

Circuits and switches Assessment Rubrics

Year 6 Achievement Standard

By the end of Year 6, students compare and classify different types of observable changes to materials. They **analyse requirements for the transfer of electricity and describe how energy can be transformed from one form to another when generating electricity**. They explain how natural events cause rapid change to Earth's surface. They describe and predict the effect of environmental changes on individual living things. **Students explain how scientific knowledge helps us to solve problems and inform decisions and identify historical and cultural contributions.**

Students follow procedures to develop investigable questions and design investigations into simple cause-and-effect relationships. They identify variables to be changed and measured and describe potential safety risks when planning methods. They collect, organise and interpret their data, identifying where improvements to their methods or research could improve the data. They describe and analyse relationships in data using appropriate representations, and construct multimodal texts to communicate ideas, methods and findings.

Note: The sections relevant to *Circuits and switches* are bolded above. The full rubrics for all year levels are available on the PrimaryConnections website.

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
SCIENCE UNDERSTANDING						
Physical sciences	Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources (ACSSU097)	Analyses requirements for the transfer of electricity and describes how energy can be transformed from one form to another when generating electricity	<ul style="list-style-type: none"><i>Circuits and switches</i> Report	<ul style="list-style-type: none">Describes non-scientific ideas about requirements for the transfer of electricityRecalls simple ideas about sources and uses of energy	<ul style="list-style-type: none">Describes how energy is transferred within an electric circuitDescribes how energy can be transformed from one form to another to generate electricity	<ul style="list-style-type: none">Provides detailed information about how energy is transferred within an electric circuit and the role of each of its componentsDescribes and explains how energy from a variety of sources is transferred and transformed to generate electricity

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				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
SCIENCE AS A HUMAN ENDEAVOUR						
Nature and development of science	Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena, and reflects historical and cultural contributions (ACSHE098)	Develops investigable questions and designs investigations into simple cause-and-effect relationships	<ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Recalls that science involves asking questions and collecting dataSuggests how different cultures have contributed to the development of science knowledge	<ul style="list-style-type: none">Discusses how science involves developing investigable questions, and collecting, organising and interpreting their dataIdentifies contributions to the development of science by people from a range of cultures	<ul style="list-style-type: none">Explains in detail how science involves developing investigable questions, collecting data to test predictions, and analysing their dataExplains how different cultures have contributed to the development of science knowledge
Use and influence of science	Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100)	Explains how scientific knowledge helps us to solve problems and inform decisions, and identify historical and cultural contributions	<ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Makes suggestions about how scientific knowledge has affected people's lives	<ul style="list-style-type: none">Explains how scientific knowledge is used in decision-making	<ul style="list-style-type: none">Describes in detail how scientific knowledge has affected people's lives and influenced their decision-making

 The Achievement standard and Content descriptions are sourced from the Australian Curriculum.

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				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
SCIENCE INQUIRY SKILLS						
Questioning and predicting	With guidance, pose clarifying questions and make predictions about scientific investigations (ACSIS232)	Follows procedures to develop investigable questions	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Suggests questions to investigatePredicts what might happen in an investigation, without supporting evidence	<ul style="list-style-type: none">Follows procedures to develop investigable questions	<ul style="list-style-type: none">Asks pertinent and investigable questions and predicts the outcomes of investigations, supported with detailed evidence based on their knowledge and experiences

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				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
SCIENCE INQUIRY SKILLS						
Planning and conducting	Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (ACSIS103)	Designs investigations into simple cause-and-effect relationships Describes potential safety risks when planning methods	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Follows procedures to plan an investigationFollows guidelines on how to safely use equipment to make and record observations	<ul style="list-style-type: none">Designs investigations into simple cause-and-effect relationshipsDescribes potential safety risks when planning methods	<ul style="list-style-type: none">Demonstrates a detailed understanding of how to design and conduct science investigations to answer questions or solve problemsExplains in detail the potential safety risks when planning methods
	Decide variables to be changed and measured in fair tests, and observe, measure and record data with accuracy using digital technologies as appropriate (ACSIS104)	Identifies variables to be changed and measured	<ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Lists ideas on variables in fair tests	<ul style="list-style-type: none">Identifies variables to be changed and measured	<ul style="list-style-type: none">Identifies variables and articulates why a test is fair or not

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				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
SCIENCE INQUIRY SKILLS						
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 (ACSIS107)	Describes and analyses relationships in data using appropriate representations	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Follows simple procedures to use provided tables and graphs, and describes relationships in data	<ul style="list-style-type: none">Describes and analyses relationships in data using appropriate representations	<ul style="list-style-type: none">Independently constructs and uses tables and graphs to represent and analyse observations, patterns or relationships in data
	Compare data with predictions and use as evidence in developing explanations (ACSIS221)	Collects, organises and interprets their data	<ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Suggests reasons for findings that are obvious and follow explicitly from evidence	<ul style="list-style-type: none">Collects, organises and interprets their data	<ul style="list-style-type: none">Analyses data to explain findings and use as evidence in developing explanations

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SCIENCE INQUIRY SKILLS						
Evaluating	Reflect on and suggest improvements to scientific investigations (ACSIS108)	Identifies where improvements to their methods or research could improve the data	<ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Demonstrates non-scientific ideas of a fair investigation	<ul style="list-style-type: none">Identifies where improvements to their methods or research could improve the data	<ul style="list-style-type: none">Articulates why a test is fair or not and suggests ways to improve the investigation
Communicating	Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multimodal texts (ACSIS110)	Constructs multimodal texts to communicate ideas, methods and findings	<i>Evaluate</i> phase in: <ul style="list-style-type: none"><i>Circuits and switches</i>	<ul style="list-style-type: none">Presents a limited report on findings	<ul style="list-style-type: none">Constructs multimodal texts to communicate ideas, methods and findings	<ul style="list-style-type: none">Completes extended reports using claims and evidence to communicate their methods and findings

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GLOSSARY

Describe	Give an account of characteristics or features.
Identify	Establish or indicate who or what someone or something is.
Explain	Provide additional information that demonstrates understanding of reasoning and/or application.
Compare	Estimate, measure or note how things are similar or dissimilar.
Analyse	Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences.
Classify	Arrange into named categories in order to sort, group or identify.
Predict	Suggest what might happen in the future or as a consequence of something.
Develop	To elaborate or expand in detail.
Design	Plan and evaluate the construction of a product or process.
Organise	To form as or into a whole consisting of a sequence or interdependent parts.
Interpret	Explaining the meaning of information or actions.
Construct	Build or make.
Solve	To work out a correct solution to a problem.

Acknowledgements

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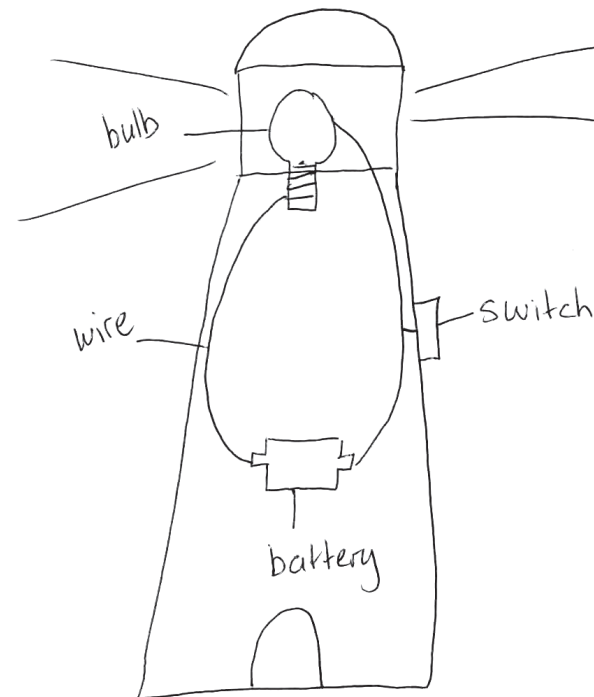
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Year 6 Work samples

Summative Assessment of Science Understanding

Below Achievement Standard

Our lighthouse



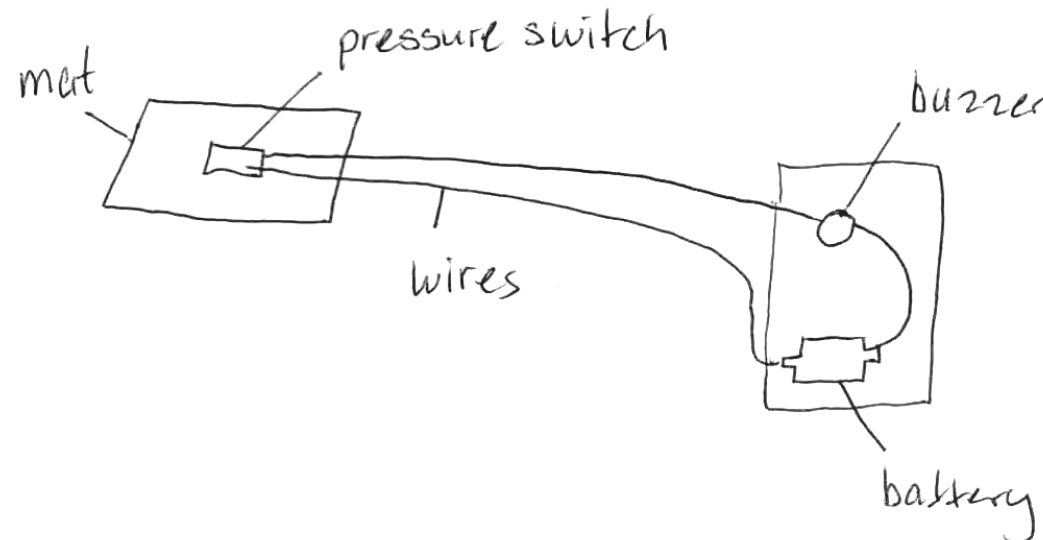
The lighthouse works because it has a circuit. Electricity goes in the wires to the bulb. Electricity comes out of the wires that are connected to the battery. When the battery is flat all of the energy has been used up and the bulb doesn't work anymore. The switch makes the light go on and off.

Year 6 Work samples

Summative Assessment of Science Understanding

At Achievement Standard

A door buzzer



We made a door buzzer. The circuit has a battery, three wires and a pressure switch. The electrical energy from the battery flows in one direction around the circuit and is transferred by the wires. When pressure is put on the switch, it closes the circuit and the buzzer transforms the electrical energy to sound energy. Then you hear the buzzer and know that someone has come in!

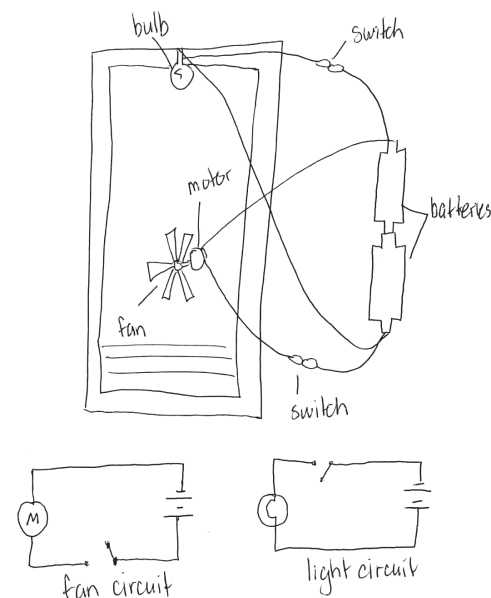
Year 6

Work samples

Summative Assessment of Science Understanding

Above Achievement Standard

A refrigerator



For our fridge we made a parallel circuit. One circuit is for the bulb and the other is for the fan to help keep the fridge cool. We made a parallel circuit so that if the bulb blows, then the fan won't be affected because it is on a different circuit.

The circuits work because the chemical energy of the batteries give the electrons in the wire a push and the electrons transfer the electrical energy from the battery to the bulb or the motor. The bulb transforms the electrical energy into light energy and a little heat energy. The motor

transforms the electrical energy into movement energy, which turns the fan that transforms the movement energy into wind energy.

The switches work because they are made out of metal, which is a conductor of electrical energy. When the switch is closed (on) the circuit is complete and the electrons can flow around the wire in one direction. When the switch is open (off) the circuit is broken and the light won't shine or the fan won't turn because the pathway for the electrons is broken.

Year 6 Work samples

Summative Assessment of Science Inquiry Skills

Below Achievement Standard

Questioning and predicting

<p>What are you going to investigate?</p> <p>What materials will make the bulb work?</p> <p>Can you write it as a question?</p>	<p>What do you predict will happen? Why?</p> <p>the light will light up</p> <p>Give scientific explanations for your prediction</p>
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Processing and analysing data and information

Explaining results

<p>Write a statement to summarise your findings about the materials investigated.</p> <p>Shiny things make the light bulb light up. Straws and toothpicks didn't.</p>
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Evaluating

Evaluating the investigation

<p>What challenges did you have doing this investigation?</p> <p>stopping people from mucking around.</p>	<p>How could you improve this investigation? (fairness, accuracy)</p> <p>Use a stronger battery next time.</p>
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Year 6 Work samples

Summative Assessment of Science Inquiry Skills

At Achievement Standard

Questioning and predicting

What are you going to investigate?

What will happen to the bulb when we change the materials we use for a switch?

Can you write it as a question?

What do you predict will happen? Why?

I think that the materials made out of metal will light up the bulb because they let the energy flow through.

Give a scientific explanation for your prediction

Processing and analysing data and information

Explaining results

Write a statement to summarise your findings about the materials investigated.

The materials made out of metal (paperclips, metal spoon, foil) made the light bulb glow. The materials made out of other materials like paper, rubber and plastic didn't.

Evaluating

Evaluating the investigation

What challenges did you have doing this investigation?

Finding different materials to fit in the test area.

How could you improve this investigation? (fairness, accuracy)

Keep the size of the materials we tested the same.

Year 6 Work samples

Summative Assessment of Science Inquiry Skills

Above Achievement Standard

Questioning and predicting

What are you going to investigate?

What will happen to the bulb in a circuit when we change the materials used for a switch?

Can you write it as a question?

What do you predict will happen? Why?

I predict that materials that are made of metal will allow the electrons to flow because they are conductors.

Give scientific explanations for your prediction

Processing and analysing data and information

Explaining results

Write a statement to summarise your findings about the materials investigated.

We found that the materials that were made from metal allowed the electrons to flow around the circuit and light up the bulb. They are called conductors. The materials not made out of metal are called insulators and stop the flow of electrons so the bulb doesn't light up.

Evaluating

Evaluating the investigation

What challenges did you have doing this investigation?

We had to keep checking that the battery and bulb were connected so we knew that it was the material not the wire stopping the bulb lighting up.

How could you improve this investigation? (fairness, accuracy)

Testing more types of materials to make sure our claim is correct.

Student Self-Assessment

Circuits and switches Student checklist Year 6

Name: _____

Date: _____

Strand	What I can do	I need help to do this	I can do this	I can do this very well
Science Understanding	I can describe how energy is transferred within an electric circuit.			
	I can describe how energy can be transformed from one form to another in an electric circuit.			
Science as a Human Endeavour	I can explain how scientific knowledge helps us to solve problems and make decisions.			
	I can explain how history and different cultures have contributed to the development of scientific knowledge.			
Science Inquiry Skills	I can predict what might happen in an investigation.			
	I can suggest ways to do an investigation.			
	I can identify the variables in an investigation.			
	I can describe how to use equipment safely.			
	I can record my observations in a table.			
	I can find patterns and relationships in my data.			
	I can make claims based on my evidence.			
	I can compare my results with my predictions.			
	I can explain why a test is fair or not.			
	I can describe where improvements could be made in my investigation.			
	I can make a report about my claims and evidence from my investigation and share it with others.			

Achievement Standard Class Checklist

Year 6 Physical sciences

(This checklist is designed to be used in conjunction with the Assessment Rubric for the *Circuits and switches* unit.)

	Science Understanding	Science as a Human Endeavour		Science Inquiry Skills						
	Analyses requirements for the transfer of electricity and describes how energy can be transformed from one form to another when generating electricity	Develops investigable questions and designs investigations into simple cause-and-effect relationships	Explains how scientific knowledge helps us to solve problems and inform decisions and identify historical and cultural contributions	Follows procedures to develop investigable questions	Designs investigations into simple cause-and-effect relationships Describes potential safety risks when planning methods	Identifies variables to be changed and measured	Describes and analyses relationships in data using appropriate representations	Collects, organises and interprets their data	Identifies where improvements to their methods or research could improve the data	Constructs multimodal texts to communicate ideas, methods and findings
Example: Student A	AAS	AS	AS	AS	AS	AAS	AS	AS	BS	AS

BAS – Below Achievement Standard This indicates that the student has a limited understanding of the concept and/or skill.
AS – At Achievement Standard This indicates that the student has a good understanding of the concept and/or skill.
AAS – Above Achievement Standard This indicates that the student has a detailed understanding of the concept and/or skill.