Government of Western Australia
School Curriculum and Standards Authority

Year levels: 3, 4, 5 and 6 | Learning area: Science

Plan for the primary years

Prior knowledge	Phases of schooling	Context
Diagnostic assessment: (if required) Students produce diagrams of familiar uses of force or energy to show the movement/transfer taking place, for example riding a bicycle. Students create a list identifying sources of energy or types of forces as appropriate. Students have been participating in Science lessons since Pre-primary and have previously examined forces, and energy.	In the middle to late childhood phase of schooling, students develop a sense of self, their world expands, and they begin to see themselves as members of larger communities. Learning experiences emphasise and lead to an appreciation of both the commonality and diversity of human experience and concerns.	All students use the same investigation template, tailored to their needs and curriculum, so are familiar with the requirements. All lessons include whole-class instruction for shared concepts, alongside small-group learning opportunities.

Year 3 content	Year 4 content	Year 5 content	Year 6 content

Science understanding
• Physical sciences
  ▪ Energy can move from one thing to another (transfer) and change form (transform)
 	
Science inquiry
• Entire strand covered through investigation and practicals
	Science understanding
	• Physical sciences
	  ▪ Forces are exerted by one object on another through direct contact, such as friction, or from a distance, such as magnetism and gravity
	
	Science inquiry
	• Entire strand covered through investigation and practicals
		Science understanding
		• Physical sciences
		  ▪ Light energy travels from a source in a straight path and can be absorbed, reflected, refracted, form shadows and be sensed
		
		Science inquiry
		• Entire strand covered through investigation and practicals
			Science understanding
			• Physical sciences
			  ▪ The transfer and transformation of energy in electrical circuits, including the role of circuit components, insulators and conductors
			
			Science inquiry
			• Entire strand covered through investigation and practicals

Year 3–Year 4 conceptual links	Year 5–Year 6 conceptual links
• Movement/transfer of energy • Types of energy/forces • Contact vs non-contact forces, or energy moving from one object to another • Science inquiry skills – questioning, predicting, planning, conducting etc. • Safety	• Movement/transfer of energy • Pathways of energy • Science inquiry skills – questioning, predicting, planning, conducting etc. • Safety

Years 3–6 conceptual links

- Movement of energy
- Types of energy
- Transfer/transformation
- Sources of energy
- Contact/non-contact for forces and energy to transfer
- Science inquiry skills – questioning, predicting, planning, conducting etc.
- Safety

Teach

Common understandings

Some suggested common understandings that could be applied across year groups for teaching

Common vocabulary:	Common skills:	Common concepts:
• energy, forces, fair test, transfer/transformation • questioning, predicting, conducting, safety risks, fair test, data, results	• Science inquiry skills – questioning, predicting, planning, conducting etc. • Assessing safety risks • Diagrams – using arrows to show the path of forces/energy and labels	• Energy is the capacity to do work and comes in different forms. • Scientists use arrows to show the transfer/transformation of energy, as well as the direction and size of forces. • Safety should always be considered when conducting investigations.

Suggested learning experiences

Learning experiences that provide a cumulative progression of knowledge and skills

beginning activities → **extension activities**

• Sort forces into contact and non-contact. • Use arrows to show force or energy. • Shine a torch through different materials.	• Create a Rube Goldberg machine, recording the energy transfers and transformations taking place and what forces are in use. • Make a closed circuit that turns on a light, identifying the movement of energy and how the light moves once the globe is lit up. • Use mirrors and a torch to investigate the movement of light. • Investigation: How does distance affect shadow size? • Investigation: How far can different balls travel when kicked? • Test the size of the field that a magnet can act upon.	• Develop a closed circuit and demonstrate the transfer and transformation of energy using diagrams and descriptions. • Investigation: How far can the light from different globes travel? • Explore the uses of different types of energy to transform into electricity, e.g. heat through burning fossil fuels or geothermal sources, kinetic through wind energy.

Assess

Consider the learning experiences and identify the points of assessment for each year level (against the year level Achievement standard)

Assessment ideas for Year 3	Assessment ideas for Year 4	Assessment ideas for Year 5	Assessment ideas for Year 6
Formative: • Brainstorm identifying types of energy and their uses, creating diagrams showing energy transfer and transformation using arrows. Summative: • When given everyday examples such as kicking a ball, frying an egg or turning on a light, identify an energy transfer or transformation. Use arrows to show this energy transfer/transformation, using appropriate scientific vocabulary. Formative and summative: • Inquiry skills, based on investigations	Formative: • Brainstorm examples of forces and categorise them as contact or non-contact. Summative: • Explain the forces at work in everyday examples such as magnets, paper planes and bowling. Produce diagrams using force arrows and identify each force as either contact or non-contact. Formative and summative: • Inquiry skills, based on investigations	Formative: • Identify sources of light, verbally describing the nature of light and how it moves. Define scientific vocabulary and use it accurately in context. Summative: • Produce diagrams and explanations of how light can be reflected, refracted and absorbed based on practical experiences throughout the unit. Formative and summative: • Inquiry skills, based on investigations	Formative: • Identify common components of circuits and their roles. Look at students' circuit diagrams and their use of circuit symbols to see if the diagrams are correct, and the circuit works. Summative: • Complete a task using a simple circuit. Use components to produce the working circuit and then produce a diagram of the circuit. The diagram should use arrows, labels and detailed explanations to describe the behaviour of the electricity. Formative and summative: • Inquiry skills, based on investigations

Relevant statements from the Year 3 Achievement standard	Relevant statements from the Year 4 Achievement standard	Relevant statements from the Year 5 Achievement standard	Relevant statements from the Year 6 Achievement standard
Students understand that energy can be transferred and transformed. Students explore science ideas by posing guided questions about the effect on one variable of changing another. They make predictions, with assistance, and test them by planning and conducting safe investigations that account for variables to be kept the same. They make and record observations with some familiar scaled instruments, such as thermometers. They organise data using tables, column graphs or models. With support, they communicate findings using familiar scientific vocabulary. Students use science knowledge to propose explanations for observed phenomena and simple solutions to problems.	Students identify contact and non-contact forces and describe, with examples, how they affect the behaviour of objects. Students explore science ideas by posing questions, with guidance, that include variables to measure and change. They make predictions based on observations and test them by planning and conducting scaffolded investigations. They make and record observations in a variety of ways and using a diversity of scaled instruments. They organise and represent data in tables, column graphs and models to identify patterns. They communicate findings using scientific vocabulary in correct contexts. Students use science knowledge to propose explanations for observed phenomena and solutions to problems.	Students identify sources of light, describe how light travels in a straight line and explain how it is reflected, refracted, absorbed, forms shadows and can be sensed. Students pose testable questions that include variables to be changed and measured. They apply science knowledge to make predictions and, with guidance, plan and conduct safe, fair investigations to test them. Students use a variety of equipment to observe, measure and record data that they organise using tables, graphs and models to identify the relationship between variables, including using line graphs to represent continuous data. Students compare their methodology with others to determine whether investigations were fair and identify ways to improve their process. They communicate their investigation procedure, data and results in various ways. Students use science knowledge to develop considered responses to problems, at a local level, through investigation and research.	Students identify the role of circuit components, insulators and conductors in the transfer and transformation of electrical energy. Students pose testable questions that include variables to be changed and measured and apply science knowledge to make reasoned predictions. They plan and conduct safe, fair, repeatable investigations to test predictions and identify the relationship between variables. Students use equipment to generate and record data that they process and represent using tables, graphs and models to describe their findings, including using line graphs to represent continuous data. They evaluate the fairness of an investigation, identifying difficulties and ways to minimise these. They compare their results to their predictions, posing questions for further investigation. With assistance, students draw conclusions based on collected data and communicate these in various ways, including scientific reports. They use science knowledge to develop considered responses to problems, at a local and global level, through investigation and research.

Make curriculum links to other learning areas

Consider the authentic connections that can be made across learning areas to develop connected programs

English: Writing, Reading and Speaking and listening – writing and following instructions, examining non-fiction texts, exploring the use of diagrams to convey information.

Technologies: Design and Technologies: Engineering principles and systems – investigating how forces and the properties of materials affect the behaviour of objects and systems.

Mathematics: Measurement – displaying data using tables, graphs and other visible models, measuring and interpreting data.

Health and Physical Education: Physical education – investigating the transfer of energy and force through sports games.