

Year 6 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 to generate electricity. They explain how natural events cause rapid change to the Earth's surface. They describe and predict the effect of environmental changes on individual living things. Students explain how scientific knowledge is used in decision making and identify contributions to the development of science by people from a range of cultures.

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 graphic representations and construct multi-modal texts to communicate ideas, methods and findings.

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
SCIENCE UNDERSTANDING						
Biological sciences	The growth and survival of living things are affected by the physical conditions of their environment (ACSSU094)	Describes and predicts the effect of environmental changes on individual living things	<i>Marvellous micro-organisms</i> Presentation	<ul style="list-style-type: none">Recalls the conditions that micro-organisms need to growLists the role of micro-organisms in food and medicine	<ul style="list-style-type: none">Explains the conditions that micro-organisms need to growDescribes the role of micro-organisms in food and medicine	<ul style="list-style-type: none">Provides detailed information about micro-organisms, how they are affected by the conditions of their environment, and the importance of the role they play in our lives

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

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SCIENCE UNDERSTANDING						
Chemical sciences	Changes to materials can be reversible, such as melting, freezing, evaporating; or irreversible, such as burning and rusting (ACSSU095)	Compares and classifies different types of observable changes to materials	<i>Change detectives</i> Report	<ul style="list-style-type: none">Identifies different changes to materials and suggests why they have occurred	<ul style="list-style-type: none">Identifies different changes to materials and explains why they have occurred	<ul style="list-style-type: none">Explains in detail the chemical and physical changes to materials, why they have occurred and if they are reversible or irreversible
Earth and space sciences	Sudden geological changes or extreme weather conditions can affect Earth’s surface (ACSSU096)	Explains how natural events cause rapid change to the Earth’s surface	<i>Earthquake explorers</i> Poster	<ul style="list-style-type: none">Lists the causes and effects of earthquakes	<ul style="list-style-type: none">Describes the causes and effects of earthquakes	<ul style="list-style-type: none">Describes and explains the causes and effects of earthquakes

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SCIENCE UNDERSTANDING						
Physical sciences	Electrical circuits provide a means of transferring and transforming electricity (ACSSU097)	Analyses requirements for the transfer of electricity	<i>It's electrifying</i> Report	<ul style="list-style-type: none">Describes non-scientific ideas about requirements for the transfer of electricity	<ul style="list-style-type: none">Describes how energy is transferred within an electric circuit	<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 components
	Energy from a variety of sources can be used to generate electricity (ACSSU219)	Describes how energy can be transformed from one form to another to generate electricity	<i>Essential energy</i> Poster Flyer	<ul style="list-style-type: none">Recalls simple ideas about sources and uses of energy	<ul style="list-style-type: none">Describes how energy can be transformed from one form to another to generate electricity	<ul style="list-style-type: none">Describes and explains how energy from a variety of sources is transferred and transformed to generate electricity

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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 (ACSHE098)	Discusses how science involves developing investigable questions and collecting, organising and interpreting their data	<ul style="list-style-type: none">• <i>Marvellous micro-organisms</i>• <i>Change detectives</i>• <i>Earthquake explorers</i>• <i>It's electrifying</i>• <i>Essential energy</i>	Recalls that science involves asking questions and collecting data	Discusses how science involves developing investigable questions and collecting, organising and interpreting their data	Provides a detailed understanding of how science involves developing investigable questions, collecting data to test predictions, and analysing their data
	Important contributions to the advancement of science have been made by people from a range of cultures (ACSHE099)	Identifies contributions to the development of science by people from a range of cultures	<ul style="list-style-type: none">• <i>Marvellous micro-organisms</i>• <i>Change detectives</i>• <i>Earthquake explorers</i>• <i>It's electrifying</i>• <i>Essential energy</i>	Suggests how different cultures have contributed to the development of science knowledge	Identifies contributions to the development of science by people from a range of cultures	Has a detailed understanding of how different cultures have contributed to the development of science knowledge

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SCIENCE AS A HUMAN ENDEAVOUR						
Use and influence of science	Scientific understandings, discoveries and inventions are used to solve problems that directly affect people's lives (ACSHE100)	Explains how scientific knowledge is used in decision making	<ul style="list-style-type: none">• <i>Marvellous micro-organisms</i>• <i>Change detectives</i>• <i>Earthquake explorers</i>• <i>It's electrifying</i>• <i>Essential energy</i>	Makes suggestions about how scientific knowledge has affected people's lives	Explains how scientific knowledge is used in decision making	Describes in detail how scientific knowledge has affected people's lives and influenced their decision making
	Scientific knowledge is used to inform personal and community decisions (ACSHE220)					

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SCIENCE INQUIRY SKILLS						
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 (AC SIS232)	Follows procedures to develop investigable questions	<i>Elaborate</i> phase in: <ul style="list-style-type: none">• <i>Marvellous micro-organisms</i>• <i>It's electrifying</i>• <i>Change detectives</i>• <i>Essential energy</i>	<p>Suggests questions to investigate</p> <p>Predicts what might happen in an investigation, without supporting evidence</p>	Follows procedures to develop investigable questions	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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SCIENCE INQUIRY SKILLS						
Planning and conducting	With guidance, plan appropriate investigation methods to answer questions or solve problems (ACSIS103)	Designs investigations into simple cause-and-effect relationships	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Marvellous micro-organisms</i><i>Change detectives</i><i>Essential energy</i>	Follows procedures to plan an investigation	Designs investigations into simple cause-and-effect relationships	Demonstrates a detailed understanding of how to design and conduct science investigations 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 (ACSIS104)	Identifies variables to be changed and measured	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Marvellous micro-organisms</i><i>Change detectives</i><i>Essential energy</i>	Lists ideas on variables in fair tests	Identifies variables to be changed and measured	Identifies variables and articulates why a test is fair or not
	Use equipment and materials safely, identifying potential risks (ACSIS105)	Describes potential safety risks when planning methods	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Change detectives</i>	Follows guidelines on how to safely use equipment to make and record observations	Describes potential safety risks when planning methods	Explains in detail the potential safety risks when planning methods

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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 (AC SIS107)	Describes and analyses relationships in data using graphic representations	<i>Elaborate</i> phase in: <ul style="list-style-type: none">• <i>Marvellous micro-organisms</i>• <i>It's electrifying</i>• <i>Change detectives</i>• <i>Essential energy</i>	Follows simple procedures to use provided tables and graphs and describes relationships in data	Describes and analyses relationships in data using graphic representations	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 (AC SIS221)	Collects, organises and interprets their data	<i>Elaborate</i> phase in: <ul style="list-style-type: none">• <i>Marvellous micro-organisms</i>• <i>It's electrifying</i>• <i>Essential energy</i>	Suggests reasons for findings that are obvious and follow explicitly from evidence	Collects, organises and interprets their data	Analyses data to explain findings and use as evidence in developing explanations

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SCIENCE INQUIRY SKILLS						
Evaluating	Suggest improvements to the methods used to investigate a question or solve a problem (ACSIS108)	Identifies where improvements to their methods or research could improve the data	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Marvellous micro-organisms</i><i>It's electrifying</i>	Demonstrates non-scientific ideas of a fair investigation	Identifies where improvements to their methods or research could improve the data	Articulates why a test is fair or not and suggests ways to improve the investigation
Communicating	Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts (ACSIS110)	Constructs multi-modal texts to communicate ideas, methods and findings	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Earthquake explorers</i> <i>Evaluate</i> phase in: <ul style="list-style-type: none"><i>Essential energy</i>	Presents a limited report on findings	Constructs multi-modal texts to communicate ideas, methods and findings	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.
Considered	Formed after careful thought.
Apply	Use, utilise or employ in a particular situation.
Explain	Provide additional information that demonstrates Understanding of reasoning and/or application.
Sequence	Arrange in order.
Familiar	Previously encountered in prior learning activities.
Discuss	Talk or write about a topic, taking into account different issues and ideas.
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.

Acknowledgements

PrimaryConnections is supported by the Australian Government.

Disclaimer

The views expressed herein do not necessarily represent the views of the Australian Government.

ESSENTIAL ENERGY

What is energy?

Energy is all around us and helps us make electricity

What are types of energy?

Solar energy- when we use electricity it comes from the solar on the roof

Chemical energy – when we use chemicals to make our bodies work

Motion energy – when we hit a ball that is motion energy

What are sources of energy?

Water makes waves and gives us energy

Fossil fuels are in the ground and we have to dig them up and they go into the atmosphere

The Sun gives us light so we can see.

What happens when energy is transferred?

It goes from the power point to something like the TV.

What happens when energy is transformed?

It turns into something else.

What will happen in the future?

In the future we have to stop using lots of energy and use the Sun instead.

Year 6 Work samples

Essential energy

Summative Assessment of Science Understanding

Below Achievement Standard

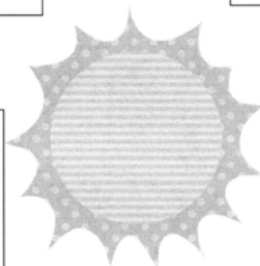
ESSENTIAL ENERGY

Energy makes things work.
We use energy every day.
Most of our energy is
electrical energy that comes
from power stations.

Some types of energy are:

Movement
Electrical
Light
Heat
Sound

Energy transfer is when
energy goes from one thing
to another such as heat
from the Sun heating up
water.



Energy transformation is
when energy goes from one
thing to another it changes
what type of energy it is
such as electrical energy
transforming to sound
energy.

Australia uses coal to
produce its electricity. Coal
is a fossil fuel and pollutes
our environment. It is also
not renewable.

Other types of energy are
oil, gas, solar, wind and
wave.

In the future Australia needs
to use more renewable
energy to make electricity
because our fossil fuels are
running out.

Year 6 Work samples










Essential energy Summative Assessment of Science Understanding

At Achievement Standard

Year 6 Work samples

Essential energy Summative Assessment of Science Understanding

Above Achievement Standard

ESSENTIAL ENERGY		
<p>Why do we need energy? Energy makes things work. We use energy in our everyday lives. Examples of our appliances that use electrical energy are:</p> 	<p>What types of energy are there? Some examples are:</p>  <p>A fan emits movement energy and uses electricity.</p>  <p>A hairdryer emits movement, heat and sound energy and uses electricity.</p>  <p>A tree has chemical energy and uses light.</p>	<p>What happens when energy is transferred? Energy is transferred when it passes from object to object One example is: A solar hot water system transfers heat from the Sun to water in the system and heats it up for us to use.</p> 
<p>What happens when energy is transformed? Energy is transformed when it takes on a different form of energy. Some machines that transform energy are:</p>  <p>Wind to electricity</p>  <p>Electricity to light, heat and sound</p>	<p>What are the sources of energy? Australia uses mainly coal which is a fossil fuel to generate electricity. Other fossil fuels that are used are oil and gas. Sources that are not fossil fuels are not used very much to generate electricity. They are: hydroelectricity, solar, wind, wave, tidal and geothermal.</p> 	<p>What the future holds We rely on fossil fuels to generate most of the electricity in Australia. Fossil fuels are not renewable and they release greenhouse gases into the atmosphere. We need to look at alternative energy sources that are renewable such as water, wind and solar.</p> 

Year 6 Work samples

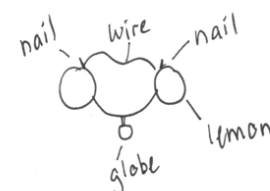
Essential energy Summative Assessment of Science Inquiry Skills

Below Achievement Standard

Questioning and predicting

What is your question for investigation? What happens to <u>the electricity</u> when we change <u>the fruit?</u>	What do you think will happen? Explain why. I think the lemon will work the best.
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Planning and conducting

To make the test fair, what things (variables) are you going to:		
Change? the fruit the wires	Measure/observe? the globe	Keep the same? • how many fruit • the globe
Change only one thing?	What would the change affect?	Which variables will you control?
Describe what you could change about the battery to generate more electricity:		
Annotated drawing of the new battery: 	What you will need: • 2 lemons • wires • globe • nails	

Processing and analysing data and information

Explaining results We found out that the lemon worked the best and that's what I predicted.

Year 6 Work samples

Essential energy Summative Assessment of Science Inquiry Skills

At Achievement Standard

Questioning and predicting

What is your question for investigation? What happens to the electricity generated by the battery when we change the type of plant material?	What do you think will happen? Explain why. I predict that because a lemon is a citrus fruit another citrus fruit will work.
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Planning and conducting

To make the test fair, what things (variables) are you going to:		
Change? the type of plant material <small>Change only one thing?</small>	Measure/observe? the brightness of the LED globe <small>What would the change affect?</small>	Keep the same? • the number of plant material • the globes • the equipment like the wires & nails <small>Which variables will you control?</small>
Describe what you could change about the battery to generate more electricity:		
Annotated drawing of the new battery: 	What you will need: • 2 pieces of copper • 2 nails • fruit & vegies • wire • globe	

Processing and analysing data and information

Explaining results The lemon was the best at lighting up the bulb and the carrot was the worst. The best ones were the citrus fruits. My prediction was kind of right because I predicted that the citrus fruits would light up the bulb the best. I did not think that the apple would work but it did.
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Year 6 Work samples

Essential energy

Summative Assessment of Science Inquiry Skills

Above Achievement Standard

Questioning and predicting

What is your question for investigation? What happens to <u>the electricity generated by the battery</u> when we change <u>the type of plant material?</u>	What do you think will happen? Explain why. I predict that any plant material that has acid like a lemon and a battery will light up the globe.
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Planning and conducting

To make the test fair, what things (variables) are you going to:		
Change? the type of plant material <small>Change only one thing?</small>	Measure/observe? the brightness of the LED <small>What would the change affect?</small>	Keep the same? • the number of plant material • the amount of metal • the type of metal • the globe <small>Which variables will you control?</small>
Describe what you could change about the battery to generate more electricity:		
Annotated drawing of the new battery: 	What you will need: <ul style="list-style-type: none"> • 2 pieces of copper • 2 nails • fruit & vegies • 3 pieces of wire • globe 	

Processing and analysing data and information

Explaining results My prediction was almost correct. I predicted that the plant material that contained acids would light up the bulb. They did but so did the apple and carrot. I think that the citrus fruits worked because they have acid in them just like the battery does. Acid conducts electricity and that is why the citrus fruits worked well. I wonder if the apple and carrot have acid in them as well but just not as much.

Student Self-Assessment

Essential energy Year 6 Physical sciences

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 can be transformed from one form to another to generate electricity			
Science as a Human Endeavour	I can identify where science is used to ask questions and make predictions			
	I can describe how different cultures have contributed to the development of science knowledge			
	I can describe situations where scientific developments have affected people's lives			
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 make a column or line graph			
	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			

Essential energy Year 6 Physical sciences

Date: _____

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

Achievement Standard Class Checklist

Essential energy Year 6 Physical sciences

(This checklist is designed to be used in conjunction with the Assessment Rubric for the *Essential energy* unit)

Date: _____

	Science Understanding	Science as a Human Endeavour			Science Inquiry Skills							
	Describes how energy can be transformed from one form to another to generate electricity	Develops investigable questions and designs investigations into simple cause-and-effect relationships	Identifies contributions to the development of science by people from a range of cultures	Explains how scientific knowledge is used in decision making	Follows procedures to develop investigable questions	Designs investigations into simple cause-and-effect relationships	Identifies variables to be changed and measured	Describes potential safety risks when planning methods	Describes and analyses relationships in data using graphic representations	Collects, organises and interprets their data	Identifies where improvements to their methods or research could improve the data	Constructs multi-modal texts to communicate ideas, methods and findings
Example: Student A	AAS		AS	AS		AAS	AS		AS			

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AS – At Achievement Standard This indicates that the student has a good understanding of the concept and/or skill
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