsed something of God’s order and wisdom.

Their garden was more than a food patch - it was a blueprint of **careful stewardship**, a living testimony to what happens when young people plan with purpose and design with love.

Curriculum links: AC9TDE8P01, AC9TDE8P02, AC9TDE10P01

D) Thinking Questions

Years 7 - 8

1. What elements should be included in a garden design plan?
2. Why is testing and adjusting a plan important?

Years 9 - 10

1. Write a sample design brief for a 3x3m organic garden space.
2. What considerations would you include to make your design sustainable and productive?

Curriculum links: AC9TDE8P01, AC9TDE8P02, AC9TDE10P01

E) Activities

All Ages

- Draw a simple garden layout including at least 4 different zones or plant types. Label each with its function.

Years 7 - 8

- Use a digital tool (e.g., Canva, Google Slides, or drawing app) to create a to-scale garden plan.

Years 9 - 10

- Develop and annotate a design plan that includes:
 - Goals and needs
 - Zone planning
 - Materials/tools
 - Sustainability strategies

Curriculum links: AC9TDE8P02, AC9TDE10P01

F) Biblical Connection & Wrap-up

Proverbs 24:27:

“Prepare your work outside; get everything ready for yourself in the field...”

God encourages careful preparation. When we plan our gardens with wisdom, stewardship, and attention to detail, we reflect His order and creativity.

G) Narration

Explain to a parent or tutor:

- What did you learn from this lesson?
 - What was your design goal?
 - How does your plan reflect sustainability?
 - What did you learn from the planning process?
-

Lesson 12: Evaluating and Improving Garden Designs

Theme: *Testing and Reflecting on Creation*

Character Trait: *Responsibility*

Curriculum Links

- **AC9TDE10P03** - Select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions.
 - **AC9TDE10P04** - Develop design criteria independently including sustainability to evaluate design ideas, processes and solutions.
-

A) Introduction

Good gardeners and good stewards, don't merely make things. They improve them. Today you'll learn how to **evaluate a garden plan or design**, using God-honouring principles like productivity, cooperation, and care.

B) Terminology

Add to your journal:

- **Evaluation criteria** - Standards used to judge the success of a design.
- **Safety procedure** - A method of ensuring safe practices during construction or gardening.
- **Justify** - To explain why a certain material, tool, or method is best.
- **Sustainable outcome** - A result that continues to benefit the environment and community long-term.

Curriculum links: AC9TDE10P03, AC9TDE10P04

C) Informational Story: “Revising the Garden Plan”

Samuel and his younger sister Zoe had spent the past term designing and building a small backyard garden with their homeschool support group. Inspired by permaculture principles and their earlier science lessons on systems and sustainability, they had created a detailed garden plan with planting zones, raised beds, composting bins, and even a native pollinator garden.

They worked hard through autumn and winter to implement their design – measuring spaces, building beds with untreated timber, laying mulch, and planting a mixture of vegetables, herbs, and flowering companion plants. They even created a curved path to increase edge zones and attract biodiversity. By the middle of winter, their garden was thriving with anticipation; but as the months passed, reality taught them that even good plans need adjustment.

When spring arrived, Samuel noticed that some of the leafy vegetables (like lettuce and silverbeet) had become weak and spindly. Zoe pointed out that their lavender was overshadowing the thyme, and a patch of

mint had spread far beyond its original boundary. The raised beds near the southern fence weren't getting enough light, and water tended to pool in the lower-left corner after every rain.

"I thought we'd done everything right," Samuel said in frustration.

"You did a lot right," their dad replied, kneeling beside them with his own journal. "But now comes the part every responsible gardener and engineer must do: **evaluation**."

Step 1: Understanding the Purpose of Evaluation

Their dad reminded them that in both science and design, no solution is final on the first try. Systems (especially organic ones) need to be **tested, observed, and revised**.

"Even God's people, like Moses or David," he said, "had to grow, adjust, and be refined over time. Your garden is no different. It is important to plan for productivity (harvesting produce); but it's also important to consider your personal growth as stewards."

He opened a notebook and wrote the title:

Garden Evaluation: Spring Term

Then he listed some **evaluation criteria** – the standards by which their garden could be judged:

- **Goal achievement:** Did it produce what we intended?
- **Functionality:** Was it easy to use and maintain?
- **Environmental impact:** Did it support biodiversity and soil health?
- **Safety:** Were all tools used appropriately and beds safe to access?
- **Sustainability:** Could the system be maintained with minimal inputs over time?

Together, they walked the garden again, this time looking through the lens of responsibility and refinement.



Step 2: Testing and Observing with a Scientific Eye

Samuel and Zoe began by recording their **observations**. This was their data collection step – an essential part of both science and design technology. They used a checklist to note:

- Which plants thrived and which struggled
- Where water gathered or drained too quickly
- Which zones needed more sun, more compost, or more space
- Where weeds were taking over



They even tracked how long it took to maintain each area, noting that one narrow bed near the fence was almost impossible to weed properly without stepping into the soil.

Zoe noticed that some of their **earlier material choices** (like straw mulch) had decomposed faster than expected, leaving soil exposed. Meanwhile, the paths made of bark chips had worked well, suppressing weeds and allowing access without muddy shoes.

Step 3: Analysing Safety and Sustainability

Next, they focused on **safety**. Their dad prompted them to think about potential hazards:

- Were sharp tools stored safely?
- Did they use gloves and proper posture when lifting heavy things?
- Were there any trip hazards in the layout?

Samuel admitted that he once slipped while watering near the sloped bed. Zoe noted that the mint patch had hidden a brick edging that nearly caused her to trip.

Together, they reviewed the **safety procedures** they had (and hadn't) followed. They made a new **safety checklist** for future gardening days, including gloves, sun protection, safe lifting, tool storage, and water awareness.

Then they considered **sustainability**. They asked:

- Are we improving the soil, or depleting it?
- Can we maintain this system without expensive external inputs?
- Does this garden encourage wildlife, or exclude it?
- Are we wasting water, or conserving it?

They realised that some parts of their garden were **resource-hungry** – needing more water or nutrients than they'd expected. Samuel suggested replacing the water-thirsty plants near the fence with native species that could thrive with less irrigation. Zoe offered to build a **worm tower** in one bed to recycle kitchen waste directly into soil nutrients.

Step 4: Making Justified Improvements

After evaluating the site and reflecting on their experience, it was time to make **improvements**. But this wasn't guesswork. Their dad encouraged them to **justify** every change.

"We don't change things just because they look messy," he said. "We make improvements when we can explain why they will help the system function better."

Using their evaluation notes, they drafted a new plan that included:

- Relocating sun-loving plants to the north-facing beds
- Building a small swale or rain garden in the waterlogged corner
- Containing mint in a pot to prevent spreading
- Widening paths and adding labels for easier access
- Swapping one raised bed's contents for drought-tolerant plants

They also set **new criteria** for the next season:

- Reduce weeding time by 25%
- Increase composting efficiency
- Attract more pollinators with diverse flowering plants
- Keep all areas accessible and hazard-free

They wrote these in their journals under a new heading:

Spring Revision Goals

Step 5: Reflecting on the Process

As the new season began, the family implemented the changes slowly but intentionally. They paused every few weeks to reflect on what was working better and where further tweaks were needed.

Zoe summarised it best in her journal:

“I used to think designing a garden was like painting a picture – you finish it, and then it’s done. But now I know it’s more like tuning an instrument or growing in faith. You test it, listen, adjust, and try again. The changes make it better, and make me better too.”

God's View of Growth and Responsibility

On the last page of their evaluation journal, their dad wrote this Scripture:

“Whoever can be trusted with very little can also be trusted with much.” – Luke 16:10

He explained that in God’s Kingdom, small tasks (like tending a garden) matter. They are opportunities to practice **faithfulness, responsibility, and thoughtful care**. Evaluating and improving our work, whether it's soil, layout, or habits, is part of being good stewards of what God gives us.

The garden wasn’t perfect. But it was **growing**, and so were its designers.

Curriculum links: AC9TDE10P03, AC9TDE10P04

D) Thinking Questions

Years 7 - 8

1. Why is it important to evaluate a garden plan after using it?
2. What changes did Zoe and Samuel make, and why?

Years 9 - 10

1. List five evaluation criteria for your garden design.
2. What changes would you make to improve **safety** or sustainability?

Curriculum links: AC9TDE10P03, AC9TDE10P04

E) Hands-on Practical Activities

All Ages

- Review your past design. Identify what worked well and what could improve.

Years 7 - 8

- Create a checklist of safety rules and equipment for using tools in the garden.

Years 9 - 10

- Write an evaluation report for a real or proposed garden design. Include:
 - What was tested
 - What criteria were used
 - Suggested improvements

Curriculum links: AC9TDE10P03, AC9TDE10P04

F) Biblical Connection & Wrap-up

Luke 16:10:

“Whoever can be trusted with very little can also be trusted with much...”

God honours careful, responsible living, even in the garden. When we assess and improve our work, we grow not just plants, but also **faithfulness**.

G) Narration

Explain to a parent or tutor:

- How did you evaluate your design?
- What changes would you make?
- Why does God care about thoughtful improvement?

WEEK 5

BUILD/PREPARE GARDEN BEDS

Lesson 13: Choosing the Right Garden Bed Design

Theme: *Designing for Purpose, Place, and People*

Character Trait Focus: *Wisdom and Cooperation in Design*

Curriculum Links

- **AC9TDE8K06** - Analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions.
- **AC9TDE8P01** - Analyse needs or opportunities for designing, and investigate and select materials, components, tools, equipment and processes.
- **AC9TDE10P01** - Analyse needs or opportunities for designing; develop design briefs; and investigate, analyse and select materials, systems, components, tools and equipment.

A) Introduction

What kind of garden bed is right for your location, climate, soil, and purpose? Today you will learn to compare **raised beds**, **in-ground beds**, and **no-dig beds**, using a designer's mindset. You'll investigate material properties, water flow, climate adaptation, and labour needs to make a wise decision. But first we will learn about healthy soils.

B) Informational Story #1: *The Living Soil*

Jacob wiped his forehead and leaned on his shovel. The sun was warm, but the breeze kept it pleasant. Around him, students from the homeschool group chatted as they dug, weeded, and spread compost into the raised garden beds.

He turned to Mrs. Vella, their science tutor. "How do we know if the soil is good enough?"

"That's an excellent question, Jacob," she replied, kneeling to scoop a handful of the crumbly brown mix. "Soil is more than just dirt. It's a living system. In fact, it's an ecosystem in itself, full of creatures, nutrients, air, and water."

The students gathered around, curious.



“Let’s think about what soil really is. Good soil has three main parts: sand, silt, and clay. But that’s just the start. It also contains **organic matter**, bits of once-living things like leaves and food scraps. Then there’s the **biotic** part of the soil: bacteria, fungi, worms, and insects. These living things break down organic matter into nutrients that plants can absorb.”

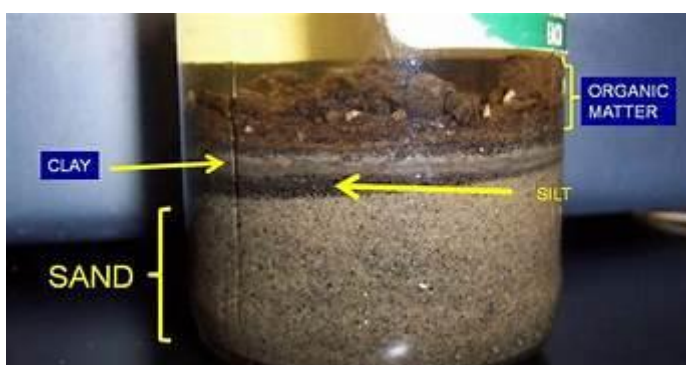
Jacob wrinkled his nose. “So there are bacteria in our soil?”

“Absolutely! And they’re doing God’s work. They recycle matter, transforming dead things into life-giving nutrients. It’s part of the cycle of energy and matter in ecosystems. Just like a food web shows how energy moves through a system, soil shows us how nutrients move.”

Another student, Ava, added, “So compost helps the soil?”

“Yes,” said Mrs. Vella. “Compost is broken-down organic matter. It’s full of nutrients and helpful microorganisms. When we add it to soil, we improve its **structure** - that is, how well it holds water, allows air to flow, and supports roots.”

She pulled out a jar. “Here’s a simple model. This is just water, with soil from one garden bed added. Watch how the sand settles quickly, the silt more slowly, and the clay takes hours. You can model the layers this way.”



Jacob tilted his head. “So, if we want plants to grow well, we need to test and improve the soil?”

“Exactly. We’re preparing a designed solution - a garden bed that supports life. We choose the right tools and materials to make that happen. That includes loosening compacted soil, removing weeds, testing drainage, and adding amendments like compost or even worm castings.”

“Can we use a shovel or a fork?” asked Ava.

“Good question,” Mrs. Vella said. “A garden fork is better for aerating, letting air into the soil without damaging worms. But sometimes, a shovel is better for removing weeds.”

The group moved to another bed. “Let’s observe something,” she said. “This bed has been mulched and fed with compost for six months. Notice the worm castings, the crumbly texture, the sweet smell. Compare it to this untouched bed that is dry, hard, and pale. Which one will support life?”



Jacob didn’t hesitate. “The living one!”



“Exactly,” she said. “Now we get to be stewards of creation - choosing materials, working with the systems God designed, and preparing this soil for the good things to come.”

C) Terminology

Read and understand these definitions:

- **Raised bed** - A gardening method where soil is built up above ground level, often framed with wood or bricks.
- **In-ground bed** - A traditional garden where planting is done directly into the native soil.
- **No-dig bed** - A layered bed built on top of existing ground, usually with compost, mulch, and cardboard.
- **Drainage** - How well water passes through soil or garden structure.
- **Thermal mass** - A material's ability to absorb and retain heat.
- **Load-bearing** - A surface or material that can safely carry weight or support structure.

Curriculum links: AC9TDE8K06, AC9TDE8P01, AC9TDE10P01

D) Informational Story #2: “Three Gardens, Three Goals”

A homeschool co-op was starting a community garden project. Three teams were assigned different locations:

- Team A had rocky, compacted soil on a slope.
- Team B had a flat, fertile patch but poor drainage.
- Team C had shallow soil over concrete near a building.

Each team researched and made a design decision.

Team A chose a **raised bed**, allowing them to bypass the poor ground and control soil quality. They selected rot-resistant hardwood timber and ensured airflow under the structure to prevent rotting. They also installed a drip irrigation system.

Team B used **in-ground beds** but added compost and sand to improve drainage. They shaped beds into slight mounds to keep roots from sitting in water and included mulch to prevent evaporation.

Team C created a **no-dig bed** over the concrete: layers of cardboard, compost, and straw. It required no digging, promoted worm life, and worked well in their confined space.

They recorded their materials, labour time, costs, and water use. Then they presented to the group: each bed had strengths and weaknesses. But all of them reflected **God's principle of working with creation**, not fighting it.

Curriculum links: AC9TDE8K06, AC9TDE8P01, AC9TDE10P01

E) Thinking Questions

Years 7 - 8

1. What are some reasons a gardener might choose a raised bed?
2. How does drainage affect plant health?

Years 9 - 10

1. Compare the advantages and disadvantages of each garden bed type.
2. How do the properties of materials influence your design choice?

Curriculum links: AC9TDE8K06, AC9TDE10P01

F) Practical Activity

Compare and Evaluate Garden Bed Types

Step-by-step:

1. **Research:** Use internet or books to find photos of the three types of beds (raised, in-ground, no-dig).
2. **Compare:** Create a 3-column chart:
 - Column 1: Type of bed
 - Column 2: Materials needed
 - Column 3: Strengths and limitations
3. **Evaluate:**
 - Identify which design would best suit your own garden location.
 - Justify your choice in writing or orally to a parent/tutor.

Extension for Years 9–10:

- Add environmental impact and long-term maintenance to your evaluation.
- Write a short design brief including your site conditions and rationale.

Curriculum links: AC9TDE8P01, AC9TDE10P01

G) Biblical Connection & Wrap-up

Proverbs 24:3 - 4:

“By wisdom a house is built, and through understanding it is established.”

Garden beds, like houses, should be wisely planned. God has given us materials and minds to work in harmony with His world. Your job in life, in whatever you undertake to do, is to build in a way that makes your little part of the world a much better place to live in; but also to build thoughtfully and carefully (with wisdom).

H) Narration Prompt

Summarise what you have learned so far about what makes soil healthy and how compost fits into the cycle of matter in an ecosystem. What tools and materials are used to prepare a garden bed for planting?

Also explain to your parent or tutor:

- What types of garden beds are there?
 - Which would you choose for your space, and why?
 - How does wise design reflect God's character?
-

Lesson 14: Preparing the Ground and Building the Frame

Theme: *From Plan to Build*

Character Trait: *Responsibility*

Curriculum Links

- **AC9TDE8P03** - Select, justify and use suitable materials, components, tools, equipment, skills and processes to safely make designed solutions.
 - **AC9TDE10P03** - Select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions.
-

A) Introduction

Now it's time to get to work. Whether you're using recycled timber, bricks, or straw bales - how you **prepare the ground and construct the frame** will determine the strength and productivity of your garden.

B) Terminology

Add these definitions:

- **Level** - A horizontal line or surface; critical for water flow and frame stability.
- **Square** - Ensuring corners are 90°; important for building accuracy.
- **Safety gear** - Equipment such as gloves, boots, goggles, and hearing protection.
- **Anchoring** - Fixing a structure in place so it won't move in wind or rain.

Curriculum links: AC9TDE8P03, AC9TDE10P03

C) Informational Story: “The Garden Bed Build Day”

On Saturday, Joel and Mia arrived at the site with their parents and tools. Their goal: build two timber-framed raised beds.

First, they cleared grass with hoes and dug out a level base. They used a string line, spirit level, and pegs to check the layout.

Next, they cut recycled hardwood to size using a circular saw (supervised). Wearing gloves and safety glasses, they screwed boards together using brackets and a cordless drill. They double-checked each corner for squareness and filled the base with compost, aged manure, and topsoil.

Mia noted that:

- They chose hardwood for longevity.
- They used screws instead of nails for easy repair.

- They wore steel-capped boots and worked in pairs for safety.

After building, they watered the soil and laid mulch. Their garden was ready. They'd taken a blueprint and turned it into reality.

Curriculum links: AC9TDE8P03, AC9TDE10P03

D) Thinking Questions

Years 7 - 8

1. What steps are important for preparing the ground?
2. Why is it important to check that corners are square and level?

Years 9 - 10

1. What safety procedures are essential when working with timber and tools?
2. Why might you choose screws over nails for your project?

Curriculum links: AC9TDE8P03, AC9TDE10P03

E) Hands-on Practical Activity

Build a Mini Bed Frame or Practice Tools

Option A - Mini Model (All Ages)

1. Use craft sticks or small wood scraps to construct a scale model of a garden bed.
2. Practise checking level and square corners using simple tools (e.g., ruler, string).
3. Write a reflection on what materials and shapes worked best.

Option B - Real Build (Supervised, for all ages)

1. Mark out a 1m x 2m raised bed on your site.
2. Prepare the soil:
Option 1 = remove grass or flip it over so the grass is now underneath the soil, level, dig if needed..or
Option 2 = mow the grass down low, then lay cardboard over the grass so it doesn't grow into the garden.
3. Don't fill the garden bed with soil just yet. Build the frame first, and we will learn how to fill it up in the next lesson.
4. Use safety gear. Build the frame with timber, bricks, or straw (use railway sleepers, wood planks, or recycled pallets)
5. Check for level and strength. Adjust as needed.



Curriculum links: AC9TDE8P03, AC9TDE10P03

F) Biblical Connection & Wrap-up

Ecclesiastes 9:10:

“Whatever your hand finds to do, do it with all your might.”

Building well is an act of worship when done with care, safety, and integrity. Jesus was a carpenter; so He knew how to measure and fit things well. We follow His example when we work with excellence.

G) Narration

Explain to a parent or tutor:

- How did you prepare the ground?
 - What tools and safety gear did you use?
 - What made your frame strong?
-

Lesson 15: Filling the Bed and Preparing for Planting

Theme: *Soil as God's Living Foundation*

Character Trait: *Stewardship*

Curriculum Links

- **AC9TDE8K06** - analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions
 - **AC9TDE8P03** - select, justify and use suitable materials, components, tools, equipment, skills and processes to safely make designed solutions
 - **AC9TDE10P03** - select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions
-

A) Introduction

Soil is more than just “dirt”; it’s a **living system** full of microbes, nutrients, air, and water. Today you’ll learn how to **layer and prepare the soil** inside your garden bed, so it reflects God's wisdom in the way all the needed components work together.

B) Terminology

- **Soil profile** - Layers of soil (topsoil, subsoil, etc.).
- **Worm castings** - Nutrient-rich waste from worms.
- **Green manure** - Fast-growing plants used to enrich soil.
- **Soil structure** - How particles stick together, affecting air and water flow.

Curriculum links: AC9TDE8K06, AC9TDE10P03

C) Informational Story: “Soil First”

Mrs. Ferguson taught the homeschool group that “You can’t grow life in dead soil.” She explained that soil should hold water like a sponge, drain well, and smell sweet (not sour).

They filled their new bed in layers:

- **Optional base for a hügelkultur deep raised bed (60cm deep):** one group decided to try a hügelkultur deep bed, partly filling the deep bed with logs and branches to hold water. This group had watched a youtube video on ‘hügelkultur’. Then, after the branches, they filled up the rest of the bed with layers of compost, soil and mulch like the other students.
- **Building up the soil:** All the students filled their garden bed frames with layers of grass clippings, chook or cow manure (or a sprinkle of ground-up ‘blood & bone’), straw, compost, (and some

students added an optional bag of ‘mushroom compost’). All these layers will decompose to make a rich soil – food for the plants.

- **Top:** rich topsoil (one group also mixed the top-soil with worm castings to enrich it further)
- Because it was late Autumn, and they weren’t going to plant until late in Winter (just before Spring); they sprinkled a green manure mix (mustard, clover) to grow for a few months, and then they would chop it into the garden just before planting.

They used a pH test kit, checked texture, and observed worm activity. They prayed over their work, asking God to bless the invisible life below.

Curriculum links: AC9TDE8K06, AC9TDE8P03, AC9TDE10P03

D) Thinking Questions

Years 7 - 8

1. What does healthy soil look and feel like?
2. Why add organic layers like straw and compost?

Years 9 - 10

1. How do different soil materials contribute to plant health?
2. What is the benefit of building soil over time, not just fertilising?

Curriculum links: AC9TDE8K06, AC9TDE10P03

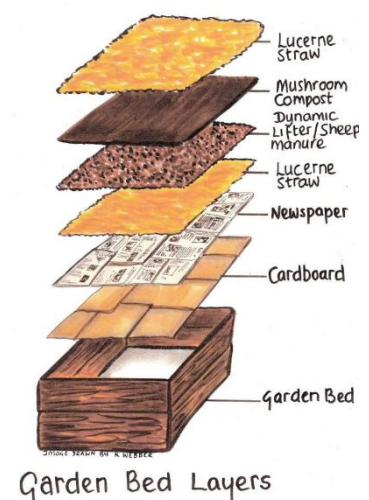
E) Hands-on Practical Activity

Build a Living Soil System

[**Note:** There are two options. i) if you want to try creating a high raised garden bed that is quite deep (eg 50 to 70 cm deep), you might want to experiment with the hügelkultur method where you place branches on the bottom of the bed...or.. i) If you are making a garden bed that is not so deep and not raised up so much (eg., 20 to 40 cm deep); then you would omit putting branches and twigs as a bottom layer, as you haven’t got so much space to fill up.]

Steps: Today we will just create our soil; then in the next lessons select what to plant. No matter what condition your soil is, we will build up good soil to feed the plants.

1. **Layer the bed:** Start with twigs/branches (if you are doing a hügelkultur bed) then grass clippings, compost, aged manure or ‘blood-&-bone’, and topsoil.
2. **Water each layer lightly.**
3. **Optional:** Sow a green manure crop if planting will be months away; or put forest-mulch or sugar-cane straw on top to stop the soil drying out and to conserve water.



Garden Bed Layers

4. **Mulch:** On top of the layers of clippings, manure, compost and top-soil – it is helpful to top it off with a layer of mulch (sugar-cane mulch or lucerne straw or wood shavings) to keep the moisture in the garden. You could do that now, or it might be easier to plant your seeds and seedlings before adding the mulch. Then you can sprinkle it around the plants.
 5. **Record:** Keep a diagram or photo log of each step. [Curriculum links: AC9TDE8P03, AC9TDE10P03]
-

F) Biblical Connection & Wrap-up

Luke 8:15: “But the seed on good soil stands for those with a noble and good heart...”

Jesus used soil to represent our hearts. When we build healthy soil, we are creating a foundation for fruitfulness, both in the garden and in life.

G) Narration

Tell your parent or tutor:

- How did you build your soil layers?
- What is the role of living organisms in the soil?
- Why does healthy soil matter to God?

Lesson 16: What Should We Grow? Choosing Seeds and Seedlings

Curriculum Links (Australian Curriculum v9)

Science

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations

Design and Technologies

- **AC9TDE8K06** - Analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions
- **AC9TDE8P03** - Select, justify and use suitable materials, components, tools, equipment, skills and processes to safely make designed solutions
- **AC9TDE10P03** - Select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions

Lesson Focus:

Students will learn how to evaluate seasonal conditions, garden layout, and nutritional needs in order to select appropriate plants. They will explore how seed packets and seedling labels provide essential data, and how these selections contribute to an interconnected ecosystem.

Key Terminology:

- **Germination** - is the process by which an organism grows from a seed or spore. The term is applied to the sprouting of a seedling from a seed
- **Hardening off** – is the practice of slowly acclimatising young plants to a new environment to prevent them from going into shock
- **Heirloom varieties** – These are plant varieties that have not been genetically modified. They must generally be passed down for decades — typically at least 100 years or so — to be considered heirloom plants.
- **Frost-sensitive** - These varieties of plants feature very little frost tolerance and could be expected to be severely injured or can die once frost hits them.
- **Frost-tolerant** – Frost tolerant plants are those that will, tolerate fairly light frosts.
- **Frost hardy** - Cold hardy plants are the most capable of them all when it comes to cold tolerance. A mature, cold hardy plant can withstand actual freezing temperatures (32F/0C) for a period of time and even temperatures below freezing..
- **Crop rotation** - Crop rotation is the practice of growing a series of different types of crops in the same area across a sequence of growing seasons. This practice reduces the reliance of crops on one

set of nutrients, pest and weed pressure, along with the probability of developing resistant pests and weeds.

- **Companion planting** - the close planting of different plants that are beneficial to each other's growth or protect each other from pests.

A) Introduction

While you were designing your garden beds, you might have decided on which plants to grow (eg., particular kinds of vegetables or flowers). But, now that the garden bed has been built and filled, it's time to review or start thinking about specifics in preparation for a visit to the Garden Nursery or Hardware store. So, today we will learn more about what to grow and what to purchase. God designed plants not only for beauty but for food, medicine, and healing (Genesis 1:29). Choosing the right plants helps us become stewards of creation by planning wisely, nourishing others, and considering how different plants cooperate in a garden ecosystem.

B) Informational Story: *Seeds of Purpose*

Mrs. Vella stood next to a table loaded with packets and punnets. She held up a small brown packet with bright green lettering.

"This," she announced, "is basil."

Jacob squinted at the label. "It says 'full sun, well-drained soil, plant after frost.' Does that mean we can plant it now?"

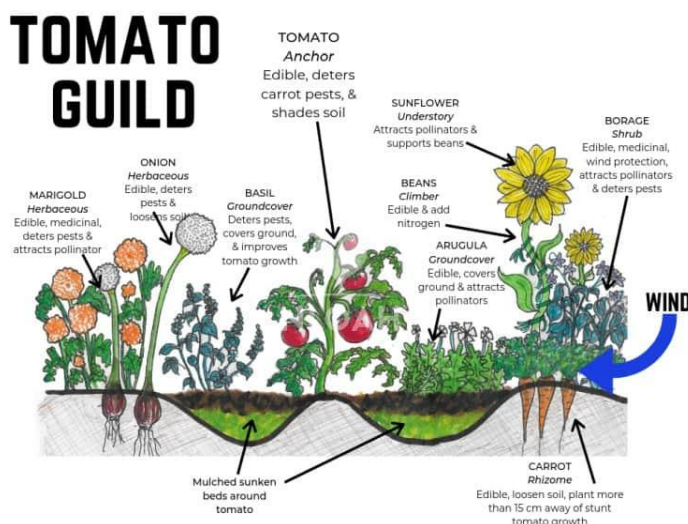
"That depends," said Mrs. Vella. "Have we had the last frost for the season?"

The students looked at each other. "Probably," Ava guessed. "It's been getting warmer in the last few weeks."

"Exactly," their tutor nodded. "So, this plant is a warm-season herb. It doesn't like cold roots. What else can we learn from the packet?"



Jacob read aloud. "Days to harvest: 60. Companion plant: tomatoes."



Mrs. Vella smiled. "Great information! That means basil will be ready in about two months. And it grows well next to tomatoes - they protect each other from pests. The farmer down the road, also mentioned Marigold flowers help keep tomatoes healthy. The Marigold flower has a strong smell that moths and other pests do not like. Marigolds also trap and kill parasitic root knot nematodes. He said the toxins in the Marigold roots seem to kill the nematode before it grows and reproduces".

She picked up another packet. “Now look at carrots. They grow underground, so they take longer to develop, and they don’t like being transplanted. It is best to sow the seeds directly into the soil. Meanwhile, lettuce can be transplanted as seedlings and harvested much sooner.”

Ava pointed to a small label on a punnet. “This one says ‘hardened off.’ What does that mean?”

“It means these seedlings were prepared for outdoor conditions. You can plant them straight into the garden without acclimating them gradually. If they weren’t hardened off, you’d leave them outside during the day and bring them in at night for a few days.”

The group divided into small teams to study plant options. Some had a list of vegetables and herbs they liked to eat. Others were interested in pollinator-friendly flowers or companion planting.

Jacob’s team made a chart with three categories: *Seed*, *Seedling*, and *Avoid for Now*.

“I think we should grow spinach, lettuce, bush beans, and marigolds,” Ava said. “Lettuce grows quickly, beans are good nitrogen fixers (they put nitrogen back into the soil), and marigolds repel bugs.”

“Let’s double-check the sun requirements,” Jacob added. “We get full sun most of the day.”

They opened a seed catalogue and found icons for frost tolerance, sunlight, and harvest time. They talked through what grew best in cooler vs. warmer months and thought about how they’d space things in the garden bed.

“Okay,” said Mrs. Vella at the end, “Each group will present their plant choices and explain why they selected each one. You need to justify your decisions: nutrient needs, growing time, how plants interact, and how they fit in your available space.”

Jacob stood tall. “We chose things that work together and give us harvests at different times. That way, we’re using our space efficiently and cooperating with how God designed plants to grow in seasons.”

“Perfect,” Mrs. Vella said. “You’ve made a wise design decision.”

C) Narration Prompt

Explain how you chose which seeds or seedlings to grow. What factors did you consider, and how did you justify your choices?

D) Reflection Questions

Years 7 - 8

1. What information can you learn from a seed packet?
2. Why do some plants grow better from seedlings rather than seeds?
3. What are companion plants, and why are they useful?
4. How does growing multiple plants in a garden reflect a food web?

Years 9 - 10

1. Compare and contrast the benefits of planting seeds vs. seedlings in a designed garden solution.
 2. Justify the inclusion of one warm-season and one cool-season crop in a mixed garden plan.
 3. How does choosing a variety of plants support sustainable food production and resilience to abiotic factors like weather?
 4. What biblical principles can be drawn from the idea of different plants growing together cooperatively?
-

E) Hands-On Activities - Choose One

Option 1: Seed Packet Scavenger Hunt (All Ages).

Purpose: Develop literacy in interpreting seed information

Materials: A selection of seed packets

Note: In the next lesson you will visit a garden supplies shop; but you might have some seed packets already to look at – otherwise get the information online.

Steps:

1. Collect 4 - 6 seed packets (vegetables, herbs, flowers).
 2. For each, record key info: spacing, planting depth, sun needs, water needs, days to harvest.
 3. Create a chart or booklet summarising the information.
 4. Reflect on which seeds might grow best in your garden bed and why.
-

Option 2: Garden Planning Chart (Years 7 - 8)

Purpose: Plan what to grow based on soil, space, and season

Steps:

1. List potential plants that are appropriate for the current season.
 2. Classify them into “Sow as Seed” or “Plant as Seedling.”
 3. Use a grid or rough sketch to plan where each one will go in the bed.
 4. Consider sunlight and companion planting.
-

Option 3: Justify Your Garden Design (Years 9 - 10)

Purpose: Practise selection and justification in design

Steps:

1. Choose 4 - 6 plants to include in your garden.
 2. For each, justify:
 - Why seed or seedling?
 - Why suitable for your local climate?
 - What is its role in the ecosystem (e.g. food, pollinator, pest deterrent)?
 3. Present your garden plan and justification in a brief oral or written report.
-

F) Biblical Connection

In 1 Corinthians 3:6, Paul says, “I planted, Apollos watered, but God gave the increase.” This reminds us that while we make thoughtful decisions and do the work of preparing and planting, it is God who blesses the growth. Choosing what to plant is both a practical decision and a spiritual one: We want to be wisely stewarding the resources He’s entrusted to us, and then trusting Him for the results.

Lesson 17: Visiting a Nursery or Hardware Store

Curriculum Links (Australian Curriculum v9)

Design and Technologies

- AC9TDE8P03 - Select, justify and use suitable materials, components, tools, equipment, skills and processes to safely make designed solutions
- AC9TDE10P03 - Select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions

Lesson Focus:

Students will apply their knowledge by visiting a garden nursery or hardware store to choose appropriate seeds and seedlings for their prepared garden beds. This lesson is primarily practical, requiring observational skills, evaluation of plant options, and preparation for the planting session in Lesson 18.

A) Introduction

After researching and planning which crops to grow, it's now time to purchase your seeds and seedlings. A visit to a local nursery or garden centre gives you the opportunity to examine healthy plants, read seed packet labels in person, and make real-world design decisions. This is a vital step in responsibly selecting resources to complete your designed garden solution.

B) Instructions for Visiting a Plant-Nursery or Hardware Store

Tutor/Parent Preparation:

- Choose a local garden nursery, hardware chain store (like Bunnings & some Mitre 10 stores sell plants), or a community market that sells vegetable seedlings and seeds.
- Ensure students have a budget limit and a list of what they plan to grow.



Student Tasks at the Nursery:

Before Leaving:

1. Bring your garden plan or plant selection list from Lesson 16.
2. Bring a notebook or template to record findings.
3. If possible, bring a small camera or smartphone to photograph labels.

At the Nursery or Store:

1. **Examine seedlings** - Look for healthy leaves, firm stems, no yellowing or wilting.

2. **Check labels** - Confirm sunlight, water, spacing, and frost tolerance.
3. **Compare seed packet brands** - Which ones give better information? Which ones match your plan?
4. **Adjust your plan if needed** - Some varieties may be unavailable or not yet in season.
5. **Ask questions** - Staff may have great advice on what grows well locally.
6. **Stick to your budget** - Work as a team to get value for money, and calculate the total cost while you are selecting what to buy.

After Returning:

1. Lay out your purchases and double-check which ones are seeds and which are seedlings.
 2. Match them to the garden layout.
 3. Store seedlings in a cool, shady place until planting. Store seed packets in a dry spot.
-

Optional Extension Activity:

Seed Packet and Seedling Label Comparison Table

Create a table with columns: Plant Name, Sun Needs, Days to Harvest, Space Required, Notes. Use this table to reflect on whether the information at the store matched what you had previously researched.

Biblical Connection

Proverbs 24:27 says, “Prepare your work outside; get everything ready for yourself in the field, and after that build your house.” This verse speaks to wise planning and preparation, essential traits for both farming and life. As you make your final selections today, remember that thoughtful stewardship honours God.

Lesson 18: Planting the Garden – Seeds and Seedlings

Curriculum Links (Australian Curriculum v9)

Science

- **AC9S7U02** - Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations

Design and Technologies

- **AC9TDE8K06** - Analyse how characteristics and properties of materials, systems, components, tools and equipment can be combined to create designed solutions
- **AC9TDE8P03** - Select, justify and use suitable materials, components, tools, equipment, skills and processes to safely make designed solutions
- **AC9TDE10P03** - Select, justify, test and use suitable technologies, skills and processes, and apply safety procedures to safely make designed solutions

Lesson Focus:

In this final step of preparing the garden, students will plant their selected seeds and seedlings into the prepared garden bed, applying previously learned design knowledge and stewardship principles. The focus is on correct planting technique, spacing, care, and cooperation with God’s natural systems.

A) Introduction

Planting time is the culmination of all your planning, designing, and preparing. You’ve studied soil, designed a garden, selected crops, and purchased materials. Today you will sow seeds and transplant seedlings, joining the work of God’s design in nurturing life from the ground.

Ecclesiastes 11:6 reminds us, “In the morning sow your seed, and at evening withhold not your hand, for you do not know which will prosper...” Our task is to plant faithfully and keep watering them each week, then trust God for the increase.

B) Instructions for Planting

Safety Reminder Before Starting:

- Wear closed shoes to protect your feet from a garden-fork or other tools, and some people like to wear garden gloves as well.
- Use tools safely.
- Handle seedlings gently. If they have delicate stems, it is sometimes better to handle them by the leaves, not the stem.

1. Planting Seedlings

Materials: Trowel, watering can, mulch (optional), gloves

Steps:

1. Lay out seedlings on top of the soil according to your plan, checking for correct spacing.
2. Use the trowel to dig small holes just deep enough to cover the seedling's root ball.
3. Gently remove the seedling from its container, holding it by the leaves.
4. Place in the hole and fill in gently with soil, pressing lightly.
5. Water gently immediately after planting.
6. (Optional) Apply a thin layer of mulch to retain moisture.



2. Sowing Seeds

Materials: Seeds, ruler, watering can with fine rose, labels

Steps:

1. Check each seed packet for planting depth and spacing.
2. Use a stick or your finger to make rows or small holes at the correct depth.
3. Sow seeds evenly. If very small, mix with a bit of sand for even distribution.
4. Cover lightly with soil and press down gently.
5. Water gently with a watering can (fine rose to avoid displacing seeds).
6. Label each row or group clearly.



C) Optional Tasks

- **Create a Garden Map:** Draw and label a diagram of the garden bed with plant names, dates planted, and expected harvest windows.
- **Take Photos:** Document your planting process to use in a project journal or future presentation.
- **Prayer of Dedication:** Pause to pray together, dedicating the garden to God's glory and the nourishment of others.

D) Light Reflection Questions

Years 7 - 8:

1. What steps did you take to ensure your seeds and seedlings were planted correctly?

2. Why is water important right after planting?
3. How will you know if the plants are growing well?

Years 9 - 10:

1. How did you apply your design choices during the planting process?
 2. What challenges did you face, and how did you overcome them?
 3. How does participating in this planting process help you better understand ecosystems and human responsibility?
-

E) Biblical Connection

Jesus often spoke in parables about planting and growing. In Mark 4:26 - 27, He said, “The kingdom of God is as if a man should scatter seed on the ground... and the seed should sprout and grow, he himself does not know how.” Gardening reminds us that God brings the growth, but He invites us to join Him in sowing.

By carefully planting seeds and seedlings, we participate in His created order, practicing responsibility, patience, and cooperation with nature. This is a beautiful expression of our role as stewards of the earth.

Lesson 19: The Body's Systems (Part 1)

Topic: Cells, Tissues, and Organs – God's Designed Systems

Curriculum Links (Australian Curriculum v9)

Science

- **AC9S8U01** – Recognise cells as the basic units of living things, compare plant and animal cells, and describe the functions of specialised cell structures and organelles
- **AC9S8U02** – Analyse the relationship between structure and function of cells, tissues and organs in a plant and an animal organ system and explain how these systems enable survival of the individual

Lesson Focus:

In this lesson, students will explore how God designed living organisms with intricate structures beginning with cells and progressing to tissues, organs, and systems. By comparing plant and animal cells and examining how structure enables function, students will develop an understanding of how life is sustained.

Key Terminology

- **Cell membrane:**
A thin, flexible barrier that surrounds the cell. It controls what enters and leaves the cell, helping to protect and support the cell while allowing it to interact with its environment.
- **Nucleus:**
The control centre of the cell. It contains the cell's DNA and manages all cell activities, including growth, reproduction, and the production of proteins.
- **Chloroplast:**
An organelle found only in plant cells (and some algae). It contains a green pigment called chlorophyll and is responsible for **photosynthesis** – the process of capturing sunlight to make food (glucose) for the plant.
- **Vacuole:**
A storage organelle within a cell. In plant cells, the central vacuole stores water, nutrients, and waste, and helps maintain the plant's shape. Animal cells have smaller vacuoles with similar functions.
- **Tissue:**
A group of similar cells that work together to perform a specific function. For example, muscle tissue helps with movement, while nervous tissue carries signals through the body.
- **Organ system:**
A group of organs that work together to carry out a major body function. For example, the **digestive system** breaks down food, and the **respiratory system** allows for breathing and gas exchange.

A) Introduction

Think about the last time you breathed, moved, or blinked. You probably didn't think about the tiny parts of your body making it all happen. Yet every moment, your body is alive with the activity of trillions of **cells** - the smallest unit of life. Each one is a miniature masterpiece of design, placed with purpose by our Creator.

In this lesson, you'll look inside God's blueprint for life - starting with cells and building up to tissues and organs. You'll discover how structure enables function and how each system works to help the body survive, grow, and serve the Lord.

B) Informational Story: *Invisible Engines of Life*

Ava sat quietly, staring at the pond water under the school microscope. The homeschool group had gathered in the science lab to study cells, and this was her first time seeing something truly microscopic.

She gasped. "It's moving!"

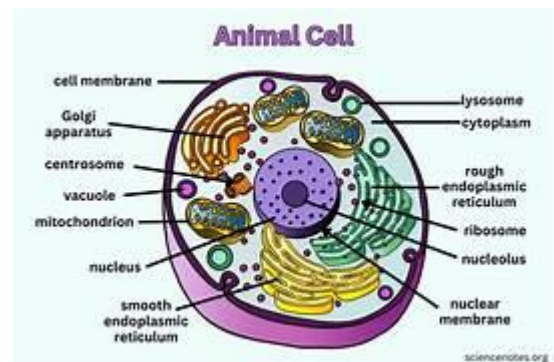
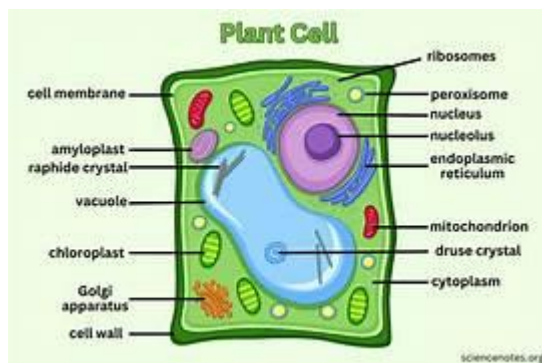
Mrs. Vella smiled. "That's a single-celled organism. It may be just one cell, but it's alive, growing, and reproducing."

Ava looked up. "So, one cell can be a whole organism?"

"Yes," the tutor nodded. "But the amazing thing is that your body is made up of trillions of cells. And each one knows what to do."

She walked to the whiteboard and drew two shapes: one square with a thick border, the other rounder and softer.

"Plant cells," she said, pointing to the square, "are rigid, thanks to their **cell wall**. They also contain **chloroplasts** to make food from sunlight. The process of converting sunlight into chemical energy is called photosynthesis."



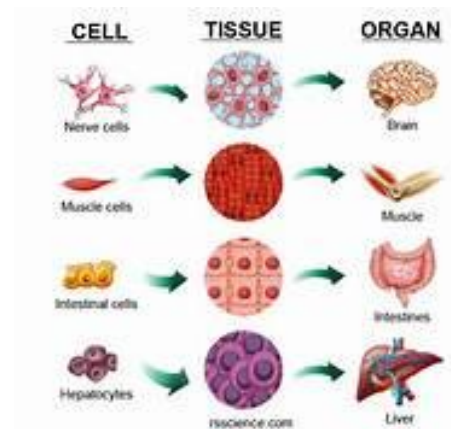
Ava piped up...

"Excuse me Mrs Valla. I've been thinking – Why are plants green?"

"That's a good question Ava" continued Mrs Valla. "It has to do with this process of photosynthesis we've been talking about. Plants are green because of a pigment found in the chloroplasts of plant cells"

called chlorophyll. It plays a crucial role in photosynthesis (converting light into chemical energy). Chlorophyll absorbs light most efficiently in the blue and red parts of the electromagnetic spectrum. This means that it reflects green light, which is why plants appear green to our eyes.”

She added green circles. “Animal cells, like yours, don’t have cell walls or chloroplasts. But both plant and animal cells have a **nucleus**, where the cell’s instructions are kept. It’s like the command centre.”



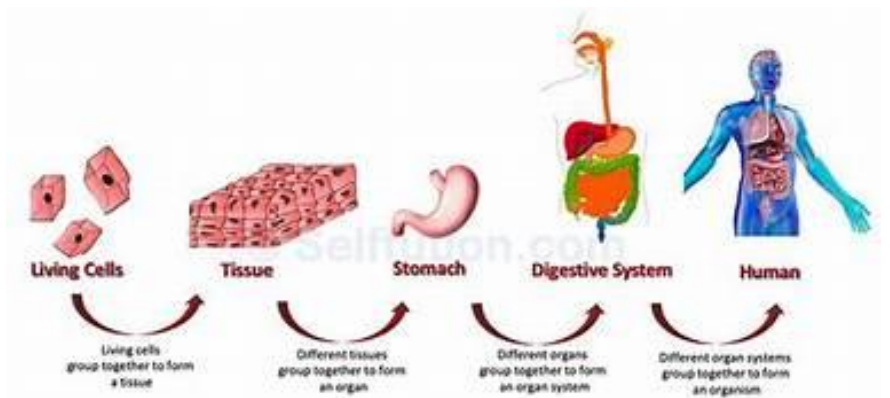
The students took notes while comparing diagrams of cell organelles.

“Now,” she continued, “cells with similar jobs group together to form **tissues**. For example, in your skin, there’s epithelial tissue protecting you from the environment. Muscles have muscle tissue for movement.”

Jacob raised his hand. “And then tissues make organs?”

“Exactly,” she said. “Let’s take the **digestive system**. Muscle tissue moves food through the stomach. Glandular tissue releases enzymes. All those tissues form the stomach - an **organ**.”

Ava raised a finger. “So, every function depends on how it’s built?”



“Yes,” Mrs. Vella said. “Structure enables function. That’s a design principle. It’s not random. God designed cells to become tissues, organs, and systems - all working together. Just like the members of the Church (the Body of Christ), every part has a role.”

Later, they dissected a fresh bean pod and looked at a cross-section of a leaf. “Look at the stomata, the tiny pores for breathing,” Mrs. Vella explained. “Even plants have systems to survive.”

“Just like us,” Ava whispered. “Even at the cell level, God’s design is everywhere.”

C) Narration Prompt

Retell how God designed living things using cells, tissues, and organs. What are the key differences between plant and animal cells, and how does structure enable function?

D) Reflection Questions

Years 7 - 8:

1. What are the main differences between plant and animal cells?
2. What is the function of the nucleus, and why is it important?

3. How do tissues and organs work together in a body system?
4. How does the digestive system show the principle of structure and function?

Years 9 - 10:

1. Compare specialised structures in plant and animal cells and explain how they reflect function.
 2. Describe the pathway from cells to tissues to organs in a human system.
 3. Analyse how structure in a leaf or muscle cell enables the plant or person to survive.
 4. How might understanding cellular structure help doctors treat diseases?
-

E) Activity Options - Choose One

Option 1: Plant and Animal Cell Model (All Ages)

Purpose: Visualise and label the parts of cells

Materials: Playdough, coloured paper, glue, cardboard

Steps:

1. Create two circular or rectangular models—one for a plant cell, one for an animal cell.
 2. Use different colours/shapes for the nucleus, membrane, chloroplasts, etc.
 3. Label each part with its function.
 4. Present your models to others or take photos for your project journal.
-

Option 2: Microscope and Cell Observation (Years 7 - 8)

Purpose: Observe real cells in natural samples

Materials: Microscope, onion skin, leaves, water samples

Steps:

1. Prepare slides with onion skin (for plant cells) and pond water (for protists).
 2. Observe and draw what you see.
 3. Label visible parts: cell wall, nucleus, cytoplasm, etc.
 4. Compare observations with textbook diagrams.
-

Option 3: Organs and Functions Flowchart (Years 9 - 10)

Purpose: Analyse structure-function relationships in a human organ system

Steps:

1. Choose one organ system (e.g., digestive, respiratory, circulatory).
 2. Research and list:
 - Main organs
 - The types of tissue in each organ
 - How each structure helps the system function
 3. Draw a labelled diagram or create a flowchart from cell → tissue → organ → system → body
 4. Explain the relationships in a short written paragraph.
-

F) Biblical Connection

Psalm 139:14 declares, “I will praise You, for I am fearfully and wonderfully made.” As we study cells and systems, we begin to feel a sense of awe for God’s amazing handiwork. Each part of creation, from chloroplasts in leaves to nerve cells in our brain, speaks of design, intention, and purpose.

Just as cells cooperate to form organs and systems, believers are part of the body of Christ, each with a unique role (1 Corinthians 12:12–27). Studying our physical body helps us understand our spiritual unity as well.

Lesson 20: The Body's Systems (Part 2)

Topic: Coordination, Responses, and Reproduction - God's Design in Action

Curriculum Links (Australian Curriculum v9)

Science

- **AC9S9U01** - Compare the role of body systems in regulating and coordinating the body's response to a stimulus, and describe the operation of a negative feedback mechanism
 - **AC9S9U02** - Describe the form and function of reproductive cells and organs in animals and plants, and analyse how the processes of sexual and asexual reproduction enable survival of the species
-

Lesson Focus:

This lesson examines how the nervous and endocrine systems work together to help the body respond to internal and external changes. It also explores God's design for reproduction in plants and animals, showing how life continues through carefully crafted processes.

Key Terminology Definitions

- **Stimulus / Response:** A **stimulus** is any change in the environment that can be detected by the body (like heat, light, or sound). A **response** is how the body reacts to that stimulus. For example, touching something hot (stimulus) causes you to quickly pull your hand away (response).
 - **Nervous system:** is the body's communication network. It uses nerves, the brain, and the spinal cord to send messages around the body so we can sense things and respond quickly.
 - **Endocrine system:** is a collection of glands that produce hormones—chemical messengers that travel in the blood to control things like growth, metabolism, and mood over time.
 - **Homeostasis:** is the process by which the body keeps its internal environment stable and balanced, like maintaining a steady temperature or the right amount of water and sugar in the blood.
 - **Negative feedback:** is a control mechanism the body uses to maintain balance. When something goes too high or too low (like body temperature), the body detects it and makes changes to bring it back to normal.
 - **Sexual and asexual reproduction:**
 - **Sexual reproduction** involves two parents and the joining of male and female cells (gametes) to create offspring with genetic variation.
 - **Asexual reproduction** involves only one parent and produces offspring that are genetically identical to the parent, with no joining of gametes.
 - **Gametes:** are special reproductive cells. In animals, the male gamete is the **sperm**, and the female gamete is the **egg (ovum)**. In plants, they are found in the pollen (male) and ovules (female). They combine during fertilisation to form a new organism.
 - **Pollination:** is the process of transferring pollen from the male part of a flower (anther) to the female part (stigma). This is how many plants begin sexual reproduction, eventually leading to seeds.
-

A) Introduction

Imagine touching a hot stove... Your hand jerks away before you can think. That's your nervous system responding to a stimulus. Or picture your body maintaining a stable temperature on a freezing day. That's your endocrine system helping maintain balance. These systems work together to help you survive.

Likewise, God has designed intricate ways for living things to reproduce, whether through a bee pollinating a flower or the joining of egg and sperm to form a baby. Every part of this process reflects divine intention and design.

B) Informational Story: *Designed for Life – Responses and Reproduction*

Jacob stared at the firepit as it crackled. He and Ava were at the homeschool group's winter camp, listening to Mr. Rohan, a paramedic and science tutor, give a fireside biology talk.

"You know," Mr. Rohan began, "your body is constantly responding to changes - even out here in the cold."

Jacob rubbed his hands together. "Like shivering?"



The Nervous System



"Exactly," Mr. Rohan nodded. "That's your **nervous system** detecting a drop in external temperature and sending a signal to muscles to contract and warm you up. But there's more. Your **endocrine system** releases hormones like adrenaline or cortisol if your body thinks it's under stress."

Ava tilted her head. "So how do the systems work together?"

"Great question," he said. "Your nervous system works fast, like electrical wiring, sending signals through **neurons**. The endocrine system works a bit slower, releasing hormones into the bloodstream

to adjust body functions over time."

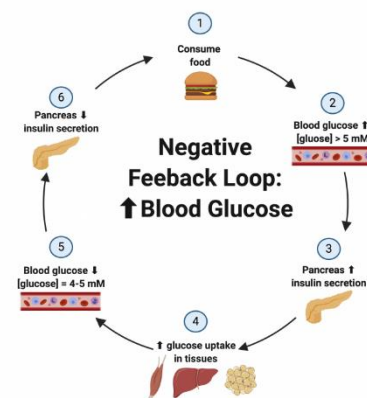
He picked up a stick and drew in the dirt.

"Let's say your blood sugar drops. Your pancreas detects the change and releases a hormone called glucagon. That's part of a **negative feedback loop**. It brings your sugar level back up. The opposite happens when your sugar is too high; then insulin is released to bring it down. The goal is **homeostasis** which keeps your body stable."

Ava looked thoughtful. "So negative feedback is a good thing?"

"Very good. It means your body is correcting something before it becomes dangerous. It's a design of balance."

Jacob nodded. "So, if I feel scared, my heart pounds. That's the nervous system and hormones working together?"

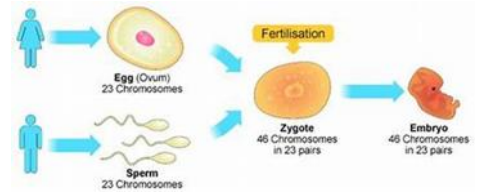
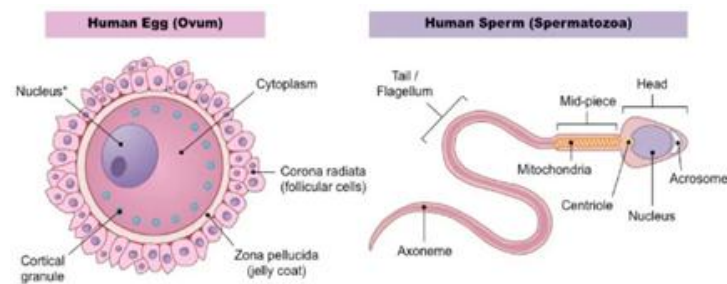


“Exactly. You react quickly. Your pupils dilate and muscles tense; but then hormones keep you alert until you’re safe again.”

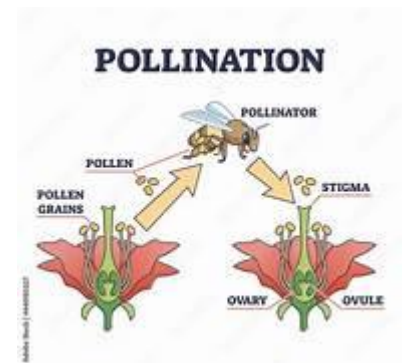
Mr. Rohan paused and smiled. “And now, let’s talk about life beginning.”

Ava blushed slightly, but he continued respectfully.

“**Reproduction** is one of the most amazing examples of God’s design. In animals, **sexual reproduction** happens when a male's sperm joins with a female's egg. The resulting embryo contains DNA (instructions for the cells) from both parents. That means there's **variation** - each offspring is unique.”

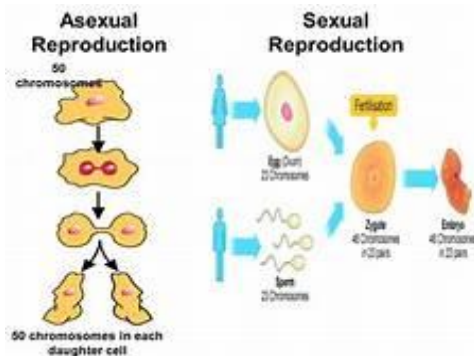


He drew a diagram of a flower. “In plants, sexual reproduction happens through **pollination**—when pollen from the male part of a flower (anther) reaches the female part (stigma). This forms a seed.”



Jacob raised a hand. “What about asexual reproduction?”

“Some plants and simple organisms reproduce **asexually**—no joining of cells, just cloning. Think of potatoes growing new shoots or starfish regrowing arms.”



Ava nodded. “So, God made ways to reproduce with and without mating.”

“Exactly,” Mr. Rohan said. “Each method helps species survive, especially when the environment is harsh or change is needed.”

He leaned closer. “Do you know what all of this tells me?”

“What?” Jacob asked.

“That your body (every reaction, every process) is not random. The whole process is so complex, it has the evidence of *design* – just like how a complex machine of intricate design can’t just suddenly (or even gradually) appear by itself and function properly. The cells are designed to communicate with each other. Systems adjust. Life continues. And every part of you was knit together by God, with wisdom and purpose.”

The group was silent, listening to the fire and the wind. Ava whispered, “I will praise You, for I am fearfully and wonderfully made.”

C) Narration Prompt

Summarise how the nervous and endocrine systems help the body respond to stimuli. What is a negative feedback loop, and why is it important? Explain how reproduction happens in animals and plants, and how it supports survival.

D) Reflection Questions

Years 7 - 8:

1. What is the difference between the nervous and endocrine systems?
2. What is a negative feedback mechanism? Give an example.
3. Describe how reproduction occurs in a flowering plant.
4. What are some advantages of sexual reproduction over asexual reproduction?

Years 9 - 10:

1. Analyse how the nervous and endocrine systems interact in a stressful situation.
 2. Describe how negative feedback helps maintain homeostasis, using a specific example.
 3. Compare the structure and function of reproductive cells in animals and flowering plants.
 4. Evaluate how both sexual and asexual reproduction can help a species survive environmental changes.
-

E) Hands-On Activity Options - Choose One

Option 1: Stimulus-Response Experiment (All Ages)

Purpose: Explore reaction time as a response to a stimulus

Materials: Ruler, timer

Steps:

1. One person holds a ruler vertically; another places fingers around it, ready to catch.
 2. Drop the ruler without warning. Measure how far it falls before being caught.
 3. Repeat several times and record results.
 4. Discuss how the nervous system processed the visual cue and muscle response.
-

Option 2: Plant Reproduction Model (Years 7 - 8)

Purpose: Understand plant reproduction through visual modelling

Materials: Craft supplies (paper, glue, pipe cleaners) or digital drawing tool

Steps:

1. Create a model or labelled diagram of a flower showing stigma, anther, ovary, and pollen.
 2. Show the process of pollination and fertilisation.
 3. Label and explain each stage.
 4. Present to a peer or family member.
-

Option 3: Negative Feedback Case Study (Years 9 - 10)

Purpose: Analyse homeostasis through scientific case scenarios

Steps:

1. Research or create a case study: e.g. body temperature regulation, blood sugar, or hydration.
 2. Identify the stimulus, receptors, effectors, and response.
 3. Draw a feedback loop diagram.
 4. Explain how failure of this loop could affect the body.
-

F) Biblical Connection

God's Word declares that He holds all things together (Colossians 1:17). Just as He sustains creation, your body is sustained by processes that bring balance and life. The nervous system sends signals like a body-wide messenger; the endocrine system uses hormones to adjust what's needed - all working in harmony. These systems mirror the Body of Christ, where each part has a function, each response matters, and balance is sustained through unity.

Reproduction, too, is a sacred design. From seeds bearing fruit to the gift of children, life is a gift and a miracle. Each step (pollination, fertilisation, development) is part of His plan to continue what He has made.

Lesson 21: Food for the Body

Topic: Nutrition and Design - Fuelling the Body with Wisdom

Curriculum Links (Australian Curriculum v9)

Design and Technologies

- AC9TDE8K05 – Analyse how properties of foods determine preparation and presentation techniques when designing solutions for healthy eating

Lesson Focus:

In this lesson, students will explore how the properties of food relate to nutritional function, preparation, and presentation. They will also examine general nutrition principles through a biblical lens of stewardship and care for the body God created.

Key Terminology Definitions

- **Macronutrients** are the main types of nutrients the body needs in large amounts to grow and function. They include:
 - **Carbohydrates** (provide energy),
 - **Proteins** (build and repair tissues),
 - **Fats** (store energy and help absorb vitamins).
- **Micronutrients** are nutrients the body needs in small amounts. They include **vitamins** and **minerals**, which are essential for health, energy, immunity, and proper body functioning.
- **Food properties** are the physical and chemical characteristics of food, such as texture, colour, flavour, nutrient content, and how food behaves when cooked or stored.
- **Nutrient density** describes how many nutrients (like vitamins and minerals) are in a food compared to its amount of energy (kilojoules or calories). Foods that are nutrient-dense give you more health benefits without too much energy - for example, vegetables, nuts, and eggs.
- **Balanced diet** is one that includes the right amounts of all the different nutrients the body needs to stay healthy. It includes a variety of foods from all the main food groups: fruits, vegetables, grains, proteins, and dairy (or alternatives).

A) Introduction

In 1 Corinthians 10:31, Paul tells us, “*Whether you eat or drink, or whatever you do, do all to the glory of God.*” This includes how we nourish our bodies. God designed food not just for survival, but for strength, growth, healing, and even joy. Understanding what we eat and how to prepare it wisely is part of loving God with all our strength.

B) Informational Story: *Fuel for the Journey - Understanding Nutrition and Food Design*

Ava stared at the menu board in the school kitchen: “Wholegrain sandwiches, carrot sticks, protein smoothies.” She wasn’t sure how that related to their science class, but she was curious.

Mrs. Vella, their science tutor, clapped her hands. “Today,” she said, “we are going to explore the science of food and how what we eat helps our body function, grow, and heal. Let’s start with something simple: why do we eat?”

Jacob grinned. “Because we’re hungry?”

Mrs. Vella smiled. “Yes. But more than that - our bodies need **fuel**. Just like a car can’t run without petrol, our cells can’t function without nutrients. So, let’s talk about what’s in our food.”

She passed out diagrams of the **six essential nutrients**:

1. **Carbohydrates** - a source of energy. Found in grains, fruits, vegetables.
2. **Proteins** - for building tissues and enzymes. Found in meat, dairy, legumes.
3. **Fats** - for insulation and energy storage. Found in oils, nuts, seeds.
4. **Vitamins** - for regulating bodily processes (e.g. Vitamin A for eyes, Vitamin C for immunity).
5. **Minerals** - for strong bones, nerve function, etc. (e.g. calcium, iron, magnesium).
6. **Water** - essential for everything: digestion, temperature regulation, waste removal.

Jacob leaned forward. “So, if I eat a burger, I get protein from the meat, fat from the cheese, and carbs from the bun?”

“Correct,” Mrs. Vella said. “But let’s think about the **quality** of those nutrients. That’s where **nutrient density** comes in. Is the bun wholegrain? Is the fat from seeds or from deep-frying?”

She held up two apples. One was whole; the other was peeled, sliced, and browned. “Presentation and preparation also matter. This affects texture, taste, and even nutrition. For example, Vitamin C breaks down quickly when exposed to air or heat. So fresh fruit retains more nutrients.”

Ava nodded. “So, food is more than just what’s in it. It matters how we prepare it?”

“Yes,” the tutor said. “Food has properties such as **texture, water content, perishability**. These influence how it’s cooked and stored. And different cooking methods such as steaming, grilling, or frying can either preserve or destroy nutrients.”

She pointed to the smoothie bar. “Let’s design a meal together: something healthy, appealing, and easy to prepare. What would you include?”

“Protein, carbs, and a colourful mix of veggies,” said Jacob.

“Exactly,” she said. “That’s **balanced nutrition and fuel** for the body God gave you to serve Him.”

She paused. “And just like we learned in our body systems lessons, the cells in your muscles, brain, and organs all rely on these nutrients to do their jobs. Food is a gift, and also a responsibility.”

C) Narration Prompt

Explain why your body needs carbohydrates, proteins, fats, vitamins, minerals, and water. How do the properties of food affect how it should be prepared and presented?

D) Reflection Questions

Years 7 - 8:

1. What are the three macronutrients, and why does your body need each one?
2. Why is water just as important as solid food?
3. How do the properties of food (like water content or texture) affect how it's stored and prepared?
4. What's the difference between a healthy fat and an unhealthy fat?

Years 9 - 10:

1. Describe how different cooking methods affect the nutritional value of food.
 2. Analyse how understanding food properties can help design better meals for health and function.
 3. Evaluate how nutrient density impacts health over time.
 4. How can we glorify God through the way we eat and prepare food?
-

E) Hands-On Activity Options – Choose One

Option 1: Build-a-Meal Challenge (All Ages)

Purpose: Practise designing a balanced, nutritious meal

Steps:

1. Using a range of real or printed food images, choose one food from each category:
 - Carbohydrate
 - Protein
 - Fat
 - Fruit/vegetable
 2. Arrange your foods into a meal on a paper plate or tray.
 3. Explain your choices and how they provide a complete, healthy meal.
 4. (Optional) Prepare and eat the meal as a family.
-

Option 2: Nutrition Label Investigation (Years 7 - 8)

Purpose: Learn to analyse real-world food data

Steps:

1. Collect three food packages with nutrition labels.
 2. Record the per-serving amounts of energy, protein, sugar, fats, fibre, etc.
 3. Compare the health value of each product.
 4. Rank the foods from most to least nutrient-dense and explain your reasoning.
-

Option 3: Design a Healthy Snack Product (Years 9 - 10)

Purpose: Apply nutrition knowledge to food product design

Steps:

1. Create a plan for a new snack food: include name, ingredients, nutrition facts, and presentation.

2. Justify your choices: How does each ingredient contribute to health? What preparation method keeps it nutritious?
 3. Design the packaging (including claims like “high fibre” or “low sugar”)
 4. Present your design and reflect on how it could meet a real-world health need.
-

F) Biblical Connection

In 1 Corinthians 6:19 - 20, Paul reminds us that *“your body is a temple of the Holy Spirit... therefore glorify God in your body.”* Caring for our health through wise nutrition is an act of worship. Food is not just about taste or appearance. It is the fuel God gives us to grow, learn, work, and serve others. Preparing it wisely and eating with self-control shows honour to the One who made us.

Lesson 22: Identities and Change

Topic: Who We Are and Who We're Becoming

Curriculum Links (Australian Curriculum v9)

Health and Physical Education

- **AC9HP8P01** - Analyse and reflect on the influence of values and beliefs on the development of identities
- **AC9HP8P02** - Analyse the impact of changes and transitions, and devise strategies to support themselves and others through these changes
- **AC9HP8P03** - Examine how roles, decision-making, and levels of power, coercion and control within relationships can be influenced by gender stereotypes
- **AC9HP10P01** - Analyse factors that shape identities and evaluate how individuals influence the identities of others
- **AC9HP10P02** - Refine, evaluate and adapt strategies for managing changes and transitions
- **AC9HP10P03** - Investigate how gender equality and challenging assumptions about gender can prevent violence and abuse in relationships

Lesson Focus:

This lesson helps students understand how identity is shaped by internal and external influences such as family, faith, culture, gender expectations, and personal values. It explores transitions during adolescence and equips students with biblical and practical strategies for managing change with courage and integrity.

Key Terminology Definitions

- **Identity** is who you are. It includes your personality, interests, values, beliefs, culture, gender, and the groups you belong to. Your identity helps shape how you see yourself and how others see you.
- **Values and beliefs:**
Values are the things you think are important in life - like honesty, kindness, or respect.
Beliefs are ideas you accept as true - such as your religious or cultural views. Together, they guide your decisions and behaviour.
- **Transitions** are times of change in life. These might include moving schools, starting puberty, becoming more independent, or changes in family life. Transitions can affect emotions, routines, and relationships.
- **Gender roles** are expectations about how people should behave based on whether they are male or female. Some of these roles are built into you by biological design because you were born male or female. As well as being natural and normal, some roles are often influenced by culture, society, and tradition. Some gender roles are helpful, but others can seem limiting or unfair when people ignore how God made them, or when peers or others put expectations on you that God might never have intended.
- **Stereotypes** are oversimplified ideas about a group of people. For example, thinking that all boys like sport or all girls like pink. Stereotypes are often untrue and can lead to unfair treatment.

- **Coercion and power:**

Coercion means forcing someone to do something they don't want to do, often by using pressure, threats, or manipulation.

Power is the ability to influence or control what others do. Power can be used positively (to protect or lead) or negatively (to control or harm).

A) Introduction

God made each person unique. King David declared that we are “fearfully and wonderfully made” (Psalm 139:14). But growing up involves lots of changes that can be confusing to live through. How do we stay true to who we are, especially when our body, friendships, roles, and even beliefs are shifting? In this lesson, we'll explore how identity is shaped, how gender roles affect our thinking, and how to navigate change without fear.

B) Informational Story: *Finding Who You Are - A Journey of Change*

Jacob was quiet on the way home from the youth conference. Something in the last session had stirred him.

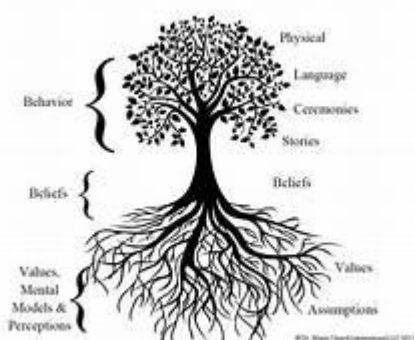
“I don't know who I am anymore,” he told his mum. “I used to be the ‘funny one.’ But now I feel serious all the time. And I don't like sports as much. I don't even know what I believe about everything anymore.”

His mum smiled gently. “That's part of growing up, Jacob. You're not losing yourself. You're growing.”

Later that week, at homeschool group, Mrs. Vella held a session on identity.

“Identity,” she said, “isn't just about personality or preferences. It's about *who you are* at your core, and for Christians, it's a recognition of *whose* you are that makes a big difference.”

She drew a diagram on the board: a tree with deep roots.



“Your *values* and *beliefs* are the roots. Your *roles* and *feelings* are like branches - they change with the seasons. But if the roots are strong, the tree stands tall.”

Ava raised her hand. “So, identity doesn't mean you have to stay the same forever?”

“Exactly,” said Mrs. Vella. “We change. We grow. That's God's design. But our identity in Christ stays firm. Galatians 2:20 says, ‘*It is no longer I who live, but Christ lives in me.*’ And if you have

known the great joy of asking Jesus to be the Captain of your ship (your life), it changes everything. He loves you so much, and when you surrender to Him, He makes everything new. Then your identity in Christ becomes your deepest truth.”

They talked about puberty, grief, moving homes, and other **transitions** that can challenge our identity.

Then came the harder part: **gender roles** and **stereotypes**.

“Sometimes, society tells us what boys and girls ‘should’ be,” Mrs. Vella explained. “Like saying girls should be quiet, or boys can’t show emotion. But the Bible shows strong, wise, and gentle men like Joseph; and bold, faithful women like Deborah or Esther.”

Jacob looked up. “So, it’s not weak to be kind?”

“Not at all,” she said. “Kindness takes strength. And to feel great tenderness towards a person, and even to cry about their situation, may be a sign of great inner character”

She gave examples of **coercion** and how people can be pressured to act against their values.

Ava nodded. “Like when people say, ‘If you loved me, you’d do this.’”

“Yes,” Mrs. Vella replied. “That’s manipulation, not love. And it’s not only little children who try that game. Many young adults have fallen for those words”.

Together, the group brainstormed ways to respond with strength and grace: using boundaries, prayer, and wise counsel.

“Identity,” said Mrs. Vella, “isn’t just something you discover. It’s something you build with God’s help.”

C) Narration Prompt

Retell the main message of the story. What is identity made of? How do transitions and expectations challenge it? What helps you stay rooted in truth?

D) Reflection Questions: If possible, discuss these questions with your parent/tutor.

Years 7 - 8:

1. What are some values or beliefs that shape your identity?
2. What kinds of life transitions might challenge how you see yourself?
3. How can gender stereotypes affect the way people act?
4. How can you help a friend going through a big change?

Years 9 - 10:

1. Analyse how your identity has changed in the last few years. What stayed the same? What shifted?
 2. Evaluate strategies you’ve used, or could use, to manage difficult transitions.
 3. How can challenging assumptions about gender roles prevent coercion in relationships?
 4. How can you encourage others to form their identity in truth, not pressure?
-

E) Activity Options - Choose One

Option 1: Identity Tree (All Ages)

Purpose: Visualise the core and changeable parts of identity

Steps:

1. Draw a large tree with roots, trunk, and branches.
 2. In the roots, write your unchanging values and beliefs.
 3. On the trunk, write your stable traits (e.g. dependable, creative).
 4. On the branches, write changeable things: hobbies, friendships, stages of life.
 5. Reflect on what holds your tree steady in storms.
-

Option 2: Transition Strategy Planner (Years 7 - 8)

Purpose: Prepare for or reflect on life changes

Steps:

1. Think of a change you've experienced (e.g. starting high school, moving, loss).
 2. What emotions did you feel? What helped you cope?
 3. Write a list of healthy strategies: talking to someone, journaling, prayer, etc.
 4. Create a guide titled: *How I Can Help Myself or a Friend Through Change*.
-

Option 3: Challenge the Stereotype Campaign (Years 9 - 10)

Purpose: Analyse and confront gender expectations

Context: God definitely designed boys differently to girls, and men often think very differently to women. This is natural - it is how we are made. It is OK for men and women to have different roles in the family that suit their strengths and interests. Some of this is just natural biology. However, there are also times when the expectations of others become a limiting hindrance to fulfilling our destiny and calling in life.

[A personal note from the author: Having been a professional ballet dancer in my 20s & 30s, I can testify that if you are male and have a strong artistic flare or a strong desire to be a dancer (or make-up artist or costume designer), it doesn't mean you are 'gay'. It just means you are gifted with creative tendencies, a reflection of the nature of our great Creator. I have been happily married to the same woman for over 40 years, and we enjoyed raising our 5 children together.

It's also interesting, that when one of my daughters was a young teenager, people often commented she should become a fashion model; but she was more interested in developing farm skills, has done a mechanics course and loves fixing things (and people). Even so, to complement her practical side, she is very feminine, and she and her husband now have 7 children. So, don't worry if you don't fit into someone else's mould. You are uniquely made, are greatly loved, and have an awesome destiny planned by God.]

Steps:

1. Identify a stereotype you've seen or experienced; or a time when someone has said "You'll never be any good at that".
2. How do you think these kinds of comments affect people (e.g. girls who want to do carpentry or engineering or become a mechanic; boys who want to become a nurse or ballet dancer or artist).
3. Create a poster, short video, or slide deck that:
 - o Describes the stereotype
 - o Shows why it's harmful

- Offers a biblical or practical truth in response
-

F) Biblical Connection

Our true identity is not found in trends or popularity, but in Christ. Romans 12:2 says, “*Do not be conformed to this world, but be transformed by the renewing of your mind.*” The world may try to label you or limit you based on appearance, gender, or ability. But God says, “You are Mine” (Isaiah 43:1).

Through every transition, Jesus is steady. He walks with us, shaping us to become more like Him. When we root our identity in His truth, we can face any change with courage and compassion.

Lesson 23: Interacting with Others

Topic: Respect, Empathy, and Building God-Honouring Relationships

Curriculum Links (Australian Curriculum v9)

Health and Physical Education

- **AC9HP8P04** – Examine the roles of respect, empathy, power and coercion in developing respectful relationships
- **AC9HP8P05** – Investigate strategies that influence how communities value diversity and propose actions they can take to promote inclusion in their communities
- **AC9HP8P06** – Analyse factors that influence emotional responses and devise strategies to self-manage emotions
- **AC9HP8P07** – Explain and apply skills and strategies to communicate assertively and respectfully when seeking, giving or denying consent
- **AC9HP10P04** – Evaluate the influence of respect, empathy, power and coercion on establishing and maintaining respectful relationships
- **AC9HP10P05** – Propose strategies and actions individuals and groups can implement to challenge biases, stereotypes, prejudices and discrimination, and promote inclusion in their communities
- **AC9HP10P06** – Evaluate emotional responses in different situations to refine strategies for managing emotions
- **AC9HP10P07** – Examine how strategies such as communicating choices, seeking, giving and denying consent, and expressing opinions and needs can support the development of respectful relationships, including sexual

Lesson Focus:

This lesson focuses on how respect, empathy, emotional intelligence, and consent build strong and God-honouring relationships. It explores practical skills for navigating power dynamics, expressing opinions, and promoting acceptance and cooperation with others.

Key Terminology Definitions

- **Empathy** means being able to understand and share someone else's feelings. It's imagining how someone else might be feeling and caring enough to respond kindly or supportively.
- **Respect** is treating others with kindness, fairness, and consideration. It means valuing people's opinions, boundaries, rights, and differences - even when you don't agree.
- **Power / Coercion**
 - **Power** is the ability to influence, lead, or control others. It can be used in healthy ways (like helping, leading, or protecting) or in unhealthy ways (like dominating or manipulating).
 - **Coercion** is when someone uses pressure, threats, or force to make another person do something they don't want to do. This is a misuse of power and is never okay in healthy relationships.
- **Consent** means giving permission freely and clearly. In relationships, it means agreeing to something willingly, without pressure or fear. True consent is always mutual, informed, and can be withdrawn at any time.
- **Emotional regulation** is the ability to understand and manage your emotions - especially in stressful or upsetting situations. It includes calming yourself down, expressing feelings appropriately, and making wise choices.
- **Inclusion** means making sure everyone feels welcome, accepted, and valued, no matter their background, ability, or differences. It involves creating environments where all people can participate fully and equally.

A) Introduction

Jesus taught us to love others as ourselves (Mark 12:31). That includes understanding others' feelings, respecting their choices, communicating clearly, and standing up against injustice. But relationships can be complex, especially when emotions are strong or when power is misused.

Today's lesson gives you practical tools for interacting with others in a way that reflects Christ.

B) Informational Story: *Walking with Others - The Power of Respect*

Ava stood outside the church youth room, arms crossed. She didn't want to go in.

Earlier that day, a boy from her group had said, "You're too sensitive - stop overreacting." She'd only asked him to stop teasing her.

Later, during homeschool group, the tutor Mrs. Vella noticed Ava's quietness and asked if everything was okay.

"It's just hard when people don't listen. I spoke up, but it didn't matter," Ava said.

"That sounds frustrating," Mrs. Vella replied gently. "Let's talk about what makes relationships respectful."

She handed out a sheet with four key words: **Respect, Empathy, Power, and Consent.**

"In every relationship, whether with friends, parents, or classmates, we bring these things," she explained. "Respect means recognising someone's dignity. Empathy means feeling what someone else feels. But sometimes, people use **power** (like teasing, guilt, or peer pressure) to control others. That's called **coercion.**"

Jacob raised his hand. "Isn't teasing just joking?"

"It depends," said Mrs. Vella. "If the other person feels hurt and asks you to stop, then it's no longer funny. That's where **consent** comes in. We need to listen when people set boundaries."

She explained that **consent** isn't just about physical space. It's about permission in all kinds of interactions: conversation, sharing belongings, even humour.

Then she wrote on the board: "*Do to others as you would have them do to you*" (Luke 6:31).

The class discussed how emotional responses like anger, embarrassment, or fear, can rise quickly. But God calls us to **self-control**. That means learning to pause, breathe, pray, and speak calmly even when we feel strong emotions.

Jacob nodded. "So even if I feel like snapping, I can choose a better response."

"Exactly," said Mrs. Vella. "God doesn't just care what you feel - He cares what you *do* with your feelings."

The class ended by creating posters that promoted acceptance and kindness. Ava wrote, "*True strength is kindness with courage.*"

C) Narration Prompt

Summarise what you learned about respect, empathy, power, and consent. How do these affect your relationships? What strategies help you manage your emotions in difficult moments?

D) Reflection Questions

Years 7 - 8:

1. What does empathy look like in a friendship or family?
2. How can power be used in negative ways, like coercion?
3. What does giving or denying consent mean in daily life?
4. What can you do when your emotions feel out of control?

Years 9 - 10:

1. Evaluate how empathy and respect work together to build trust in relationships.
 2. Describe how bias or stereotypes can lead to exclusion. What can you do to challenge this?
 3. Analyse a time when you successfully managed a difficult emotional situation. What helped?
 4. Propose a strategy for communicating your boundaries respectfully in a group or relationship.
-

E) Activity Options - Choose One

Option 1: Respect Role Plays (All Ages)

Purpose: Practise responding to real-life situations with empathy and self-control

Steps:

1. In pairs or groups, choose a scenario (e.g. someone being left out, a teasing comment, a disagreement).
 2. Role-play a respectful and assertive response.
 3. Discuss what went well and what could be improved.
 4. Reflect on how Jesus might have responded in that moment.
-

Option 2: Emotions Journal (Years 7 - 8)

Purpose: Develop emotional awareness and management skills

Steps:

1. For three days, keep a journal:
 - What emotions did you feel?
 - What caused them?
 - How did you respond?
 2. Identify any moments where you paused (or caught yourself about to react) and you chose a godly response instead.
 3. Write a prayer asking God to help you grow in emotional wisdom.
-

Option 3: Inclusion Action Plan (Years 9 - 10)

Purpose: Challenge bias and promote acceptance and kindness

Steps:

1. Identify a group in your community or church that often feels excluded (e.g. new students, people with disabilities, quiet personalities).
 2. Brainstorm practical actions to promote inclusion and acceptance (e.g. buddy systems, awareness days, conversation starters).
 3. Choose one action and create a plan to implement it in your homeschool group, youth group, or local community.
 4. Present your plan to your tutor and/or your peers and invite feedback.
-

F) Biblical Connection

Jesus saw people others ignored. He touched the untouchable. He respected women, honoured children, and spoke truth to those in powerful positions. His life was the perfect model of **empathy and respect**.

Romans 12:18 says, *“If it is possible, as far as it depends on you, live at peace with everyone.”* That includes setting boundaries, saying no respectfully, and standing up for others. It also means recognising the image of God in everyone, regardless of differences.

As we interact with others, let’s be guided by the Spirit and not by fear, frustration, or peer pressure. Let’s be known for kindness that is courageous and truthful.

Lesson 24: Making Healthy and Safe Choices

Topic: Discernment, Protection, and Living Wisely

Curriculum Links (Australian Curriculum v9)

Health and Physical Education

- **AC9HP8P08** - Refine protective behaviours and evaluate community resources to seek help for themselves and others
 - **AC9HP8P09** - Investigate how media and influential people impact attitudes, beliefs, decisions and behaviours in relation to health, safety, relationships and wellbeing
 - **AC9HP8P10** - Plan and implement strategies, using health resources, to enhance their own and others' health, safety, relationships and wellbeing
 - **AC9HP10P08** - Plan, rehearse and evaluate strategies for managing situations where their own or others' health, safety or wellbeing may be at risk
 - **AC9HP10P09** - Critique health information, services and media messaging about relationships, lifestyle choices, health decisions and behaviours to evaluate their influence on individual attitudes and actions
 - **AC9HP10P10** - Plan, justify and critique strategies to enhance their own and others' health, safety, relationships and wellbeing
-

Lesson Focus:

This lesson teaches students how to make healthy, wise decisions in everyday life. It equips them with tools to respond to risky situations, identify truth in media, practise protective behaviours, and seek help when needed.

Key Terminology Definitions

- **Protective behaviours** are actions and strategies people use to keep themselves safe from harm. They include recognising unsafe situations, trusting your instincts, setting boundaries, saying “no,” and knowing when and how to ask for help.
 - **Influence / Pressure**
 - **Influence** is when someone or something affects your thoughts, feelings, or actions. This can be positive (e.g. encouragement from a friend) or negative (e.g. media that promotes unhealthy habits).
 - **Pressure** is when someone tries to make you do something you may not want to do. Peer pressure is common and can be either helpful (encouraging good choices) or harmful (pushing risky behaviour).
 - **Health resources** are people, services, or materials that provide support, information, or care for your physical, emotional, or mental health. Examples include doctors, school counsellors, websites like Kids Helpline, and community programs.
 - **Help-seeking** means reaching out to others when you need support or advice. It can be informal (talking to a trusted adult or friend) or formal (contacting a health service or professional). Asking for help is a sign of strength and wisdom.
 - **Discernment** is the ability to make wise and thoughtful decisions, especially when faced with tricky or confusing situations. It involves thinking carefully, identifying risks, and choosing what is right and best - morally, emotionally, and practically.
 - **Wellbeing** is a person's overall sense of health and happiness. It includes physical health, emotional stability, positive relationships, a sense of purpose, and feeling safe and supported in daily life.
-

A) Introduction

God calls us to live wisely. In Proverbs 3:21–23, we read, “*My son, do not let wisdom and understanding out of your sight... Then you will go on your way in safety.*” Our health, safety, and choices matter, not just for ourselves, but for others around us. This lesson helps you learn how to make wise decisions that honour God and protect your mind, body, and relationships.

B) Informational Story: *Wise Steps in a Noisy World*

Jacob scrolled through his feed. A celebrity chef claimed that cutting out all carbs cured his anxiety. Another post promoted a “detox tea” with dozens of excited comments. Then he saw an ad: “*Real friends never say no - click here to join our challenge.*”

He felt uneasy. Why did so much of the internet feel pushy?

That afternoon, his homeschool group met with Pastor Lydia, who also had a background in counselling. She began the lesson with a question:

“How do you know when advice is true and beneficial?”

The room went quiet.

“It’s hard,” she said. “We’re surrounded by **influencers**, ads, and viral videos. But not all information is good or safe.”

She passed out cards showing real-world dilemmas:

- A friend offering you an unhealthy energy drink when you’re tired
- An Instagram post promising health benefits without being based on any science
- A group pressuring you to join a prank that could hurt someone
- A feeling of anxiety but not knowing where to turn
- A good friend who wants to be too intimate.

“Let’s talk about **protective behaviours**,” she said. “These are choices you can make to keep yourself and others safe. They include:

- Saying no clearly
- Avoiding risky situations
- Identifying a safe adult
- Knowing how to get help”

Jacob raised his hand. “What if people make fun of you for not going along with the crowd?”

“That’s a real challenge,” she said. “But Proverbs 13:20 says, ‘*He who walks with the wise becomes wise, but the companion of fools suffers harm.*’ True strength isn’t going along, it’s choosing well.”

Ava added, “So even if it’s uncomfortable, we can still choose what’s right?”

“Yes,” Pastor Lydia nodded. “And part of that is using **discernment** by asking, ‘Is this wise? Is it true? Does it honour God and protect life?’”

The group brainstormed safe places to get help: trusted adults, youth leaders, health clinics, support lines, prayer, parents.

“Sometimes,” said Pastor Lydia, “the most courageous thing is to ask for help. God never intended you to face life alone.”

C) Narration Prompt

Retell what you learned about protective behaviours and wise choices. How can you tell if advice is trustworthy? What resources or people can help you stay safe and healthy?

D) Reflection Questions

Years 7 - 8:

1. What are protective behaviours, and when might you need them?
2. How can media or influencers affect the way you think or act?
3. Name three places or people you could go to for help if you felt unsafe or confused.
4. What does it mean to honour God with your choices?

Years 9 - 10:

1. Evaluate a real or hypothetical situation where peer pressure affected someone's health or wellbeing.
 2. What steps would you take to assess whether media advice is trustworthy?
 3. Critique the messaging behind an online health or lifestyle trend you've seen recently.
 4. Create a strategy for helping a friend who may be at risk (e.g. mental health, unsafe and immoral choices, or an abusive situation).
-

E) Activity Options - Choose One

Option 1: Safety Scenario Role Plays (All Ages)

Purpose: Practise protective behaviours and safe decision-making

Steps:

1. In small groups or pairs, choose or create a scenario (e.g. peer pressure to skip a rule, seeing unsafe content online, needing help for anxiety).
 2. Role-play two responses: one unsafe, and one wise.
 3. Discuss what protective behaviours made the difference.
 4. Reflect on how faith influences your decision-making in that moment.
-

Option 2: Media Message Investigation (Years 7 - 8)

Purpose: Build media literacy skills

Steps:

1. Choose a recent ad, post, or influencer message about health or lifestyle.
 2. Ask: Is it evidence-based? What's the motive behind it? Is it morally right?
 3. Identify any pressure tactics (e.g. "everyone is doing it," fear-based marketing; "You'll miss out if you're not quick to respond").
 4. Create a checklist for evaluating health-related information online.
-

Option 3: Help-Seeking Resource Guide (Years 9 - 10)

Purpose: Empower students to access and share helpful support

Steps:

1. Research 3 - 5 local or national support resources (e.g. Lifeline, Kids Helpline, headspace, Christian counselling).
 2. Record contact details and what each service offers.
 3. Create a printed or digital guide titled: *Help When You Need It - A Guide for Teens*.
 4. Include prayers or Scriptures to encourage others.
-

F) Biblical Connection

God calls us to walk in wisdom, not fear. Proverbs 4:7 says, "*Wisdom is the principal thing; therefore get wisdom.*" He also promises to be our guide: "*If any of you lacks wisdom, let him ask God*" (James 1:5).

Some people think making healthy and safe choices is just about avoiding harm. But it's more than that, it's about living in freedom. Jesus said, "*I came that they may have life, and have it abundantly*" (John 10:10). That includes physical, emotional, and spiritual wellbeing.

Did you know the Bible says you are God's temple (1 Corinthians 6:19). That means He wants to dwell in you – always helping you, closer than the closest friend. Caring for your body, managing your emotions, and seeking help when needed are ways of honouring Him.

WEEK 9	CULMINATING PROJECT OR ASSESSMENT

Assessment 1 = Work samples from activities in lessons (in your Science Journal)

Assessment 2 = to be decided.
