

# 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"><li>Recalls the conditions that micro-organisms need to grow</li><li>Lists the role of micro-organisms in food and medicine</li></ul>	<ul style="list-style-type: none"><li>Explains the conditions that micro-organisms need to grow</li><li>Describes the role of micro-organisms in food and medicine</li></ul>	<ul style="list-style-type: none"><li>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</li></ul>

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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"><li>Identifies different changes to materials and suggests why they have occurred</li></ul>	<ul style="list-style-type: none"><li>Identifies different changes to materials and explains why they have occurred</li></ul>	<ul style="list-style-type: none"><li>Explains in detail the chemical and physical changes to materials, why they have occurred and if they are reversible or irreversible</li></ul>
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"><li>Lists the causes and effects of earthquakes</li></ul>	<ul style="list-style-type: none"><li>Describes the causes and effects of earthquakes</li></ul>	<ul style="list-style-type: none"><li>Describes and explains the causes and effects of earthquakes</li></ul>

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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"><li>Describes non-scientific ideas about requirements for the transfer of electricity</li></ul>	<ul style="list-style-type: none"><li>Describes how energy is transferred within an electric circuit</li></ul>	<ul style="list-style-type: none"><li>Provides detailed information about how energy is transferred within an electric circuit and the role of each of its components</li></ul>
	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"><li>Recalls simple ideas about sources and uses of energy</li></ul>	<ul style="list-style-type: none"><li>Describes how energy can be transformed from one form to another to generate electricity</li></ul>	<ul style="list-style-type: none"><li>Describes and explains how energy from a variety of sources is transferred and transformed to generate electricity</li></ul>

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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"><li>• <i>Marvellous micro-organisms</i></li><li>• <i>Change detectives</i></li><li>• <i>Earthquake explorers</i></li><li>• <i>It's electrifying</i></li><li>• <i>Essential energy</i></li></ul>	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"><li>• <i>Marvellous micro-organisms</i></li><li>• <i>Change detectives</i></li><li>• <i>Earthquake explorers</i></li><li>• <i>It's electrifying</i></li><li>• <i>Essential energy</i></li></ul>	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"><li>• <i>Marvellous micro-organisms</i></li><li>• <i>Change detectives</i></li><li>• <i>Earthquake explorers</i></li><li>• <i>It's electrifying</i></li><li>• <i>Essential energy</i></li></ul>	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 (ACSIS232)	Follows procedures to develop investigable questions	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><li><i>Marvellous micro-organisms</i></li><li><i>It's electrifying</i></li><li><i>Change detectives</i></li><li><i>Essential energy</i></li></ul>	<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"><li><i>Marvellous micro-organisms</i></li><li><i>Change detectives</i></li><li><i>Essential energy</i></li></ul>	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"><li><i>Marvellous micro-organisms</i></li><li><i>Change detectives</i></li><li><i>Essential energy</i></li></ul>	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"><li><i>Change detectives</i></li></ul>	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"><li>• <i>Marvellous micro-organisms</i></li><li>• <i>It's electrifying</i></li><li>• <i>Change detectives</i></li><li>• <i>Essential energy</i></li></ul>	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"><li>• <i>Marvellous micro-organisms</i></li><li>• <i>It's electrifying</i></li><li>• <i>Essential energy</i></li></ul>	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"><li><i>Marvellous micro-organisms</i></li><li><i>It's electrifying</i></li></ul>	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"><li><i>Earthquake explorers</i></li></ul> <i>Evaluate</i> phase in: <ul style="list-style-type: none"><li><i>Essential energy</i></li></ul>	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

<b>Describe</b>	Give an account of characteristics or features.
<b>Identify</b>	Establish or indicate who or what someone or something is.
<b>Considered</b>	Formed after careful thought.
<b>Apply</b>	Use, utilise or employ in a particular situation.
<b>Explain</b>	Provide additional information that demonstrates Understanding of reasoning and/or application.
<b>Sequence</b>	Arrange in order.
<b>Familiar</b>	Previously encountered in prior learning activities.
<b>Discuss</b>	Talk or write about a topic, taking into account different issues and ideas.
<b>Compare</b>	Estimate, measure or note how things are similar or dissimilar.
<b>Analyse</b>	Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences.

## Acknowledgements

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## Disclaimer

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

### **An interview with Anton van Leeuwenhoek**

Thank you Mr van Leeuwenhoek for being with us today. We have heard about your work with microorganisms and would like to ask you a few questions.

**What are micro-organisms and how did you discover them?**

Micro-organisms are things that very small.

He discovered them in a drop of water that was full of tiny little creatures.

**What conditions do moulds and yeast need to grow?**

Moulds need bread or fruit to grow on. Mould also grows on cheese and can turn the cheese green. Moulds like dark places.

Yeast grows in bread and helps the bread to rise.

**How do micro-organisms help us?**

Micro-organisms help us make food like bread.

Thank you Mr Van Leeuwenhoek. We appreciate you sharing your knowledge about micro-organisms with us.

## **Year 6 Work samples**

### ***Marvellous micro-organisms*** **Summative Assessment of Science Understanding**

**Below Achievement Standard**

### **An interview with Anton van Leeuwenhoek**

Thank you Mr van Leeuwenhoek for being with us today. We have heard about your work with microorganisms and would like to ask you a few questions.

**What are micro-organisms and how did you discover them?**

Micro-organisms are living things that are so small that they are impossible to see with the naked eye.

I discovered microorganisms when I made my own lenses and microscopes. When I looked at a drop of water I discovered that it was full of tiny little creatures.

**What conditions do moulds and yeast need to grow?**

Moulds need some light, moisture and cool to warm conditions. They grow on plant and animal matter.

Yeast needs the temperature to be just right - not too hot and not too cold. Warm conditions are just right for the yeast to work to make the bread rise.

**How do micro-organisms help us?**

We use micro-organisms like yeast and bacteria to make food like bread, yoghurt and cheese.

Micro-organisms are also used to help in medicine. One is penicillin which helps us fight infections.

Thank you Mr Van Leeuwenhoek. We appreciate you sharing your knowledge about micro-organisms with us.

## **Year 6 Work samples**

### ***Marvellous micro-organisms* Summative Assessment of Science Understanding**

#### **At Achievement Standard**

#### An interview with Anton van Leeuwenhoek

Thank you Mr van Leeuwenhoek for being with us today. We have heard about your work with microorganisms and would like to ask you a few questions.

#### What are micro-organisms and how did you discover them?

Micro-organisms are living things that are so small that they are impossible to see with the naked eye. Many micro-organisms are made up of only a single living cell.

I decided to make my own lenses and microscopes that could magnify things up to 300 times. When I looked at a drop of water I discovered that it was full of tiny little creatures. I kept looking and found little creatures everywhere. I called them animalcules.

#### What are moulds?

Moulds are a type of fungus that grow on different surfaces. Moulds reproduce by producing spores. Spores are all around us - in the air and on the ground.

#### What conditions do moulds need to grow?

Moulds need some light, moisture and cool to warm conditions. They grow on plant and animal matter. We mostly see mould growing on bread, fruits and vegetables and in bathrooms. They are often fluffy looking and can be green, blue, brown orange and yellow.

#### How do micro-organisms help us?

We use micro-organisms in the production of many foods. These foods include bread (yeast) yoghurt (bacteria) cheese (bacteria) and beer (yeast).

The micro-organism yeast is used in making bread. Yeast breaks down sugars and releases a gas called carbon dioxide. The gas forms pockets in the dough and helps it to rise.

Moulds are micro-organisms that help our ecosystem by decomposing and recycling dead organic materials.

Micro-organisms are used to help in medicine. For example, penicillin is produced by the *Penicillium* mould. Penicillin fights off infections. Before penicillin was developed people used to die from infections.

Thank you Mr Van Leeuwenhoek. We appreciate you sharing your knowledge about micro-organisms with us.

## Year 6 Work samples

### **Marvellous micro-organisms** **Summative Assessment of Science Understanding**

#### Above Achievement Standard

## Year 6 Work samples

### Marvellous micro-organisms Summative Assessment of Science Inquiry Skills

#### Below Achievement Standard

#### Questioning and predicting

<p>What are you going to investigate?</p> <p>How much mould grows on the bread</p> <p>Can you write it as a question?</p>	<p>What do you predict will happen? Why?</p> <p>The mould will grow on the bread that is in the dark.</p> <p>Give scientific explanations for your prediction</p>
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#### Planning and conducting

To make this a fair test what things (variables) are you going to:		
<p>Change?</p> <p>the light</p> <p>Change only one thing</p>	<p>Measure?</p> <p>the mould</p> <p>What would the change affect?</p>	<p>Keep the same?</p> <p>the bread the bag</p> <p>Which variables will you control?</p>

#### Processing and analysing data and information

<p>Presenting results</p> <p>Can you show your results in a graph?</p> <p>Explaining results</p> <p>When you changed ..... light ..... what happened to mould growth?</p> <p>The mould grew on the bread that was in the light</p> <p>Why did this happen?</p> <p>I am not sure. Maybe the one in the dark didn't have enough air.</p> <p>Was your prediction accurate?</p> <p>No it wasn't.</p>
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#### Evaluating

<p>Evaluating the investigation</p> <p>What problems did you have in doing this investigation?</p> <p>Taping up the bag &amp; measuring the mould</p>	<p>How could you improve this investigation (fairness, accuracy)?</p> <p>Put the bread in a different place.</p>
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## Year 6 Work samples

### Marvellous micro-organisms Summative Assessment of Science Inquiry Skills

#### At Achievement Standard

#### Questioning and predicting

<p>What are you going to investigate?</p> <p>What happens to mould growth when we change the amount of light?</p> <p>Can you write it as a question?</p>	<p>What do you predict will happen? Why?</p> <p>I think that mould will grow on the bread in the dark because that's where mould grows.</p> <p>Give scientific explanations for your prediction</p>
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#### Planning and conducting

To make this a fair test what things (variables) are you going to:		
<p>Change?</p> <p>the amount of light</p> <p>Change only one thing</p>	<p>Measure?</p> <p>the mould</p> <p>What would the change affect?</p>	<p>Keep the same?</p> <ul style="list-style-type: none"> <li>- the bread</li> <li>- the position of the bread</li> <li>- the bag type</li> </ul> <p>Which variables will you control?</p>

#### Processing and analysing data and information

<p>Presenting results</p> <p>Can you show your results in a graph?</p> <p>Explaining results</p> <p>When you changed the amount of light, what happened to mould growth?</p> <p>The mould grew on the bread that was in the light.</p> <p>Why did this happen?</p> <p>The bread was a bit soggy which must have helped the mould to grow.</p>	<p>PrimaryConnections® Linking science with literacy</p> <p>Marvellous micro-organisms</p>
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#### Evaluating

<p>Evaluating the investigation</p> <p>What problems did you have in doing this investigation?</p> <p>Measuring the mould</p>	<p>How could you improve this investigation (fairness, accuracy)?</p> <p>Improve the way we measured the mould.</p>
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## Year 6 Work samples

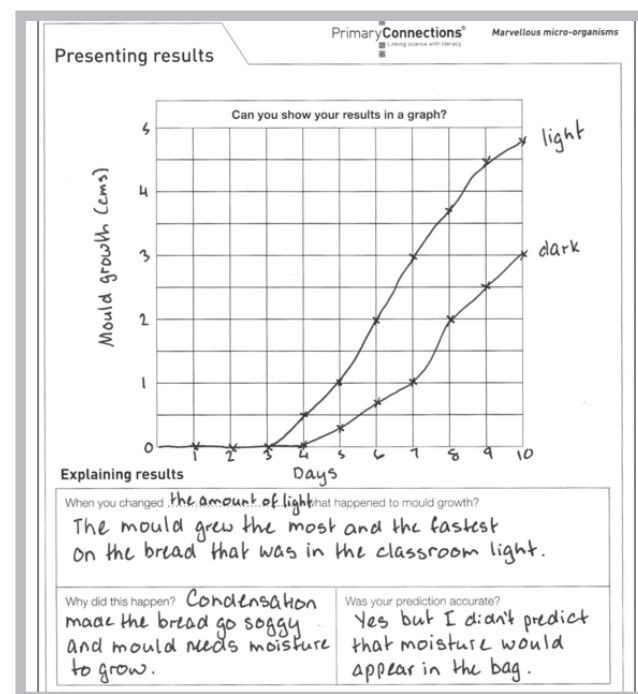
### Marvellous micro-organisms Summative Assessment of Science Inquiry Skills

#### Above Achievement Standard

#### Questioning and predicting

<p>What are you going to investigate?</p> <p>What happens to mould growth when we change the amount of light?</p> <p>Can you write it as a question?</p>	<p>What do you predict will happen? Why?</p> <p>I predict that the most mould will grow on the bread that is in the classroom light. because mould needs light to grow in.</p> <p>Give scientific explanations for your prediction</p>
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#### Processing and analysing data and information



#### Evaluating

<p>Evaluating the investigation</p> <p>What problems did you have in doing this investigation? Stopping people from opening the cupboard and letting the light in.</p>	<p>How could you improve this investigation (fairness, accuracy)?</p> <ol style="list-style-type: none"> <li>1. Put a sign on the door.</li> <li>2. Have more than one sample of each.</li> </ol>
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#### Planning and conducting

To make this a fair test what things (variables) are you going to:		
<p>Change?</p> <p>the amount of light</p> <p>Change only one thing</p>	<p>Measure?</p> <p>the growth of the mould</p> <p>What would the change affect?</p>	<p>Keep the same?</p> <p>type of bread, the amount of moisture, the location of the bread, the size and type of plastic bag.</p> <p>Which variables will you control?</p>

# Student Self-Assessment

## Marvellous micro-organisms Year 6 Biological sciences

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Strand	What I can do	I need help to do this	I can do this	I can do this very well
<b>Science Understanding</b>	I can explain the conditions that micro-organisms need to grow			
<b>Science as a Human Endeavour</b>	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			
<b>Science Inquiry Skills</b>	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			



Date: \_\_\_\_\_

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

Date: \_\_\_\_\_

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