

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.

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 physical conditions of their environment (ACSSU094)	Describes and predicts the effect of environmental changes on individual living things	<ul style="list-style-type: none"><i>Rising salt</i> Letter	<ul style="list-style-type: none">Recalls that living things need certain conditions to grow and survive	<ul style="list-style-type: none">Explains the conditions that living things need to grow and survive	<ul style="list-style-type: none">Provides detailed information about how the growth and survival of living things are affected by the conditions of their environment

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

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				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>Rising salt</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>Rising salt</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 where scientific knowledge has affected people’s lives and influenced their decision-making

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				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>Rising salt</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

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

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				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 and describes potential safety risks when planning methods	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Rising salt</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 relationships	<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 and describes potential safety risks when planning methods	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Rising salt</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, and describes potential safety risks when planning methods	<ul style="list-style-type: none">Identifies variables and articulates why a test is fair or not

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

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				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>Rising salt</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	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Rising salt</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

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

Organisers	CONTENT DESCRIPTIONS	ACHIEVEMENT STANDARD	EVIDENCE	LEVEL OF ACHIEVEMENT		
				BELOW ACHIEVEMENT STANDARD	AT ACHIEVEMENT STANDARD	ABOVE ACHIEVEMENT STANDARD
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	<i>Elaborate</i> phase in: <ul style="list-style-type: none"><i>Rising salt</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>Rising salt</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

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

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.

Copyright © Australian Academy of Science, 2016.

Acknowledgements

PrimaryConnections is supported by the Australian Government.

Disclaimer

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

Year 6 Work samples

Summative Assessment of Science Understanding

Below Achievement Standard

Dear Concerned Lifestyler

Thank you for your letter.

You say that your plants were looking unhealthy so you started pouring water over them morning, noon and night. I would like to know how much water you are using and what kind of soil you have. Just simple things like the water you use and what kind of soil you have can result in unhealthy plants.

What are you feeding your animals? Every animal has different feeding needs. If your animals aren't getting the right feed it can lead to a loss of weight and healthy skin.

How rich is the grass? You said that the cows are having stomach problems. The richness of the grass can affect cows and give them colic. A way to prevent this is to lock up the cows in an area with less grass.

You say that you are giving the cows dry feed. Try wetting the feed so that they can swallow it better.

Why are animals drinking lots of water? Your grass might not have water in it so that might be why they are drinking so much water from the dam. Try wetting down your grass every now and then.

Have you checked the quality of your water? This could be a reason why your plants aren't growing healthy.

I hope this has helped and I will be looking forward to your response.

From

The Experts

Year 6 Work samples

Summative Assessment of Science Understanding

At Achievement Standard

Dear Concerned Lifestyler

To start off with, I think it is good that it is great that your family is following your dream of growing everything you need. I hope my response will help answer your questions.

It is great that you are growing your own plants but you say they are not looking healthy at all so you started pouring water over them morning, noon and night. The problem is that you are probably overwatering your plants. Overwatering just floods the plants and causes them to die. But not enough water will affect the plants too. You need to perhaps just water once or twice a day and use less water.

It is awesome that your family is putting in time and effort to become sustainable. It is not a good thing that your cows are having stomach troubles. Try wetting down their dry feed to make it easier for them to digest the food. It is also not very good that they are drinking a lot of water. You say that your water comes from a well deep underground. This well might have a lot of salt in the water which will make the cows dehydrated, make them drink more and make them unwell. A way to fix this problem is you may have to think about using a new water source. The high amount of salinity could also be the reason why some of your pastures are not growing because plants don't like too much salt in their water either.

It is great to have chickens, as who doesn't like eggs for breakfast! You say in your letter that your chickens aren't producing any eggs. This might also be because of the salt in the water. So again maybe check your water for too much salt and decide what you need to do.

I hope my answers will help you with your concerns and will help you follow your dream by growing everything you need and living sustainably.

From

The Experts

Year 6 Work samples

Summative Assessment of Science Understanding

Above Achievement Standard

Dear Concerned Lifestyler,

Thank you for reporting your issues to us. I think you have lots of potential to create a sustainable farm. I will try to answer your queries to my best ability.

Firstly, you are most likely overwatering your plants and your pasture, which is killing your plants. We did an investigation on the best way to water plants and we found out that the plants that were overwatered (we poured lots of water on them three times a day) did not grow very well. Those plants turned yellow and their leaves drooped. But we also found that under watering plants also makes their leaves turn yellow and droop. You need to make sure that you are not over watering or under watering your plants. So maybe you can look at reducing the number of times a day and how much water you are giving your plants.

Secondly, have you checked your water for salt? We also investigated what happens when plants are watered with different concentrations of salty water. We found out that the saltier the water is the more the plants are affected. A little bit of salt seems to be okay but too much salt just makes the plants die very quickly.

From what you describe the cows are likely to be having stomach problems also due to too much salt in their water. If the water in the dam is also salty then they are drinking salty water. We read an article that said that too much salt can cause excessive thirst, loss of appetite, stomach pain, diarrhoea and increased urination. Check to see if your cows have any of these other symptoms, but I would say that there is too much salt in their water. Also, since you are feeding them dry feed, their mouths will remain dry. I recommend to filter their water or feed them the same water that you are drinking.

Thirdly, I would say that the chickens are really unhappy also because of salty water. Your vegetables probably contain too much salt for the chickens, causing them to be upset and not wanting to mate to produce eggs.

I hope that I have provided you with good feedback to help you take a different approach to transition your farm to being sustainable.

Sincerely,

The Experts

Year 6

Work samples

Summative Assessment of Science Inquiry Skills

Below Achievement Standard

PrimaryConnections®
Linking science with literacy

Rising salt

Further investigation planner

Name: _____ Date: _____

Other members of your team: _____

What are you trying to find out?

<p>What is your question for investigation?</p> <p>How will salt and fertiliser affect the way plants grow?</p> <p><small>Write your question as a question?</small></p>	<p>What do you predict will happen? Explain why.</p> <ul style="list-style-type: none"> • the one with water will grow fine • the one with both will die • the one with fertiliser will die <p><small>Give scientific reasons for your prediction.</small></p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

To make this a fair test what things (variables) are you going to:

<p>Change?</p> <p>All the plants are watered differently</p> <p><small>Change only one thing</small></p>	<p>Measure/Observe?</p> <p>Come in every day to measure</p> <p><small>What would the change affect?</small></p>	<p>Keep the same?</p> <p>They are all different</p> <p><small>Which variables will you control?</small></p>
----------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------

<p>What are you going to do?</p> <ul style="list-style-type: none"> - fertiliser and salt - mist - water - just salt - fertiliser <p><small>Use dot points</small></p>	<p>What equipment will you need?</p> <ul style="list-style-type: none"> • spray bottle • salt • fertiliser • water <p><small>Use dot points</small></p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Copyright © Australian Academy of Science, 2015. Resource sheet 6

PrimaryConnections®
Linking science with literacy

Rising salt

Further investigation results

Name: _____ Date: _____

Recording results

Plant 1

Day of observation	Height of seedling (mm)
1	60
2	100
3	200
4	100
5	100

Plant 2

Day of observation	Height of seedling (mm)
1	60
2	80
3	60
4	120
5	120

Empty grid for Plant 1 results.

Empty grid for Plant 2 results.

Copyright © Australian Academy of Science, 2015. Resource sheet 6

Year 6

Work samples

Summative Assessment of Science Inquiry Skills

At Achievement Standard

PrimaryConnections®
Linking science with literacy

Rising salt

Further investigation planner

Name: _____ Date: _____

Other members of your team: _____

What are you trying to find out? Do different plants react the same way to salty water?

What is your question for investigation? What happens to the growth of seedlings when we change the type of plant that is watered by a salt solution?	What do you predict will happen? Explain why. I predict that the seedlings will react the same and die after a few days because they are both vegetables with similar leaves & roots.
----------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

To make this a fair test what things (variables) are you going to:

Change? The plant type <small>(Change only one thing)</small>	Measure/Observe? How tall the plant grows <small>What would the change affect?</small>	Keep the same? - the salt water - how the plant is watered - the location - how measured <small>Which variables will you control?</small>
---------------------------------------------------------------------	----------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------

What are you going to do? - Water 2 seedlings with salt solution - Measure how tall each grows <small>(Use drawings of recording)</small>	What equipment will you need? - 2 seedlings - salt solution - ruler - water <small>(Use dot points)</small>
----------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------

Copyright © Australian Academy of Science, 2015. Resource sheet 6

PrimaryConnections®
Linking science with literacy

Rising salt

Further investigation results

Name: _____ Date: _____

Recording results

<p>Tomato / salt</p> <table border="1"> <caption>Tomato / salt</caption> <thead> <tr> <th>Day of observation</th> <th>Height of seedling (mm)</th> </tr> </thead> <tbody> <tr><td>1</td><td>80</td></tr> <tr><td>3</td><td>90</td></tr> <tr><td>5</td><td>50</td></tr> <tr><td>7</td><td>40</td></tr> <tr><td>9</td><td>40</td></tr> </tbody> </table>	Day of observation	Height of seedling (mm)	1	80	3	90	5	50	7	40	9	40	<p>Capsicum / salt</p> <table border="1"> <caption>Capsicum / salt</caption> <thead> <tr> <th>Day of observation</th> <th>Height of seedling (mm)</th> </tr> </thead> <tbody> <tr><td>1</td><td>70</td></tr> <tr><td>3</td><td>75</td></tr> <tr><td>5</td><td>40</td></tr> <tr><td>7</td><td>30</td></tr> <tr><td>9</td><td>30</td></tr> </tbody> </table>	Day of observation	Height of seedling (mm)	1	70	3	75	5	40	7	30	9	30
Day of observation	Height of seedling (mm)																								
1	80																								
3	90																								
5	50																								
7	40																								
9	40																								
Day of observation	Height of seedling (mm)																								
1	70																								
3	75																								
5	40																								
7	30																								
9	30																								
<p>Control - water</p> <table border="1"> <caption>Control - water</caption> <thead> <tr> <th>Day of observation</th> <th>Height of seedling (mm)</th> </tr> </thead> <tbody> <tr><td>1</td><td>70</td></tr> <tr><td>3</td><td>80</td></tr> <tr><td>5</td><td>130</td></tr> <tr><td>7</td><td>160</td></tr> <tr><td>9</td><td>200</td></tr> </tbody> </table>	Day of observation	Height of seedling (mm)	1	70	3	80	5	130	7	160	9	200	<p>_____</p>												
Day of observation	Height of seedling (mm)																								
1	70																								
3	80																								
5	130																								
7	160																								
9	200																								

Copyright © Australian Academy of Science, 2015. Resource sheet 6

Year 6

Work samples

Summative Assessment of Science Inquiry Skills

Above Achievement Standard

PrimaryConnections®
Linking science with literacy

Rising salt

Further investigation planner

Name: _____ Date: _____

Other members of your team: _____

What are you trying to find out? Do different plants react the same way to different concentrations of salt water?

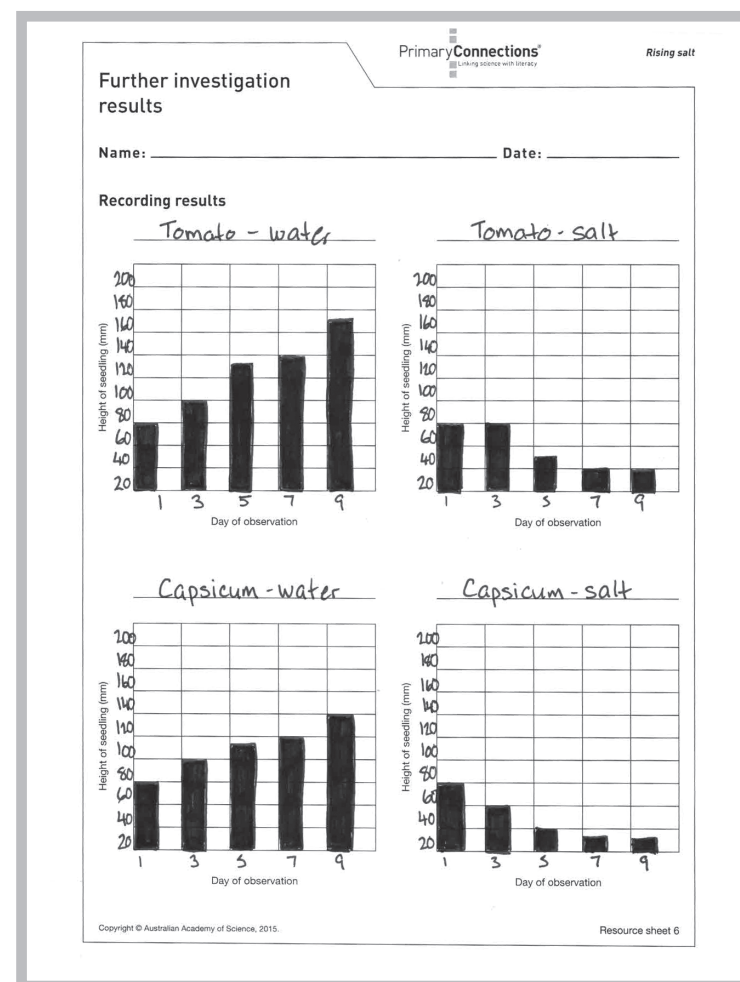
<p>What is your question for investigation?</p> <p>What happens to the growth and survival of seedlings exposed to different concentrations of salt water when we change the type of plant?</p> <p><small>Can you write it as a question?</small></p>	<p>What do you predict will happen? Explain why.</p> <p>I predict that vegetable seedlings will react the same because they are similar plants with similar leaves and roots.</p> <p><small>Give scientific explanations for your prediction</small></p>
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

To make this a fair test what things (variables) are you going to:

<p>Change?</p> <p>The type of plant</p> <p><small>Change only one thing</small></p>	<p>Measure/Observe?</p> <p>The growth of the plant</p> <p><small>What would the change affect?</small></p>	<p>Keep the same?</p> <ul style="list-style-type: none"> the soil the location how it is watered the salt solutions <p><small>Which variables will you control?</small></p>
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p>What are you going to do?</p> <ol style="list-style-type: none"> Set up two different veg seedlings. Water each the same with the salt solutions. Observe and measure each plants growth. <p><small>Use drawing, technology</small></p>	<p>What equipment will you need?</p> <ul style="list-style-type: none"> 2 tomato seedlings 2 capsicum seedlings ruler salt solution <p><small>Use dot points</small></p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Copyright © Australian Academy of Science, 2015. Resource sheet 6



Student Self-Assessment

Rising salt 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 changes in the environment affects individual living things.			
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.			

[illegible]

Copyright © Australian Academy of Science, 2016.