

# MERBEIN P-10 COLLEGE SCIENCE SCOPE & SEQUENCE

<u>Year</u>	<u>Science Understanding</u>	<u>Science Inquiry Skills</u>	<u>Science as a Human Endeavour</u>
<b>P</b>	<p><b>Staying Alive</b></p> <ul style="list-style-type: none"> <li>- Living things have basic needs, including food and water</li> </ul> <p><b>What's it made of?</b></p> <ul style="list-style-type: none"> <li>- Objects are made of materials that have observable properties</li> </ul> <p><b>Weather in my world</b></p> <ul style="list-style-type: none"> <li>- Daily and seasonal changes in our environment, including the weather, affect everyday life</li> </ul> <p><b>On the Move</b></p> <ul style="list-style-type: none"> <li>- The way objects move depends on a variety of factors, including their size and shape.</li> </ul>		
<b>1</b>	<p><b>Schoolyard safari</b></p> <ul style="list-style-type: none"> <li>- Living things have a variety of external features</li> <li>- Living things live in different places where their needs are met.</li> </ul> <p><b>Spot the difference</b></p> <ul style="list-style-type: none"> <li>- Everyday materials can be physically changed in a variety of ways.</li> <li>- Up, down and all around</li> <li>- Observable changes occur in the sky and landscape.</li> </ul> <p><b>Up, down and all around</b></p> <ul style="list-style-type: none"> <li>- Observable changes occur in the sky and landscape</li> </ul> <p><b>Look! Listen!</b></p> <ul style="list-style-type: none"> <li>- Light and sound are produced by a range of sources and can e sensed.</li> </ul>		
<b>2</b>	<p><b>Watch it grow</b></p> <ul style="list-style-type: none"> <li>- Living things grow, change and have offspring similar to themselves.</li> </ul> <p><b>All mixed up</b></p> <ul style="list-style-type: none"> <li>- Different materials can be combined, including by mixing, for a particular purpose.</li> </ul> <p><b>Water works</b></p> <ul style="list-style-type: none"> <li>- Earth's resources, including water, are used in a variety of ways</li> </ul> <p><b>Push-pull</b></p> <ul style="list-style-type: none"> <li>- A push or pull affects how an object moves or changes shape.</li> </ul>		

<p style="text-align: center; font-size: 24pt; font-weight: bold;">3</p>	<p><u>Chemical Sciences</u> A change of state between solid and liquid can be caused by adding or removing heat</p> <p><u>Biological sciences</u> Living things can be grouped on the basis of observable features and can be distinguished from non-living things</p> <p><u>Earth and space sciences</u> Earth's rotation on its axis causes regular changes, including night and day</p> <p><u>Physical sciences</u> Heat can be produced in many ways and can move from one object to another</p>	<p><u>Questioning and Predicting</u> With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge</p> <p><u>Planning and conducting</u> Suggest ways to plan and conduct investigations to find answers to questions</p> <p>Safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate</p> <p><u>Processing and analysing data and information</u> Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends</p> <p>Compare results with predictions, suggesting possible reasons for findings</p> <p><u>Evaluating</u> Reflect on the investigation, including whether a test was fair or not</p> <p><u>Communicating</u> Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports</p>	<p><u>Nature and Development of Science</u> Science involves making predictions and describing patterns and relationships</p> <p><u>Use and influence of science</u> Science knowledge helps people to understand the effect of their actions</p>
<p style="text-align: center; font-size: 24pt; font-weight: bold;">4</p>	<p><u>Biological Sciences</u> Living things have life cycles. Living things, including plants and animals, depend on each other and the environment to survive</p> <p><u>Chemical Sciences</u> Natural and processed materials have a range of physical properties; these properties can influence their use</p> <p><u>Earth and Space Sciences</u> Earth's surface changes over time as a result of natural processes and human activity</p> <p><u>Physical Sciences</u> Forces can be exerted by one object on another through direct contact or from a distance</p> <p><u>Focus:</u> -Plants in action and Friends or foes?-Primary Connections -Material world and Package it better-Primary Connections -Beneath our feet-Primary Connections -Smooth moves or Magnetic moves-Primary Connections</p>	<p><u>Questioning and predicting</u> With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge</p> <p><u>Planning and conducting</u> Suggest ways to plan and conduct investigations to find answers to questions. Safely use appropriate materials, tools or equipment to make and record observations, using formal measurements and digital technologies as appropriate</p> <p><u>Processing and analysing data and information</u> Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends. Compare results with predictions, suggesting possible reasons for findings</p> <p><u>Evaluating</u> Reflect on the investigation, including whether a test was fair or not</p> <p><u>Communicating</u> Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports</p>	<p><u>Nature and development of science</u> Science involves making predictions and describing patterns and relationships</p> <p>Science knowledge helps people to understand the effect of their actions</p> <p><u>Use and influence of science</u> Science knowledge helps people to understand the effect of their actions</p>

**Biological sciences**

- Living things have structural features and adaptations that help them to survive in their environment.

**Chemical sciences**

- Solids, liquids and gases have different observable properties and behave in different ways.

**Earth and space sciences**

- The Earth is part of a system of planets orbiting around a star (the sun).

**Physical sciences**

- Light from a source forms shadows and can be absorbed, reflected and refracted.

**Focus**

- Desert survivors* - Primary Connections.
- What's the matter?* - Primary Connections.
- Earth's place in space* - Primary Connections.
- Light shows* - Primary Connections.
- Five E's – Engage, Explore, Explain, Elaborate and Evaluate.
- Team Skills.
- Team Roles.

**Note:** *Primary connections is adaptable, for example what isn't taught in grade 5 will be covered in grade 6 based on the focus.*

**Nature and development of science**

- Develop an understanding of the behaviour of light by making observations of its effects.
- Test predictions relating to the behaviour of solids, liquids and gases by conducting observational experiments.
- Research how scientists were able to develop ideas about the solar system through the gathering of evidence through space exploration.
- Describe how scientists from a range of cultures have improved our understanding of the solar system, such as Copernicus, Khayyám and Galileo.
- Research the different types of scientists who work in teams in space exploration, and Australia's involvement in space exploration.
- Learn how Aboriginal and Torres Strait Islander people used observation of the night sky to assist with navigation.

**Use and influence of science**

- Investigate how the development of materials such as plastics and synthetic fabrics have led to the production of useful products.
- Describe how technologies developed to aid space exploration have changed the way people live, work and communicate.
- Explore objects and devices that include parts that involve the reflection, absorption or refraction of light such as mirrors, sunglasses and prisms.
- Consider how best to ensure growth of plants.
- Consider how decisions are made to grow particular plants and crops depending on environmental conditions.
- Compare the benefits of using solid, liquid or gaseous fuels to heat a home.
- Describe the safety aspects of using gases.

**Focus**

- Primary Connections resources.

**Questioning and predicting**

- With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be.

**Planning and conducting**

- With guidance, plan appropriate investigation methods to answer questions or solve problems.
- Decide which variable should be changed and measured in fair tests and accurately observe, measure and record data, using digital technologies as appropriate.
- Use equipment and materials safely, identifying potential risks.

**Processing and analysing data and information**

- Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate.
- Compare data with predictions and use as evidence in developing explanations.

**Evaluating**

- Suggest improvements to the methods used to investigate a question or solve a problem.

**Communicating**

- Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts.

**Focus**

- Primary Connections resources.

**Biological sciences**

- The growth and survival of living things are affected by the physical conditions of their environment.

**Chemical sciences**

- Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible, such as burning and rusting.

**Earth and space sciences**

- Sudden geological changes or extreme weather conditions can affect Earth's surface.

**Physical sciences**

- Electrical circuits provide a means of transferring and transforming electricity.
- Energy from a variety of sources can be used to generate electricity.

**Focus**

- *Marvellous micro-organisms* – Primary Connections
- *Change detectives* - Primary Connections
- *Earthquake explorers or Volcanoes* - Primary Connections
- *It's electrifying and Essential energy* - Primary Connections
- Five E's – Engage, Explore, Explain, Elaborate and Evaluate.
- Team Skills.
- Team Roles.

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**Nature and development of science**

- Investigate how knowledge about the effects of using the Earth's resources has changed over time.
- Describe how understanding of the causes and effects of major natural events has changed as new evidence has become available.
- Investigate the use of electricity, including predicting the effects of changes to electric circuits.
- Consider how gathering evidence helps scientists to predict the effect of major geological or climatic events.
- Investigate how people from different cultures have used sustainable sources of energy, for example water and solar power.
- Explore institutions and locations where contemporary Australian scientists conduct research on catastrophic natural events.
- Learn how Aboriginal and Torres Strait Islander knowledge, such as the medicinal and nutritional properties of Australian plants, is being used as part of the evidence base for scientific advances.
- Investigate the development of earthquake measurements from the Chinese invention of the seismograph in the second century.

**Use and influence of science**

- Research the scientific work involved in global disaster alerts and communication, such as cyclone, earthquake and tsunami alerts.
- Investigate how electrical energy is generated in Australia and around the world.
- Research the use of methane generators in Indonesia.
- Consider how electricity and electrical appliances have changed the way some people live.
- Consider how personal and community choices influence our use of sustainable sources of energy.
- Investigate how understanding of catastrophic natural events helps in planning for their early detection and minimising their impact.
- Recognise that science can inform choices about where people live and how they manage natural disasters.
- Consider how guidelines help to ensure the safe use of electrical devices.
- Discuss the use of electricity and the conservation of sources of energy.

**Focus**

- Primary Connections resources.

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**Evaluating**

- Suggest improvements to the methods used to investigate a question or solve a problem.

**Communicating**

Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts.

**Focus**

- Primary Connections resources.

**Separating Mixtures:**

Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques

**Earth in Space/Earth's Resources:**

Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon

Earth's gravity pulls objects towards the centre of the Earth

Some of Earth's resources are renewable, but others are non-renewable

**The Living World:**

There are differences within and between groups of organisms; classification helps organise this diversity  
Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions

**Forces and Using Magnets**

Change to an object's motion is caused by unbalanced forces acting on the object

Earth's gravity pulls objects towards the centre of the Earth

**Living Places**

Water is an important resource that cycles through the environment

**Working in a Laboratory**

Use scientific knowledge and findings from investigations to evaluate claims

**Science Skills**

Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed

In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task

**Separating Mixtures**

Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate

**Earth in Space/Resources**

Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate

**Living World**

Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions

**Living Places**

Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions

**How Things Work**

Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method

**Working in a Laboratory**

Science Knowledge can develop through collaboration and connecting ideas across the disciplines of science.

**Science Skills**

People use understanding and skills from across the disciplines of science in their science occupations

**Earth in Space/Earth's Resources**

Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.

Science Knowledge can develop through collaboration and connecting ideas across the disciplines of science.

**Living world**

Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.

**Forces and Magnets:**

Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.

**Living Places:**

Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world.

**How Things work:**

People use understanding and skills from across the disciplines of science in their science occupations

**Chemical Reactions**

Chemical change involves substances reacting to form new substances

**Energy in Our Lives**

Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems

**Cells:**

Cells are the basic units of living things and have specialised structures and functions

**Body Systems:**

Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce

**Particles and Heat Energy:**

The properties of the different states of matter can be explained in terms of the motion and arrangement of particles

**Elements and Compounds:**

Differences between elements, compounds and mixtures can be described at a particle level

**Rocks:**

Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales

**Science at Work**

Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge

In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task

**Chemical Reactions**

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed

**Science at Work:**

Science Knowledge can develop through collaboration and connecting ideas across the disciplines of science. People use understanding and skills from across the disciplines of science in their science occupations

**Chemical Reactions:**

Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management.

**Energy in our Lives:**

Science and technology contribute to finding solutions to a range of contemporary issues, these solutions may impact on other areas of society and involve ethical considerations.

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**Elements and compounds:**

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**Everyday Substances:**

Science and technology contribute to finding solutions to a range of contemporary issues, these solutions may impact on other areas of society and involve ethical considerations.

**Inside the Atom:**

All matter is made of atoms which are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms

Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed

**Everyday Reactions:**

Chemical reactions, including combustion and the reactions of acids, are important in both nonliving and living systems and involve energy transfer

**Body Balance:**

Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment

**Light and Sound:**

Energy transfer through different mediums can be explained using wave and particle models

**Ecosystems:**

Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems

**Electrical Energy/ Using Electricity:**

Energy transfer through different mediums can be explained using wave and particle models

**Dynamic Earth:**

The theory of plate tectonics explains global patterns of geological activity and continental movement

**Inside the Atom:**

Scientific understanding, including models and theories, are contestable and refined over time through a process of review by the scientific community.

Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries.

**Everyday reactions:**

People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions

**Light and Sound:**

Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries.

**Electricity:**

Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities.

The values and needs of contemporary society can influence the focus of scientific research.

**Ecosystems:**

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**Microbes:**

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**Dynamic Earth:**

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**The Periodic Table:**

The atomic structure and properties of elements are used to organise them in the Periodic Table

**Investigating Reactions:**

Different types of chemical reactions are used to produce a range of products and can occur at different rates

**Inheritance:**

The transmission of heritable characteristics from one generation to the next involves DNA and genes

**Evolution:**

The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence

**Space Science:**

The universe contains features including galaxies, stars and solar systems and the Big Bang theory can be used to explain the origin of the universe

**Earth Systems:**

Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere

**Road Science:**

The motion of objects can be described and predicted using the laws of physics

**Our Energy Future:**

Energy conservation in a system can be explained by describing energy transfers and transformations

**Investigating Reactions**

Formulate questions or hypotheses that can be investigated scientifically.

Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data

**Inheritance**

Use knowledge of scientific concepts to draw conclusions that are consistent with evidence

**Evolution**

Plan, select and use appropriate investigation methods, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods.

Use knowledge of scientific concepts to draw conclusions that are consistent with evidence.

Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data.

Communicate scientific ideas and information for a particular purpose, including constructing evidence based arguments and using appropriate scientific language, conventions and representations

**Space Science**

Critically analyse the validity of information in secondary sources and evaluate the approaches used to solve problems

Communicate scientific ideas and information for a particular purpose, including constructing evidence based arguments and using appropriate scientific language, conventions and representations

**Road Science**

Formulate questions or hypotheses that can be investigated scientifically

Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data

Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies

**Our Energy Future**

Communicate scientific ideas and information for a particular purpose, including constructing evidence based arguments and using appropriate scientific language, conventions and representations

**Periodic Table**

Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community.

**Evolution**

Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community.

**Earth Systems**

People can use scientific knowledge to evaluate whether they should accept claims, explanations or predictions

**Space Science**

Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries.

The values and needs of contemporary society can influence the focus of scientific research.

**Road Science**

The values and needs of contemporary society can influence the focus of scientific research.

**Our Energy Future**

Advances in science and emerging sciences and technologies can significantly affect people's lives, including generating new career opportunities