

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>
P	<p><u>BIOLOGICAL SCIENCE</u></p> <ul style="list-style-type: none"> - Living things have basic needs, including food and water <p><u>CHEMICAL SCIENCE</u></p> <ul style="list-style-type: none"> - Objects are made of materials that have observable properties <p><u>EARTH & SPACE SCIENCE</u></p> <ul style="list-style-type: none"> - Daily and seasonal changes in our environment, including the weather, affect everyday life <p><u>PHYSICAL SCIENCE</u></p> <ul style="list-style-type: none"> - The way objects move depends on a variety of factors, including their size and shape <p><u>SCIENCE AS A HUMAN ENDEAVOUR</u></p>	<p><u>QUESTIONING AND PREDICTING</u></p> <ul style="list-style-type: none"> - Respond and pose questions make predictions about familiar objects and events. - Participate in guided investigations including making observations - Using informal measurements in the collection and recording of observations - Use a range of methods including drawings and tables to sort information - Compare observations and predictions with those of others - Represent and communicate observations and ideas about changes in objects and events in a variety of ways <p><u>PLANNING</u></p>	<ul style="list-style-type: none"> - People use science in everyday life
1	<p>Schoolyard Safari</p> <ul style="list-style-type: none"> - Living things have a variety of external features - Living things live in different places where their needs are met. <p>Spot the Difference</p> <ul style="list-style-type: none"> - Everyday materials can be physically changed in a variety of ways. - Up, down and all around - Observable changes occur in the sky and landscape. <p>Up, Down and All Around</p> <ul style="list-style-type: none"> - Observable changes occur in the sky and landscape <p>Look! Listen!</p> <ul style="list-style-type: none"> - Light and sound are produced by a range of sources and can be sensed. 		

<p style="text-align: center; font-size: 2em; font-weight: bold;">2</p>	<p>Watch it Grow</p> <ul style="list-style-type: none"> - Living things grow, change and have offspring similar to themselves. <p>All Mixed Up</p> <ul style="list-style-type: none"> - Different materials can be combined, including by mixing, for a particular purpose. <p>Water Works</p> <ul style="list-style-type: none"> - Earth's resources, including water, are used in a variety of ways <p>Push-Pull</p> <ul style="list-style-type: none"> - A push or pull affects how an object moves or changes shape. 		
<p style="text-align: center; font-size: 2em; font-weight: bold;">3</p>	<p><u>CHEMICAL SCIENCE</u></p> <ul style="list-style-type: none"> - A change of state between solid and liquid can be caused by adding or removing heat <p><u>BIOLOGICAL SCIENCE</u></p> <ul style="list-style-type: none"> - Living things can be grouped on the basis of observable features and can be distinguished from non-living things <p><u>EARTH & SPACE SCIENCE</u></p> <ul style="list-style-type: none"> - Earth's rotation on its axis causes regular changes, including night and day <p><u>PHYSICAL SCIENCE</u></p> <ul style="list-style-type: none"> - Heat can be produced in many ways and can move from one object to another including their size and shape <p><u>SCIENCE AS A HUMAN ENDEAVOUR</u></p>	<p><u>QUESTIONING AND PREDICTING</u></p> <ul style="list-style-type: none"> - With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge <p><u>PLANNING AND CONDUCTING</u></p> <ul style="list-style-type: none"> - 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><u>PROCESSING AND ANALYSING DATA AND INFORMATION</u></p> <ul style="list-style-type: none"> - 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><u>EVALUATING</u></p> <ul style="list-style-type: none"> - Reflect on the investigation, including whether a test was fair or not <p><u>COMMUNICATING</u></p> <ul style="list-style-type: none"> - Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports 	<p><u>NATURE AND DEVELOPMENT OF SCIENCE</u></p> <ul style="list-style-type: none"> - Science involves making predictions and describing patterns and relationships <p><u>USE AND INFLUENCE OF SCIENCE</u></p> <ul style="list-style-type: none"> - Science knowledge helps people to understand the effect of their actions

BIOLOGICAL SCIENCE

- Living things have life cycles. Living things, including plants and animals, depend on each other and the environment to survive

CHEMICAL SCIENCE

- Natural and processed materials have a range of physical properties; these properties can influence their use

EARTH AND SPACE SCIENCE

- Earth's surface changes over time as a result of natural processes and human activity

PHYSICAL SCIENCE

- Forces can be exerted by one object on another through direct contact or from a distance

QUESTIONING AND PREDICTING

- With guidance, identify questions in familiar contexts that can be investigated scientifically and predict what might happen based on prior knowledge

PLANNING AND CONDUCTING

- 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

PROCESSING AND ANALYSING DATA AND INFORMATION

- 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

EVALUATING

- Reflect on the investigation, including whether a test was fair or not

COMMUNICATING

- Represent and communicate ideas and findings in a variety of ways such as diagrams, physical representations and simple reports

NATURE AND DEVELOPMENT OF SCIENCE

- Science involves making predictions and describing patterns and relationships
- Science knowledge helps people to understand the effect of their actions

USE AND INFLUENCE OF SCIENCE

- Science knowledge helps people to understand the effect of their actions

BIOLOGICAL SCIENCE

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

CHEMICAL SCIENCE

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

EARTH & SPACE SCIENCE

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

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

FOCUS

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.
- Communicate ideas and processes using evidence to develop explanations of events and phenomena and to identify simple cause and effect relationships.

BIOLOGICAL SCIENCE

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

CHEMICAL SCIENCE

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

EARTH & SPACE SCIENCE

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

PHYSICAL SCIENCE

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

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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.

QUESTIONING AND PREDICTING

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PLANNING AND CONDUCTING

- With guidance, plan appropriate investigation methods to answer questions or solve problems.
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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.
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EVALUATING

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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/RESOURCES

- Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the sun, Earth and the moon
- Some of Earth's resources are renewable, but others are non-renewable

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

LIVING PLACES

- Water is an important resource that cycles through the environment

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

SCIENCE AS A HUMAN ENDEAVOUR

- Scientific knowledge and understanding of the world changes as new evidence becomes available, science knowledge can develop through collaboration and collecting ideas
- Science & technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations

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

CHEMICAL SCIENCE**Chemical Reactions:**

- Chemical change involves substances reacting to form new substances
- **Elements and Compounds:**
- Differences between elements, compounds and mixtures can be described at a particle level

ENERGY IN OUR LIVES

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

LIGHT AND SOUND

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

BIOLOGICAL SCIENCE**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

EARTH & SPACE SCIENCE**Rocks:**

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

PHYSICAL SCIENCE**Light & Sound:**

- Light can form images using the reflective features of curved mirrors and refractive image of lenses & disperse to produce a spectrum which is part of a large spectrum of radiation

LIGHT & SOUND

- Light can form images using the reflective feature of lenses and can disperse to produce a spectrum which is part of a larger spectrum of radiation
- The properties of sound can be explained by a wave model

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

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

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
- An animal's response to coordinated by its CNS; neurons transmit electrical impulses and are connected by synapses

ECOSYSTEMS

- Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems
- Energy flow in Earth's atmosphere can be explained by the transfer of heat

ELECTRICAL ENERGY/ USING ELECTRICITY

- Energy transfer through different mediums can be explained using wave and particle models
- Electric circuits can be designed for diverse purposes using different components; the operation of circuits can be explained through the concepts of voltage & current
- The interaction of magnets can be explained by a field model magnets are used in the generation of electricity

DYNAMIC EARTH

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

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

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 including identification of independent, dependent and controlled variables.
- Construct and use a range of representations including graphs, keys, models and formulas to record and summarise data from student investigations and secondary sources to represent qualitative and quantitative patterns or relationships and distinguish between discrete and distinguishable data.
- Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data

INHERITANCE AND EVOLUTION

- Independently 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 investigation types.
- 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

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

ROAD SCIENCE

- 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