Science

Year 6
Satisfactory

WORK SAMPLE PORTFOLIO

Annotated work sample portfolios are provided to support implementation of the Foundation – Year 10 Australian Curriculum.

Each portfolio is an example of evidence of student learning in relation to the achievement standard. Three portfolios are available for each achievement standard, illustrating satisfactory, above satisfactory and below satisfactory student achievement. The set of portfolios assists teachers to make on-balance judgements about the quality of their students' achievement.

Each portfolio comprises a collection of students' work drawn from a range of assessment tasks. There is no pre-determined number of student work samples in a portfolio, nor are they sequenced in any particular order. Each work sample in the portfolio may vary in terms of how much student time was involved in undertaking the task or the degree of support provided by the teacher. The portfolios comprise authentic samples of student work and may contain errors such as spelling mistakes and other inaccuracies. Opinions expressed in student work are those of the student.

The portfolios have been selected, annotated and reviewed by classroom teachers and other curriculum experts. The portfolios will be reviewed over time.

ACARA acknowledges the contribution of Australian teachers in the development of these work sample portfolios.

THIS PORTFOLIO: YEAR 6 SCIENCE

This portfolio provides the following student work samples:

Sample 1	Worksheet: Reversible and irreversible changes
Sample 2	Pamphlet: Generating electrical energy
Sample 3	Worksheet: Energy transformations
Sample 4	News report: Natural disasters
Sample 5	Investigation poster: Mouldy bread
Sample 6	Investigation report: Insulation
Sample 7	Investigation report: Designing an electrical switch
Sample 8	Pamphlet: Famous scientists

In this portfolio, the student classifies changes to materials as reversible and irreversible (WS1). The student constructs an electrical switch and identifies the requirements for the transfer of energy in an electrical circuit (WS7) and describes the energy transformations that occur in the generation of electrical energy from a range of energy sources (WS2, WS3). The student explains how a natural event caused rapid change to Earth's surface (WS4) and demonstrates understanding that living things are affected by environmental conditions (WS5). The student identifies how scientific knowledge is used in decision-making (WS3, WS5) and describes how scientists from different backgrounds have contributed to the development of science and to improving the lives of many people (WS8).

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Science

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The student demonstrates the ability to follow procedures to develop investigable questions and design investigations into simple cause and effect relationships, including identifying variables to be changed and measured (WS5, WS6) and articulates potential safety risks when planning their investigation methods (WS5, WS8). The student collects, organises and interprets investigation data (WS2, WS5, WS6, WS8) and identifies where improvements to their methods could improve the data (WS5, WS6, WS8). The student interprets, describes and analyses trends in data using graphic representations (WS5) and constructs multimodal texts to communicate ideas, methods and findings (WS2, WS3, WS4, WS5, WS6, WS7, WS8).

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Worksheet: Reversible and irreversible changes

Year 6 Science achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

> *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 multimodal texts to communicate ideas, methods and findings.*

Summary of task

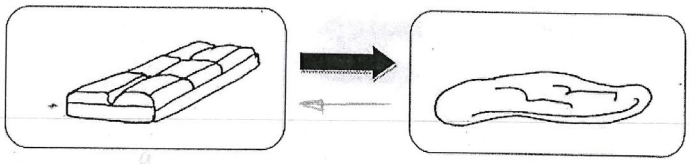
Students studied a unit of work on changes to materials. They explored a range of changes, including melting, freezing, dissolving, burning and rusting, and classified these as reversible or irreversible.

Students were asked to complete the worksheet independently as a summary of what they had learned over the unit.

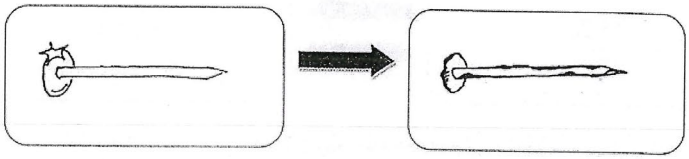
Worksheet: Reversible and irreversible changes

Reversible and irreversible changes – Part A

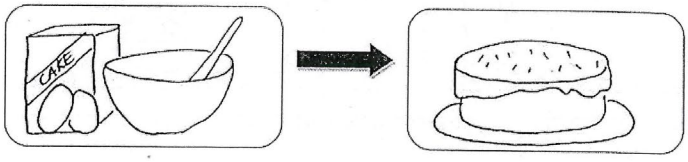
1. Look at each of the changes and fill in the blanks to say whether the changes are reversible or irreversible.
2. For the reversible changes, draw another arrow below the first one, pointing the other way.
3. For each change, explain why you thought it was reversible or irreversible.



Melting chocolate is reversible change because: You can Set the chocolate by puting it in the fridge for a while.



An iron nail rusting is a iravesible change because: you can't get rust off a nail.



Baking a cake is a iravesible change because: you can't just un cook it and take out the Set ingreediance

Annotations

Correctly classifies changes associated with heating and rusting as reversible or irreversible and provides an explanation based on observable properties.

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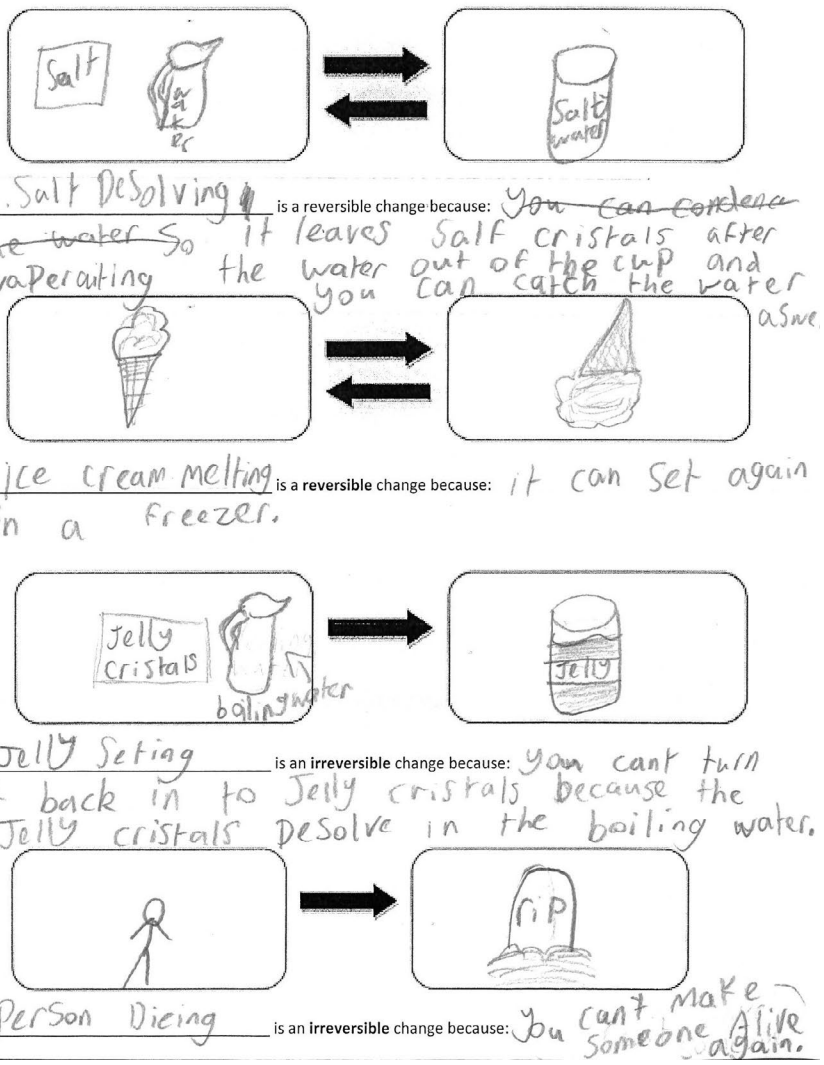
Worksheet: Reversible and irreversible changes

Part B

Draw and label two examples of a reversibe change and two examples of an irreversible change. Explain your selection.



Annotations

Suggests examples of reversible and irreversible changes, including heating and dissolving, based on observed phenomena.

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Pamphlet: Generating electrical energy

Year 6 Science achievement standard

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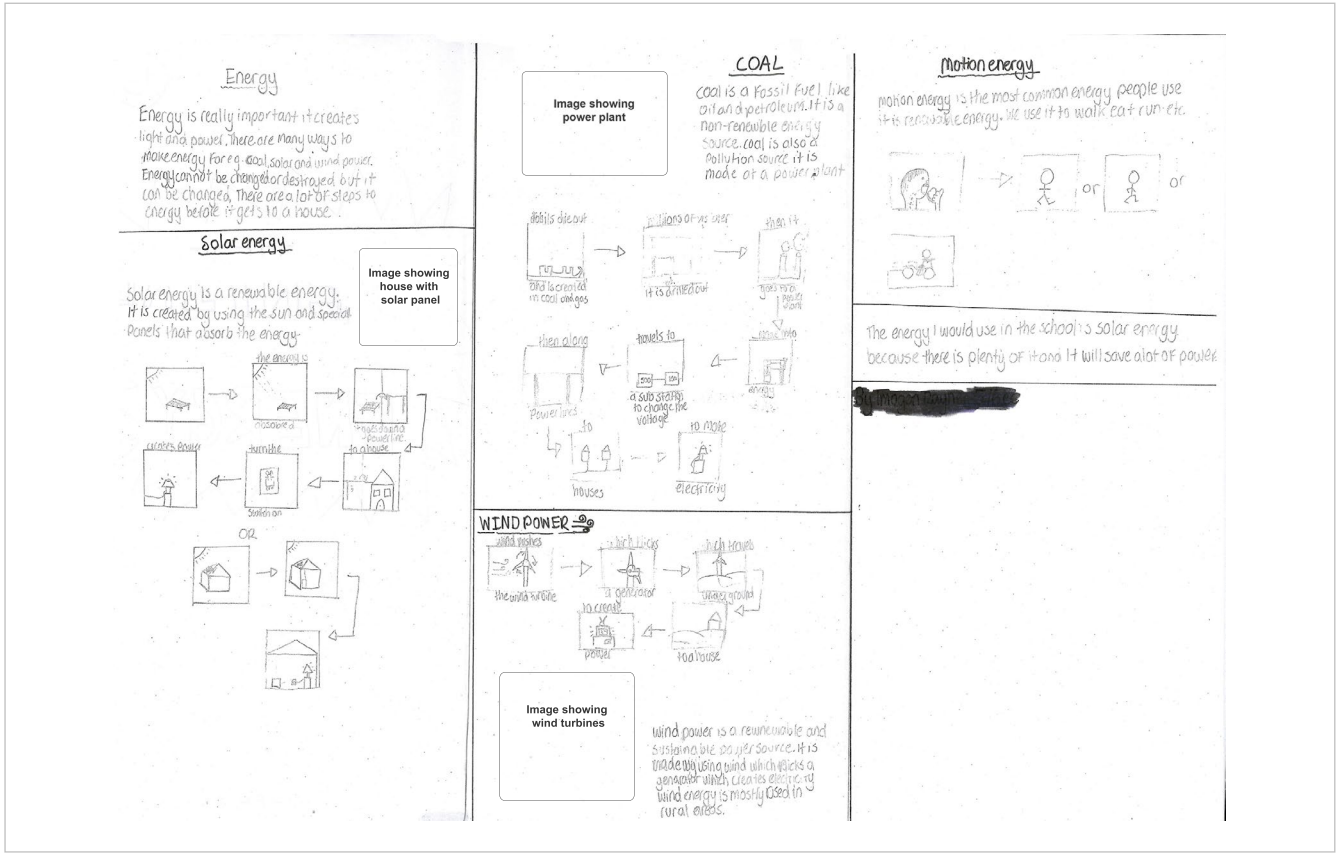
Summary of task

Students had been investigating electrical energy and energy transformations. They had constructed electrical circuits and explored the ways in which electrical energy could be transformed into heat, movement and light energy. Students had been introduced to the concept of renewable and non-renewable resources and had viewed a documentary on the ways in which electrical energy can be generated.

Students were asked to develop an information pamphlet to describe the energy transformations that occur when electricity is being generated and to show the difference between renewable and non-renewable energy sources. Students were provided with stimuli in the form of key words and energy-related graphics. They completed the task over three 60-minute lessons.

Pamphlet: Generating electrical energy



Annotations

Constructs flow charts to organise collected data on electrical energy generation.

Describes how electrical energy is generated from solar energy, coal and wind turbines.

Identifies solar, wind and motion energy sources as renewable.

Annotations (Overview)

The student constructs a multimodal text to communicate ideas and findings.

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Worksheet: Energy transformations

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Summary of task

Students had completed a unit of work in which they learned how energy from a variety of sources can be used to generate electricity.

Students were asked to select a form of renewable energy and create a flow chart to illustrate how it can be transformed into energy for use in the home. They were also asked to complete a worksheet answering questions about how energy is transformed in order to generate electricity.

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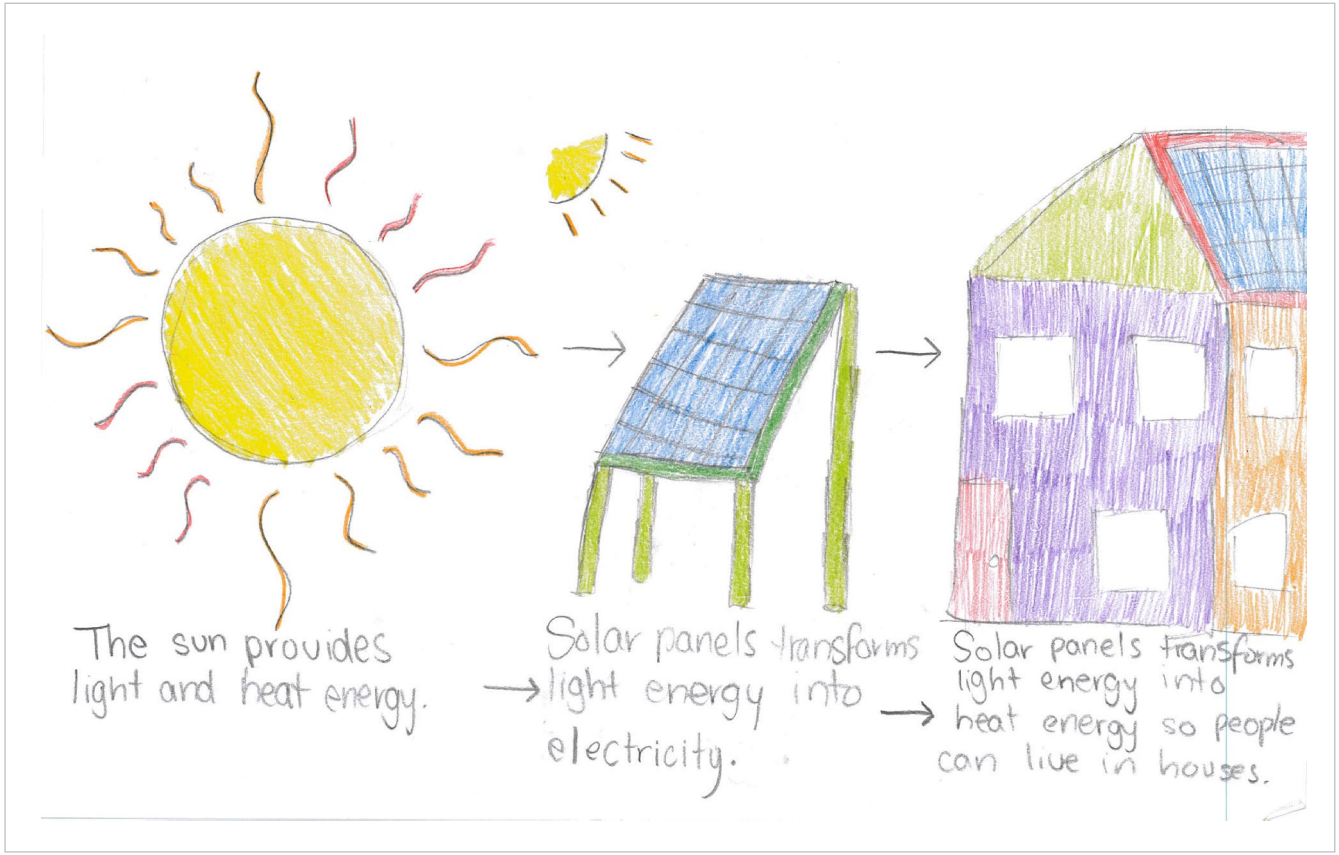
Worksheet: Energy transformations



Annotations

Identifies a range of forms of energy.

Constructs a flow chart to describe the energy transformations related to harnessing solar energy.

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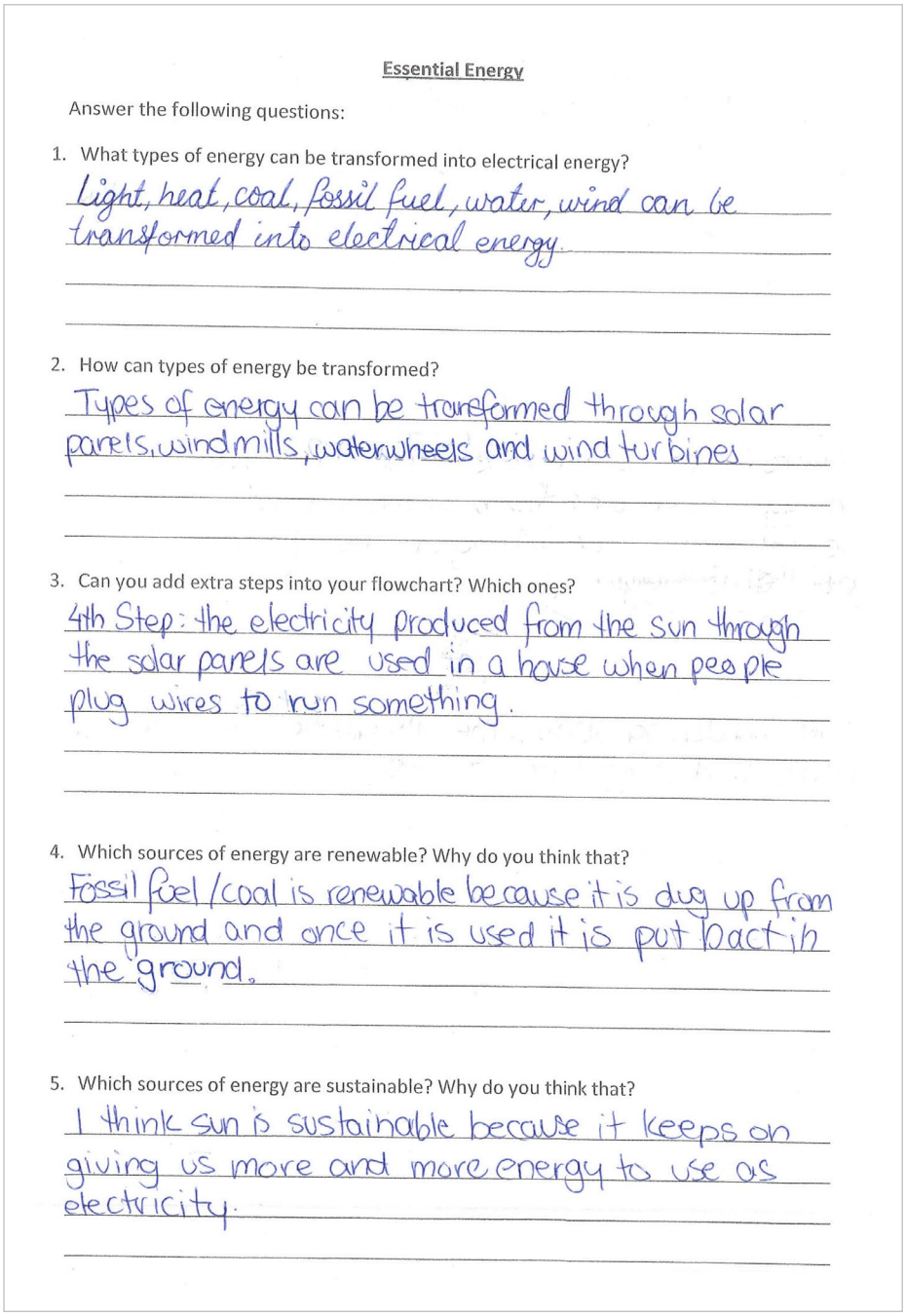
Worksheet: Energy transformations



Essential Energy

Answer the following questions:

1. What types of energy can be transformed into electrical energy?

Light, heat, coal, fossil fuel, water, wind can be transformed into electrical energy.

2. How can types of energy be transformed?

Types of energy can be transformed through solar panels, windmills, waterwheels and wind turbines

3. Can you add extra steps into your flowchart? Which ones?

4th Step: the electricity produced from the sun through the solar panels are used in a house when people plug wires to run something.

4. Which sources of energy are renewable? Why do you think that?

Fossil fuel / coal is renewable because it is dug up from the ground and once it is used it is put back in the ground.

5. Which sources of energy are sustainable? Why do you think that?

I think sun is sustainable because it keeps on giving us more and more energy to use as electricity.

Annotations

Identifies a range of energy sources that can be transformed into electrical energy.

Identifies technologies that generate electrical energy.

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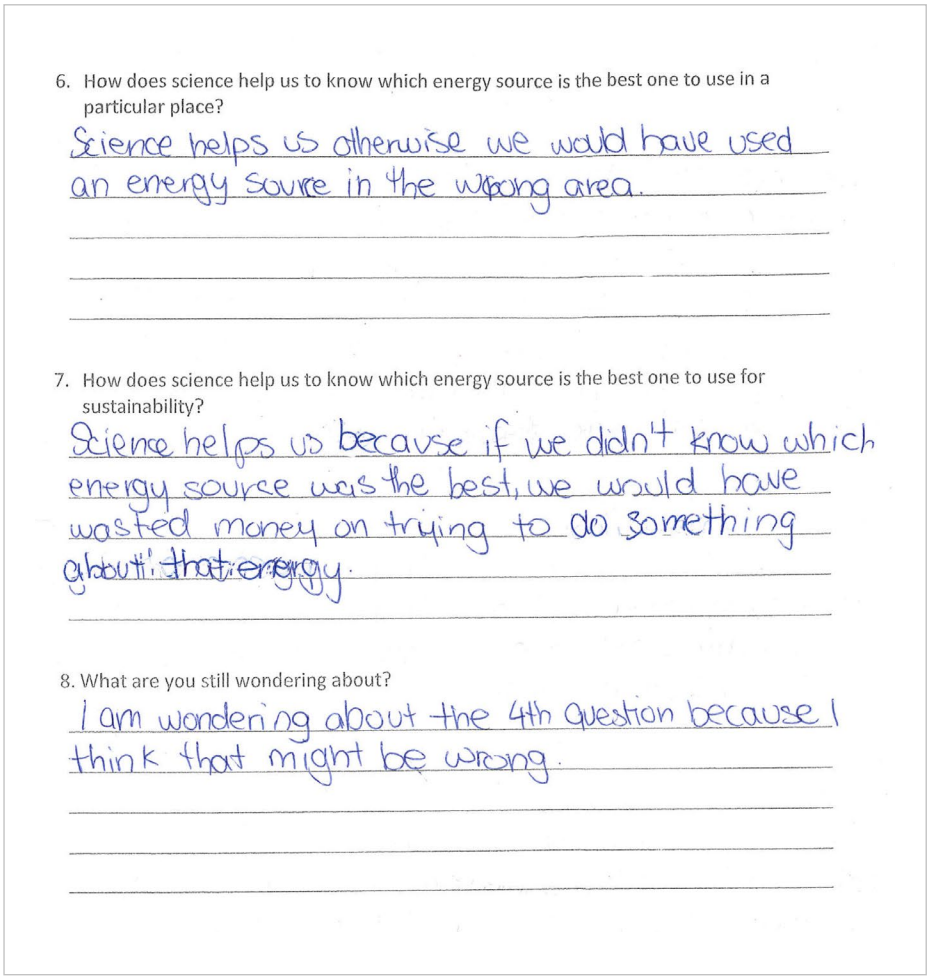
Worksheet: Energy transformations



6. How does science help us to know which energy source is the best one to use in a particular place?

Science helps us otherwise we would have used an energy source in the wrong area.

7. How does science help us to know which energy source is the best one to use for sustainability?

Science helps us because if we didn't know which energy source was the best, we would have wasted money on trying to do something about that energy.

8. What are you still wondering about?

I am wondering about the 4th question because I think that might be wrong.

Annotations

Identifies a situation in which scientific knowledge is used in decision-making.

Annotations (Overview)

The student constructs a multimodal text to communicate ideas and findings.

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News report: Natural disasters

Year 6 Science achievement standard

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Summary of task

Students had been researching the cause, effects and characteristics of a variety of geological events and extreme weather conditions, including earthquakes, tsunamis, volcanic eruptions, floods, cyclones and droughts.

In this task, students were required to research a specific natural disaster and to plan and present a television news report on the event. Students were required to include information on how the event occurred and the effect it had on people and the environment. Students researched and produced their videos over 10 class lessons and in their own time.

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News report: Natural disasters

Annotations

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Investigation poster: Mouldy bread

Year 6 Science achievement standard

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Summary of task

Students had discussed the needs of living things and the effect of environmental changes on individual living things, exploring issues related to changes in their local bushland. The teacher also introduced the idea that an ecosystem can exist on pieces of food, with organisms such as mould inhabiting the food, and that these organisms are living things which also have needs and can be affected by changes to their environmental conditions.

For this task, students were required to work in small groups to design an investigation into the conditions in which mould grows best on bread. They were presented with a scenario in which a shopkeeper was finding that their bread was growing mouldy faster than a competitor's, and wanted advice about what conditions might be causing this. Students were provided with steps to follow in designing their experiment and were required to present their findings on a poster, including a letter to the shopkeeper with their advice.

Before undertaking the experiment, the teacher ensured that students were aware of the safety requirements for observing mouldy food. Students were told not to handle the food under any circumstances, and to ensure that the bags were kept sealed. The teacher checked all bags and supervised students when observing the bread.

Investigation poster: Mouldy bread

Annotations

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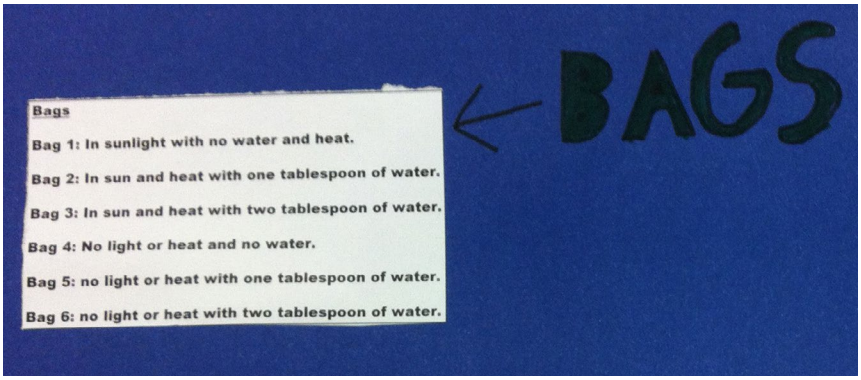
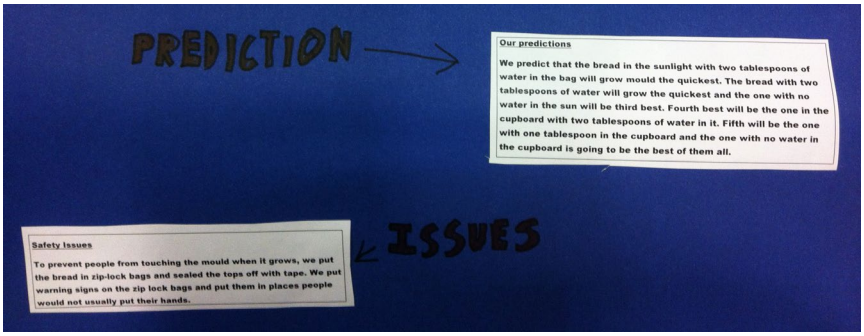
Investigation poster: Mouldy bread





Annotations

Designs an investigation to test the effect of changing light, heat and water on the growth of the organism.

Predicts that sunlight will be the most influential variable on the growth of the mould.

Identifies safety risks and plans appropriate methods to reduce the risks.

Collects data and provides a visual representation of raw data.

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Science

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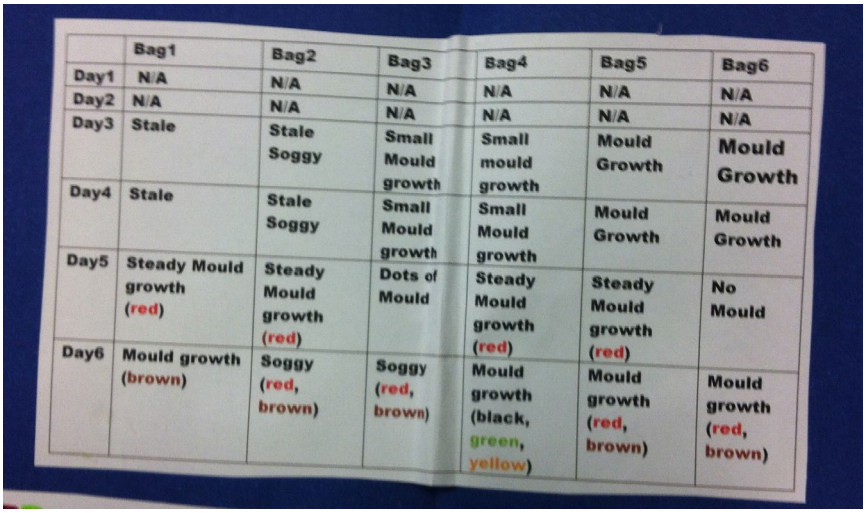
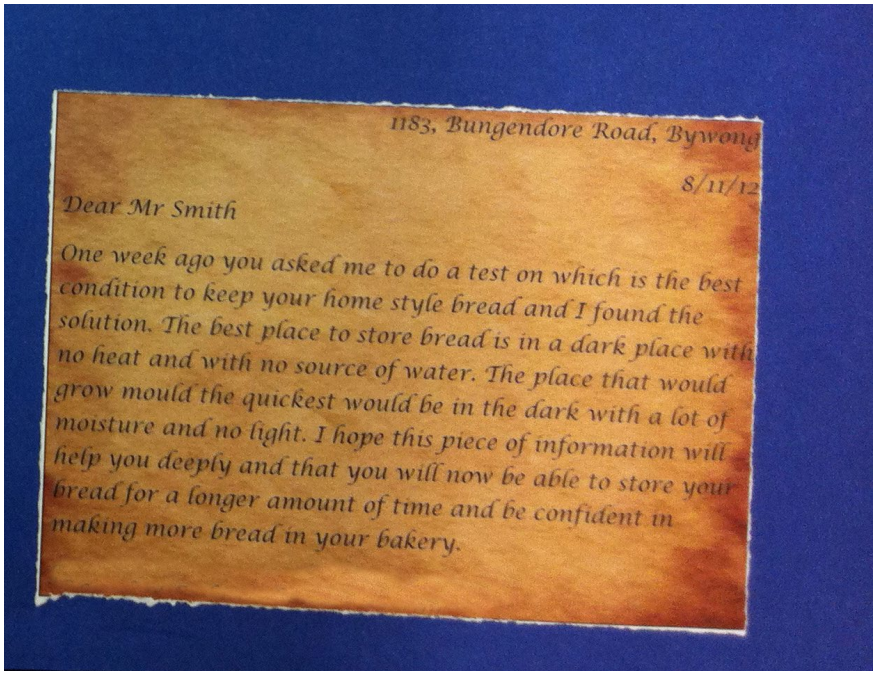
Investigation poster: Mouldy bread



	Bag1	Bag2	Bag3	Bag4	Bag5	Bag6
Day1	N/A	N/A	N/A	N/A	N/A	N/A
Day2	N/A	N/A	N/A	N/A	N/A	N/A
Day3	Stale	Stale Soggy	Small Mould growth	Small mould growth	Mould Growth	Mould Growth
Day4	Stale	Stale Soggy	Small Mould growth	Small Mould growth	Mould Growth	Mould Growth
Day5	Steady Mould growth (red)	Steady Mould growth (red)	Dots of Mould	Steady Mould growth (red)	Steady Mould growth (red)	No Mould
Day6	Mould growth (brown)	Soggy (red, brown)	Soggy (red, brown)	Mould growth (black, green, yellow)	Mould growth (red, brown)	Mould growth (red, brown)



1183, Bungendore Road, Bywong

8/11/12

Dear Mr Smith

One week ago you asked me to do a test on which is the best condition to keep your home style bread and I found the solution. The best place to store bread is in a dark place with no heat and with no source of water. The place that would grow mould the quickest would be in the dark with a lot of moisture and no light. I hope this piece of information will help you deeply and that you will now be able to store your bread for a longer amount of time and be confident in making more bread in your bakery.

Annotations

Organises qualitative observations in an appropriate table.

Analyses data to form a conclusion that is consistent with the data and describes the effect of environmental conditions on mould.

Indicates how scientific knowledge can inform decision-making.

Annotations (Overview)

The student constructs a multimodal text to communicate ideas, methods and findings.

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Investigation report: Insulation

Year 6 Science achievement standard

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Summary of task

Students had been studying Australian history, specifically life in the late 1880s. They had investigated the use of science in the context of large blocks of ice in 'ice chests' to keep food cool. They discussed how 'icemen' would transport the ice packed in hessian bags and sawdust to prevent it from melting too quickly. In a class discussion, students also considered the materials they might use to keep food cool in the absence of refrigeration devices.

Using this scenario as a stimulus, students were asked to plan and conduct an investigation to determine which materials were effective insulators of an ice cube. Students were provided with an investigation plan template and a range of materials. They planned and conducted their investigation in two class lessons, and spent a further lesson completing their investigation report.

Investigation report: Insulation

Insulation Investigation

In Australia, the first ice specifically for cooling food was made in 1851. Soon people bought big blocks of ice and put them in "ice chests". Gradually "icemen" began to take ice packed in hessian bags and sawdust around the city streets, delivering ice once or twice a week.

Student name: _____ Class: _____

Other member/members of your team:

_____

What is to be investigated:

We are going to investigate which materials have the best insulation properties.

Which materials keep the ice the coldest for the longest?

Can you write it as a question?

What do you predict will happen? Explain why.

I predict that the car insulator will work the best as it is made for insulating.

Give scientific explanations for your opinion.

Annotations

Constructs an investigable question.

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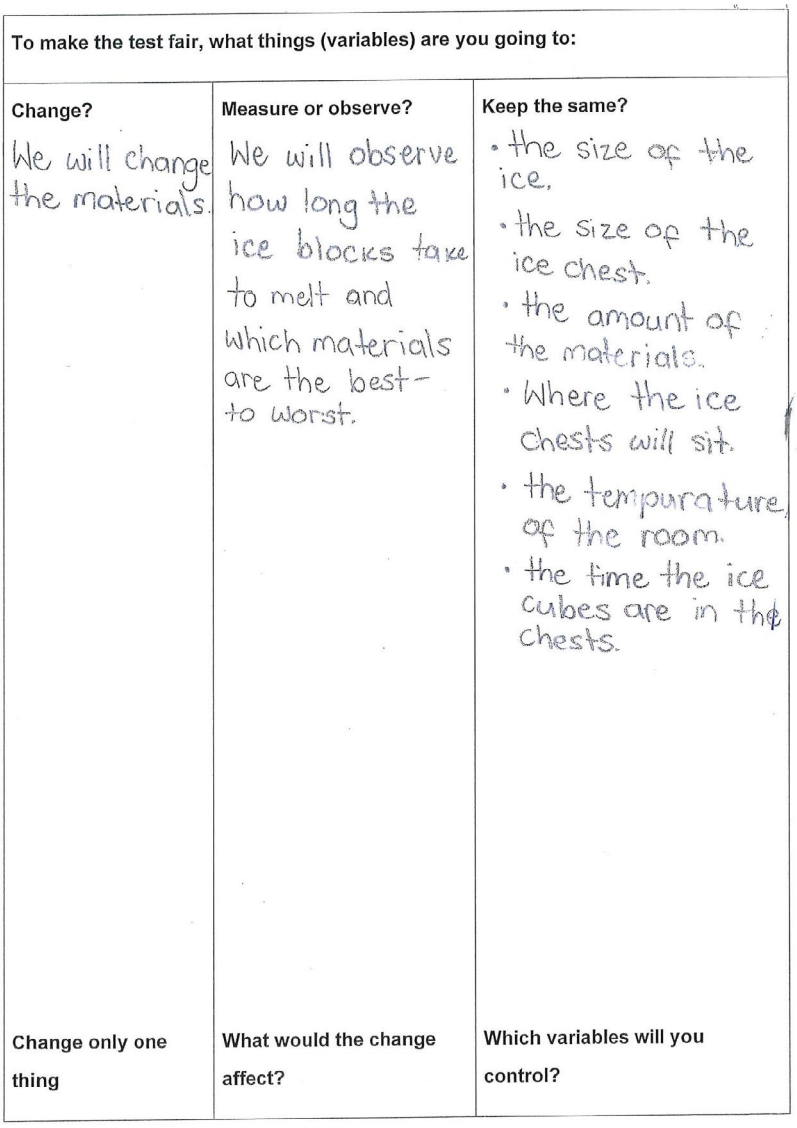
Investigation report: Insulation



To make the test fair, what things (variables) are you going to:

Change?	Measure or observe?	Keep the same?
We will change the materials.	We will observe how long the ice blocks take to melt and which materials are the best- to worst.	• the size of the ice. • the size of the ice chest. • the amount of the materials. • Where the ice chests will sit. • the tempurature of the room. • the time the ice cubes are in the chests.
Change only one thing	What would the change affect?	Which variables will you control?

Annotations

Identifies variables to be changed, measured and controlled.

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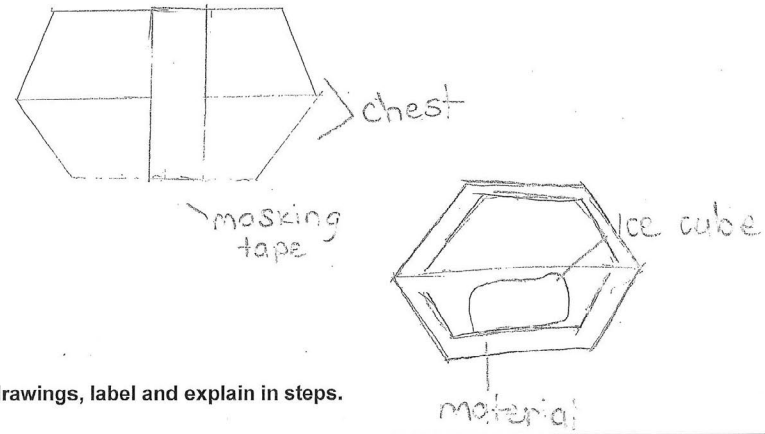
Investigation report: Insulation

Describe how you will set up and conduct the investigation.

1. Glue the materials to the inside of the ice chests.
2. Make some masking tape hinges to put on the ice chests.
3. Put the ice cubes inside the chests and then close them.
4. List/Record how long the ice cubes took to melt
5. Record the rest of your findings.

Hinging.



Use drawings, label and explain in steps.

Annotations

Designs an investigation method including collection of data.

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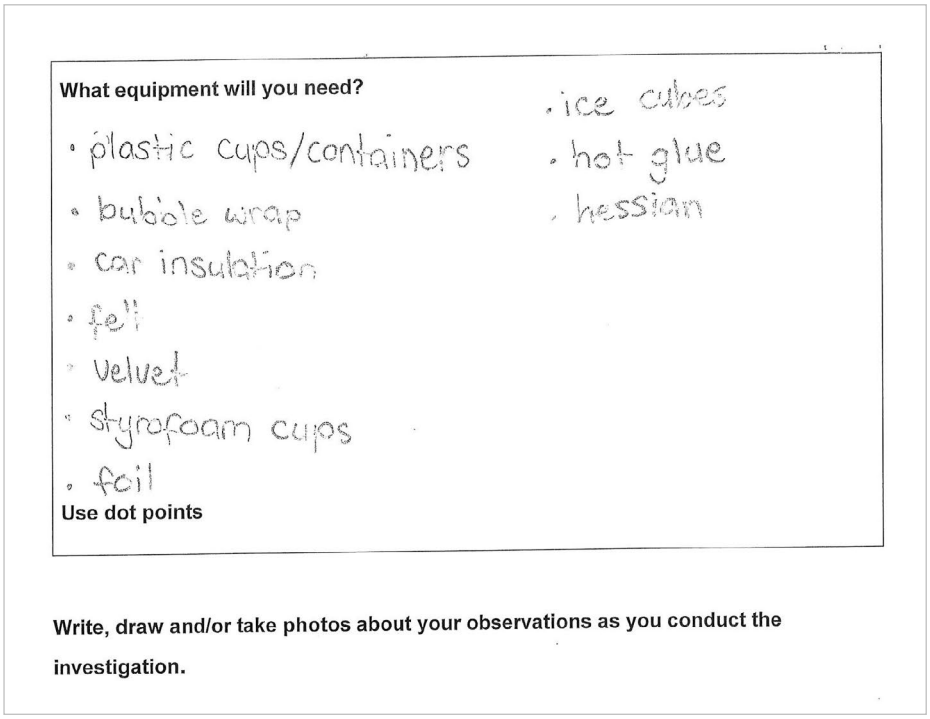
Investigation report: Insulation



What equipment will you need?

- plastic cups/containers
- bubble wrap
- car insulation
- felt
- velvet
- styrofoam cups
- foil
- ice cubes
- hot glue
- hessian

Use dot points

Write, draw and/or take photos about your observations as you conduct the investigation.

Annotations

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Science

Year 6
Satisfactory

Investigation report: Insulation

	bubble wrap	car insulation-1	felt	car insulation-2	styrofoam	foil	control	hessian
5 mins								
10 mins	slight	slight					slight	
15 mins	slight	slight	slight	slight	slight	slight	1 fifth	slight
20 mins	slight	slight	1 fifth	slight	slight	slight	1 quarter	slight
25 mins	slight	slight	1 third	slight	slight	1 quarter	1 half	slight
30 mins	slight	slight	1 half	slight	slight	2 thirds	2 thirds	slight
35 mins	slight	slight	2 thirds	slight	slight	3 quarters	3 quarters	slight
40 mins	slight	slight	2 thirds	slight	1 quarter	4 fifths	4 fifths	slight
45 mins	slight	slight	3 quarters	slight	1 quarter	5 sixths	5 sixths	slight
50 mins	1 quarter	1 quarter	4 fifths	1 quarter	1 third	6 sevenths	7 eighths	1 quarter
55 mins	1 quarter	1 quarter	5 sixths	1 third	1 third	7 eighths	7 eighths	1 quarter
60 mins	1 half	1 third	6 sevenths	1 half	1 half	8 nineths	8 nineths	1 quarter
65 mins	1 half	1 half	6 sevenths	1 half	1 half	9 tenths	9 tenths	1 third
70 mins	1 half		7 eighths			nearly	nearly	1 half
75 mins	2 thirds		8 nineths			melted	melted	2 thirds
80 mins	2 thirds		9 tenths					3 quarters
85 mins	3 quarters		nearly					4 fifths
90 mins	5 sixths		melted					7 eighths
95 mins	nearly							nearly
100 mins	melted							melted
105 mins					nearly			
110 mins				nearly	melted			
115 mins				melted				
120 mins		melted						

Annotations

Constructs a table to present and organise data.

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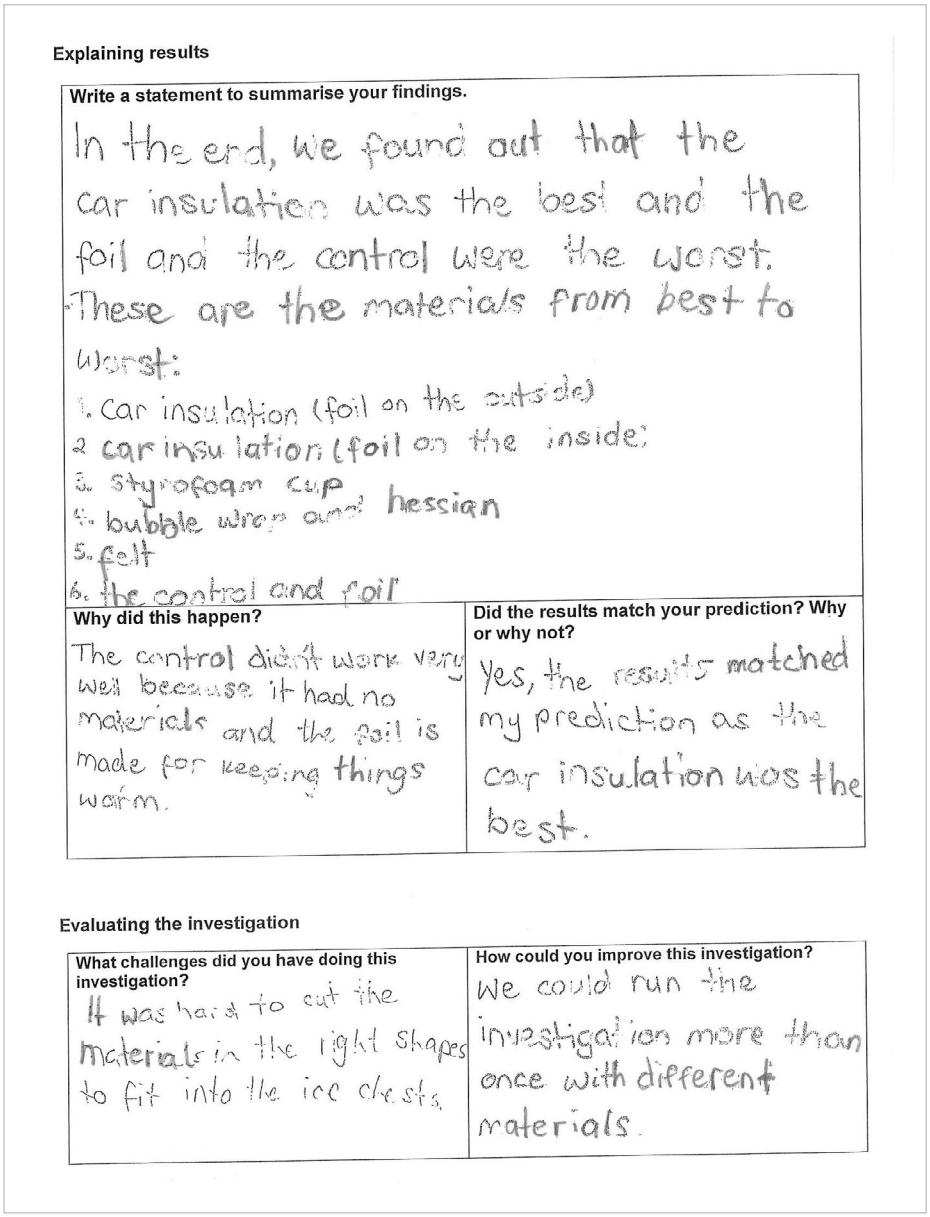
Investigation report: Insulation



Explaining results

Write a statement to summarise your findings.

In the end, we found out that the car insulation was the best and the foil and the control were the worst. These are the materials from best to worst:

1. car insulation (foil on the outside)
2. car insulation (foil on the inside)
3. styrofoam cup
4. bubble wrap and hessian
5. felt
6. the control and foil

Why did this happen?

The control didn't work very well because it had no materials and the foil is made for keeping things warm.

Did the results match your prediction? Why or why not?

Yes, the results matched my prediction as the car insulation was the best.

Evaluating the investigation

What challenges did you have doing this investigation?

It was hard to cut the materials in the right shapes to fit into the ice chests.

How could you improve this investigation?

We could run the investigation more than once with different materials.

Annotations

Interprets data to order materials with reference to insulation effectiveness.

Identifies that repeating the investigation could improve the data.

Annotations (Overview)

The student constructs a multimodal text to communicate ideas and findings.

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Investigation report: Designing an electrical switch

Year 6 Science achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

> *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 multimodal texts to communicate ideas, methods and findings.*

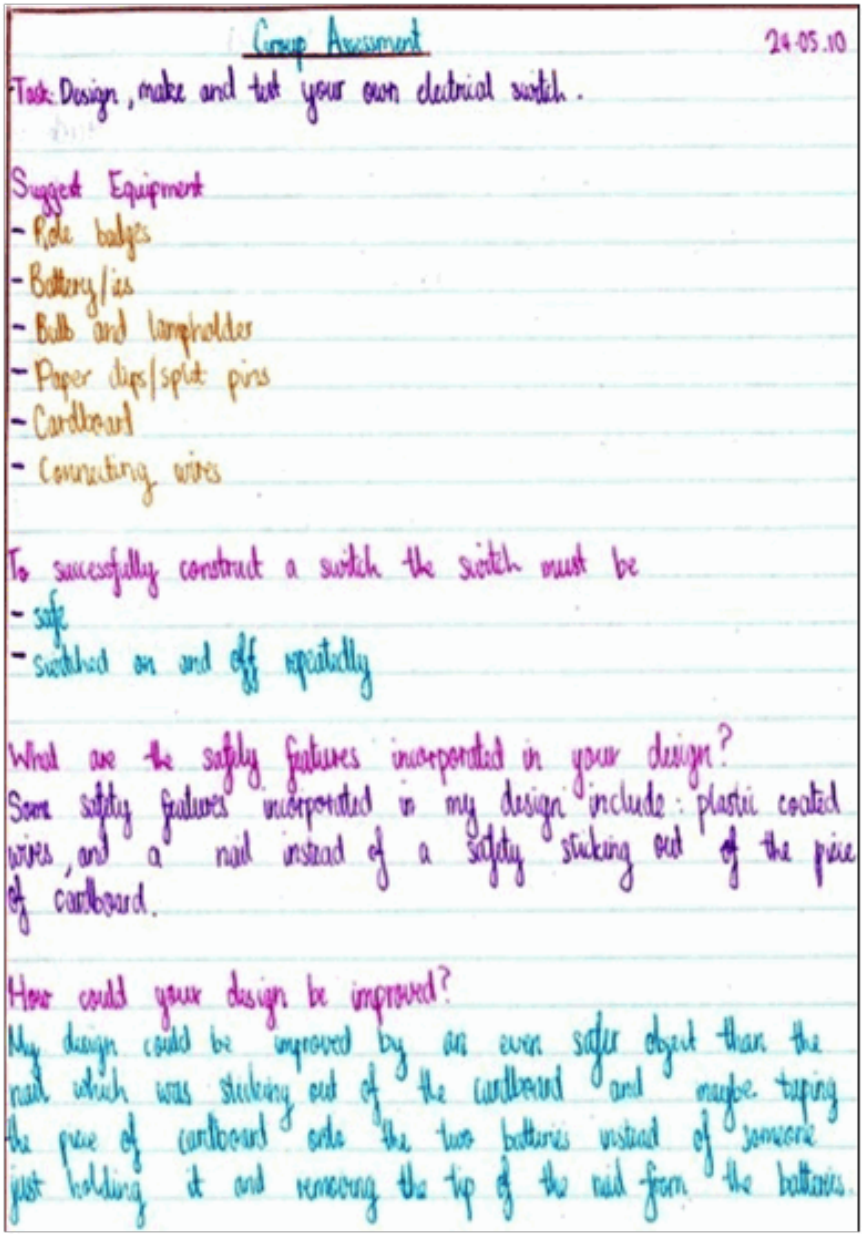
Summary of task

Students studied a unit of work on electrical energy. Students had explored construction of electrical circuits. The teacher had discussed safety precautions with the class. The low-voltage light bulbs and batteries used in this investigation are safe to touch and cannot draw large currents or reach hazardous temperatures. The glass bulbs are relatively strong but should be handled with care to avoid breakage.

Students were asked to design and make their own electrical switch. They were asked to:

- design an electrical switch that is both safe and is able to be switched on and off repeatedly
- represent their design in a diagram
- build the electrical switch
- test the success of their electrical switch
- reflect on the design of their electrical switch and make recommendations for improvement
- communicate the findings in a report.

Investigation report: Designing an electrical switch



Group Assessment 24.05.10

Task: Design, make and test your own electrical switch.

Suggest Equipment
- Ride badges
- Battery/ies
- Bulb and lampholder
- Paper clips/split pins
- Cardboard
- Connecting wires

To successfully construct a switch the switch must be
- safe
- switched on and off repeatedly

What are the safety features incorporated in your design?
Some safety features incorporated in my design include: plastic coated wires, and a nail instead of a safety sticking out of the piece of cardboard.

How could your design be improved?
My design could be improved by an even safer object than the nail which was sticking out of the cardboard and maybe taping the piece of cardboard onto the two batteries instead of someone just holding it and removing the top of the nail from the batteries.

Annotations

Identifies equipment required for transfer of electricity.

Identifies how safety was considered in the design.

Indicates where improvements to the method could be made.

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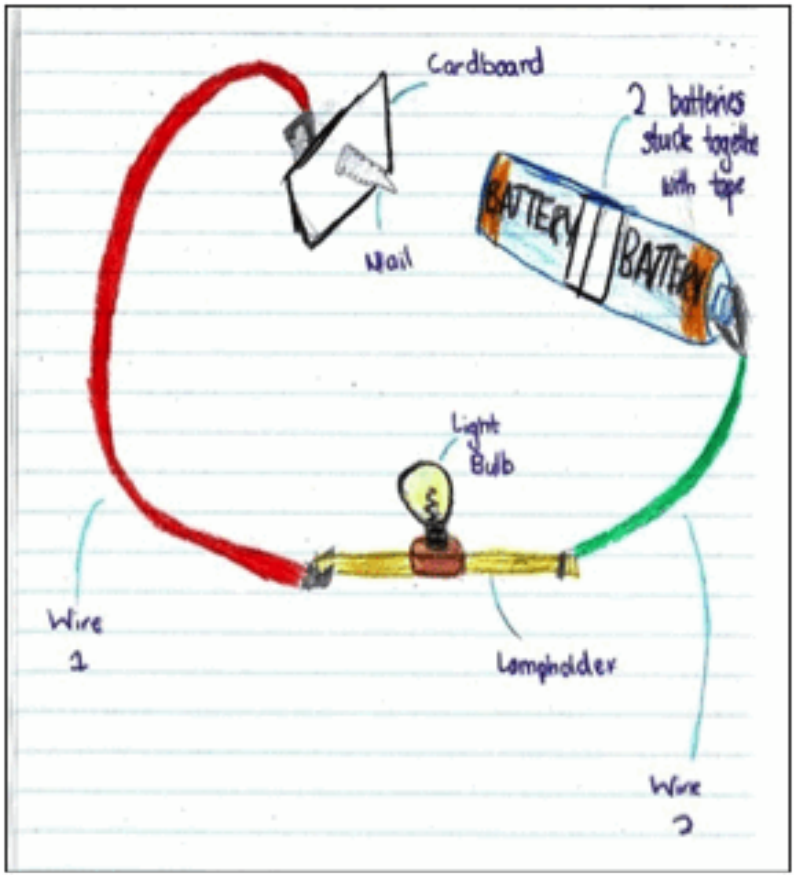
Science

Year 6
Satisfactory

Investigation report: Designing an electrical switch



Annotations

Communicates ideas using labelled graphic representations and text.

Identifies components required for transfer of electricity.

Incorporates visual texts to illustrate results.

Annotations (Overview)

The student collects and organises data to answer a research question and constructs a multimodal text to communicate ideas and findings.

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Pamphlet: Famous scientists

Year 6 Science achievement standard

The parts of the achievement standard targeted in the assessment task are highlighted.

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>
> *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 multimodal texts to communicate ideas, methods and findings.*

Summary of task

Students had completed a unit exploring notable contributors to the development of science.

Students were asked to research two different 'amazing' people in science: one Australian and one other. They were required to research the scientists' lives, evaluate the contribution of the work of the scientist and reflect on the impact these people have had on their lives. They were given the choice of how to present their work. This student produced an illustrated pamphlet.

Pamphlet: Famous scientists

Wilderness Times Science Supplement

February 2010

Special points of interest:

* Rosalind died at the age of 37
* Howard went to school at saint peter's college
* Howard saved 80 million lives worldwide

Inside this issue:

Rosalind Franklin

Did you know?

Rosalind Franklin started off as being a chemist at a London university and later on she started to work as an assistant with a man at and Kings College in Cambridge.

During her work on DNA she later understood the formula of the Deoxyribonucleic acid and discovered the helical structure of the DNA molecule.

She later died from cancer. After she died the man she worked with later accepted a Nobel prize for both of their work on DNA.

Rosalind Franklin

Howard Florey

Howard Florey

Did you know?

Dr Howard Florey was born in Adelaide, South Australia.

In 1945 Howard Florey shared a Nobel prize for Physiology or Medicine with two other people for their major role in extracting penicillin.

His major discovery has saved over millions and millions of people world wide.

Howard Florey has had his picture on the Australian $50 for around a couple of decades.

Also died at a young age of 69.

Annotations

Identifies contributions to the development of science by people from different backgrounds.

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Pamphlet: Famous scientists

Rosalind Franklin

Did you know?

That Rosalind Franklin died at the young age of 37.

Rosalind Franklin's Personal History

Rosalind Franklin was born in 1920 and died in 1958.

Later on in her life she had many jobs such as a British biophysicist, physicist, chemist, biologist, X-ray crystallographer and also a Chemist at London University.

Then she became an assistant to John Randall along side Maurice Wilkins at King's College at Cambridge. During her work with John Randall she later understood the formula called Deoxyribonucleic acid.

She later discovered the helical structure of the DNA molecule .

At a very young age she died of a cancer called ovarian cancer.

After her death John Randall later accepted the Nobel prize for her work on DNA.

Rosalind Franklin's Contribution to our world

Rosalind Franklin has made a really big contribution to the world by discovering what DNA looks like and this helps by curing many diseases and identifying what type of disease it is and so on.

If Rosalind Franklin didn't discover DNA the world would not have enough medicine to go round and diseases would not have cures and many people would die.

So Rosalind Franklin had made a big discovery by helping people understand the way of DNA and cures for diseases.

How Rosalind Franklin changed my life

Rosalind Franklin has changed my life by finding cures for diseases. If she didn't discover the structure of DNA and if I had a disease that no body knew about or had heard of it I would probably be very sick or of even dead.

Annotations

Identifies how research contributed to improving people's lives.

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Pamphlet: Famous scientists

Howard Florey

Howard Florey's Personal History

Howard Florey was born in Adelaide , South Australia 1898 and died in 1968.

At the University of Adelaide he studied medicine.

He had also a couple of jobs such as an Australian pharmacologist and a pathologist.

In 1945 he shared a Nobel prize with Ernst Boris Chain and Sir Alexander Fleming for Physiology or Medicine.

Howard Florey's discovery saved over an amazing 80 million people worldwide.

During 1973 and 1995 Florey had his portrait on the Australian $50 note.

He later died at a young age of 69.

Did you know?

Howard Florey went to Saint Peter's College in Adelaide South Australia.

Howard Florey's Contribution to our world

Howard Florey has made a huge contribution to our world by saving over 80 million people with his powerful and life saving drug penicillin.

If he didn't invent this wonderful medicine a lot of people would not live for a very long time and a lot of people would die to sickness very quickly.

His huge discovery is one of the biggest breakthroughs in medical history in the world.

How Howard Florey has changed my life

Howard Florey has changed my life because every time I have an infection I always use penicillin and if that wasn't around I would become really sick or maybe even die because of maybe really little things. If penicillin wasn't invented there would be millions of deaths every week or maybe even every day.

Annotations

Describes the life of Howard Florey, including how his discoveries have affected people's lives.

Uses clear language including the appropriate use of scientific terms.

Identifies how scientific research has global impacts.

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Pamphlet: Famous scientists

Rosalind Franklin

Reference List

Wikipedia

Howard Florey

Reference List

Wikipedia

Thankyou for your interest in my science supplement. I am sure to you too have benefitted from the discoveries of Howard Florey and Rosalind Franklin

Annotations

Annotations (Overview)

The student collects and organises data to answer a research question and constructs a multimodal text to communicate ideas and findings.

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