Science

Year 6
Below 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	Investigation poster: Mouldy bread
Sample 5	Investigation report: Insulation

In this portfolio, the student classifies changes to materials as reversible and irreversible (WS1). The student describes the energy transformations that occur in the generation of electrical energy from a range of energy sources (WS2, WS3). The student demonstrates understanding that living things are affected by environmental conditions (WS4). The student identifies how scientific knowledge is used in decision-making in a range of areas (WS3, WS4). 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 (WS4, WS5) and articulates potential safety risks when planning their investigation methods (WS4). The student collects, organises and interprets investigation data (WS2, WS4, WS5) and identifies where improvements to their methods could improve the data (WS4, WS5). The student interprets, describes and analyses trends in data using graphic representations (WS4, WS5) and constructs multimodal texts to communicate ideas, methods and findings (WS2, WS3, WS4, WS5).

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.*
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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 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.

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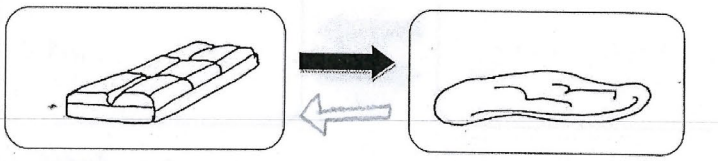
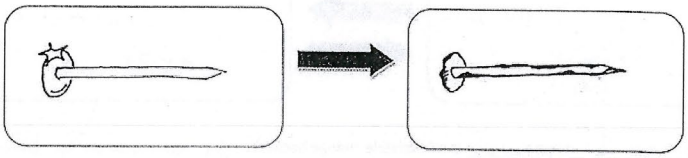
Worksheet: Reversible and irreversible changes

Reversible and irreversible changes – Part A

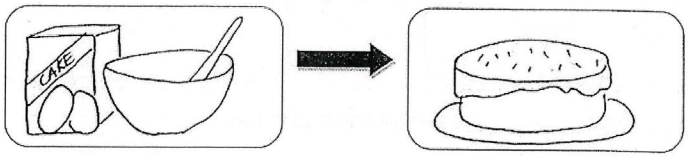
1. Look at each of the changes and fill in the blanks to say whether the changes are reversible or irreversible.
2. For the reversible changes, draw another arrow below the first one, pointing the other way.
3. For each change, explain why you thought it was reversible or irreversible.



Melting chocolate is reversible change because: You can freeze it back into a solid and if you have a mould you can make it exactly the same



An iron nail rusting is a irriversible change because: You cant take rust off a nail to make it look new it would hurt your hand and is pretty much impossible.

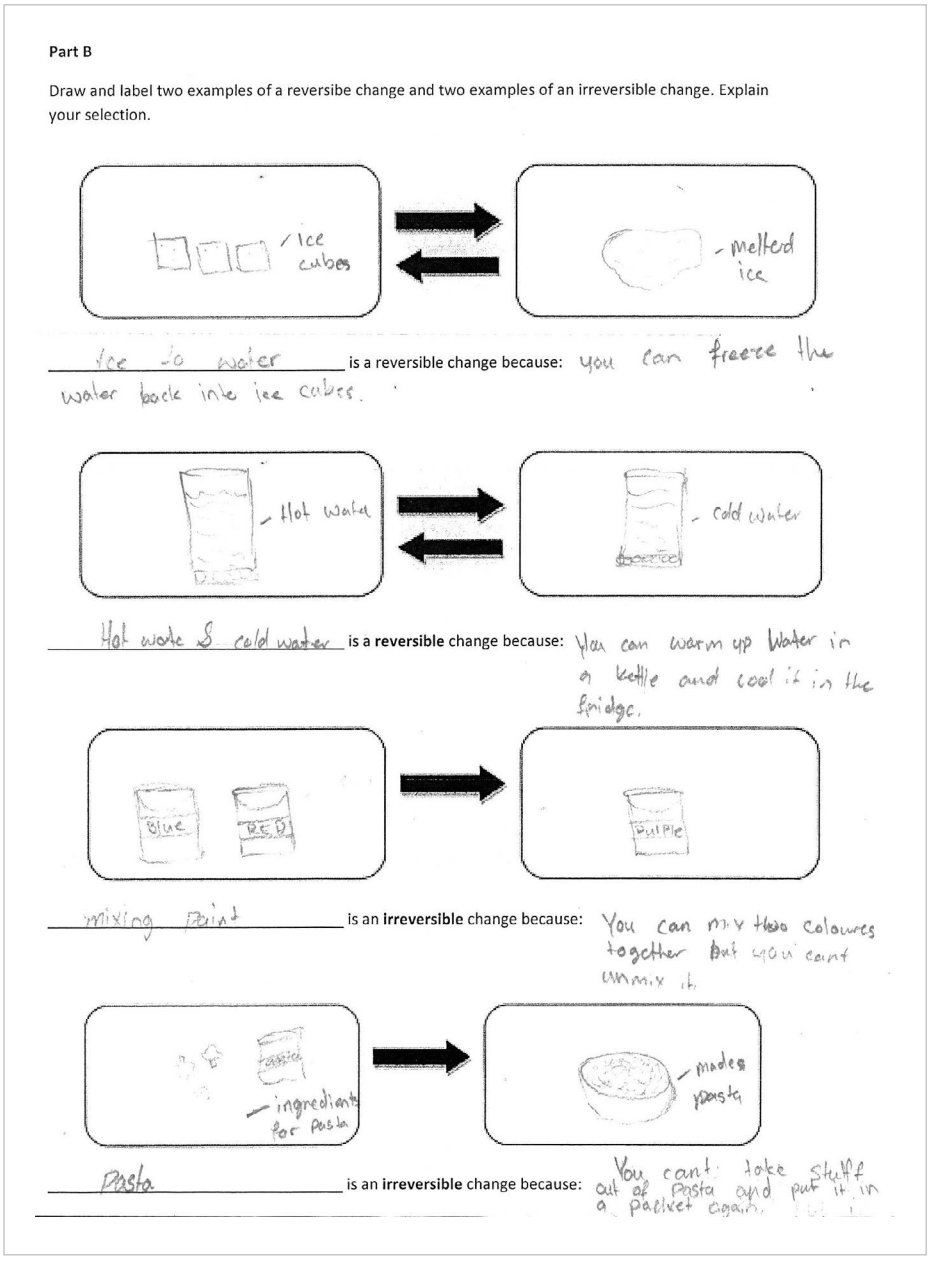


Baking a cake is a irriversible change because: You cant unbake a cake it is impossible to take flour and other ingredients out of a cake when it is already made.

Annotations

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

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.

Ice to water is a reversible change because: you can freeze the water back into ice cubes.

Hot wate & cold water is a **reversible** change because: You can warm up water in a kettle and cool it in the fridge.

mixing Paint is an **irreversible** change because: You can mix two colours together but you cant unmix it.

Pasta is an **irreversible** change because: You cant take stuff out of pasta and put it in a packet again.

Annotations

Suggests examples of reversible and irreversible changes, including change in temperature and mixing, based on observed phenomena.

Pamphlet: Generating electrical energy

Year 6 Science achievement standard

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

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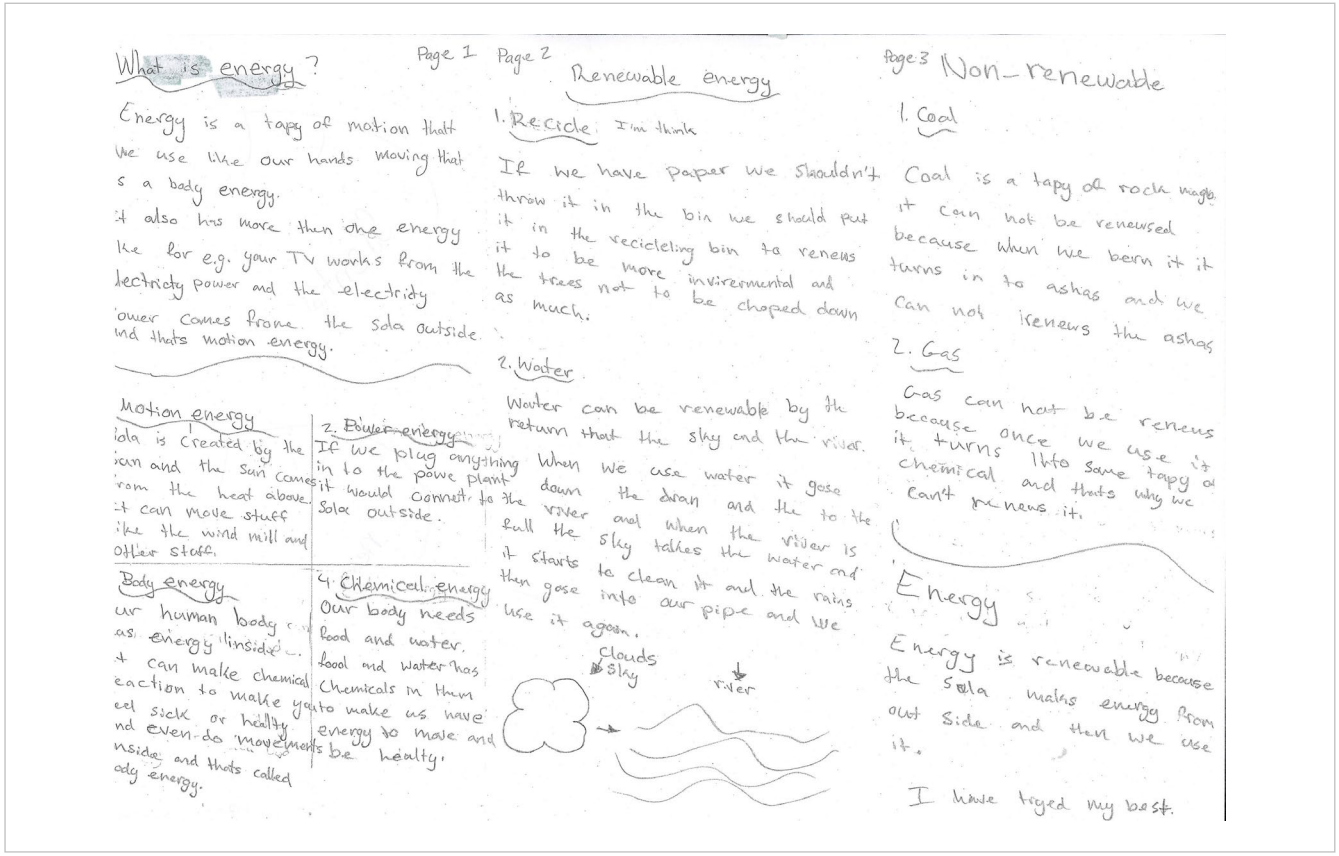
Summary of task

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



What is energy?

Page 1

Energy is a tapy of motion thatt we use like our hands moving that s a body energy.
it also has more then one energy like for e.g. your TV works from the electricty power and the electricty ower comes frome the sola outside nd thats motion energy.

Motion energy

iola is created by the ean and the sun comes rom the heat above. it can move stuef ike the wind mill and ther staff.

2. Boiler energy

If we plug anything in to the powe plant it would connect to the Sola outside.

Body energy

ur human body as energy inside. t can make chemical eaction to make y eel sick or healty nd even do movements nside and thats called ody energy.

4. Chemical energy

Our body needs food and water. food and water has Chemicals in them to make us have energy to move and be healty.

Page 2

Renewable energy

1. Recicle I'm think

If we have paper we shouldn't throw it in the bin we should put it in the recicleing bin to renews it to be more invironmental and the trees not to be choped down as much.

2. Water

Wouter can be renewable by th return that the sky end the river.

When we use water it gose down the draan and the to the river and when the river is full the sky takes the water and it starts to clean it and the rains then gose into our pipe and we use it agean.

Clouds
Sky
river

Page 3

Non-renewable

1. Coal

Coal is a tapy of rock mage it can not be renewsed because when we burn it it turns in to ashas and we can not renews the ashas

2. Gas

Gas can not be renews because once we use it it turns Into some tapy of chemical and thats why we can't renews it.

Energy

Energy is renewable because the sola makes energy from out side and then we use it.

I have tryed my best.

Annotations

Identifies coal and gas as non-renewable energy sources.

Identifies different forms of energy.

Annotations (Overview)

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

Worksheet: Energy transformations

Year 6 Science achievement standard

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

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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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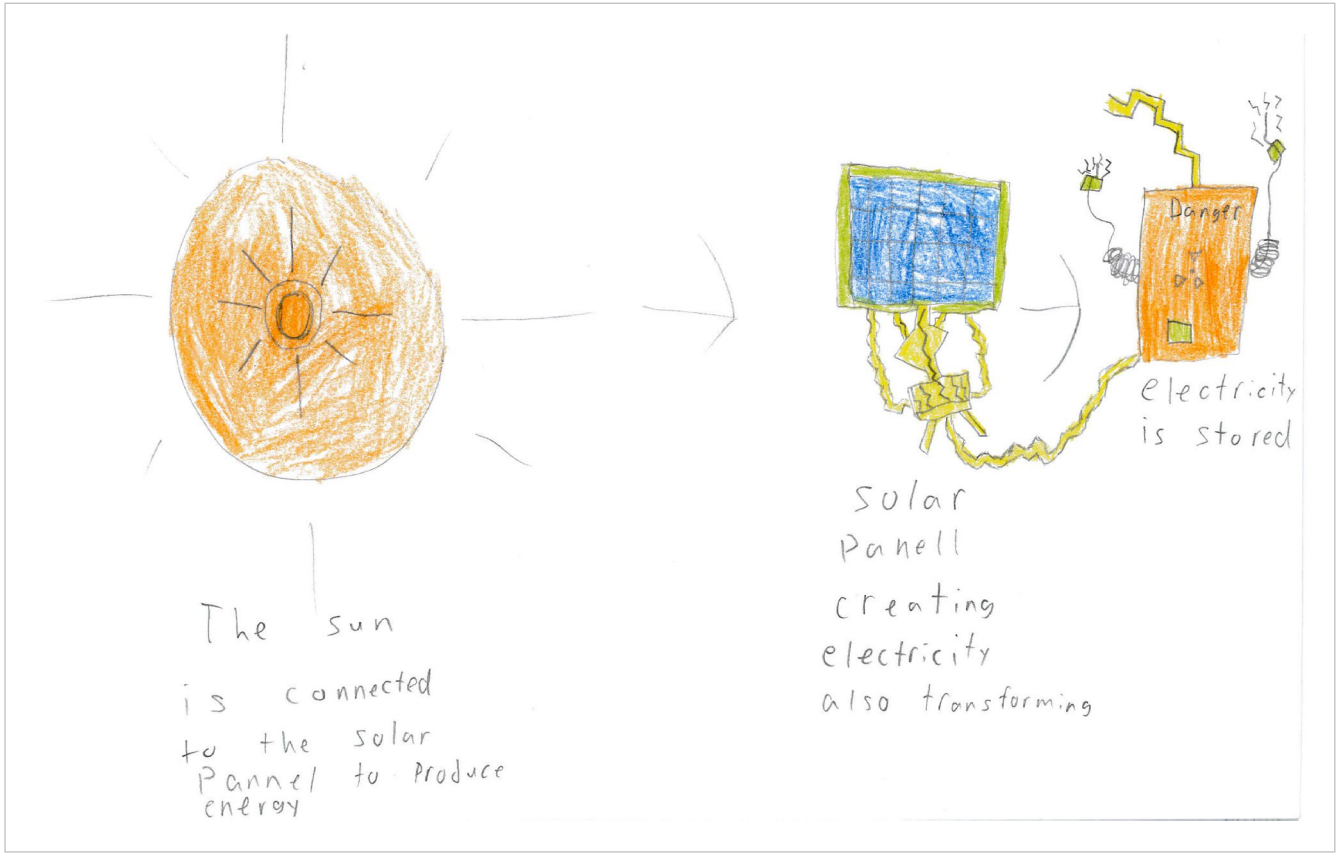
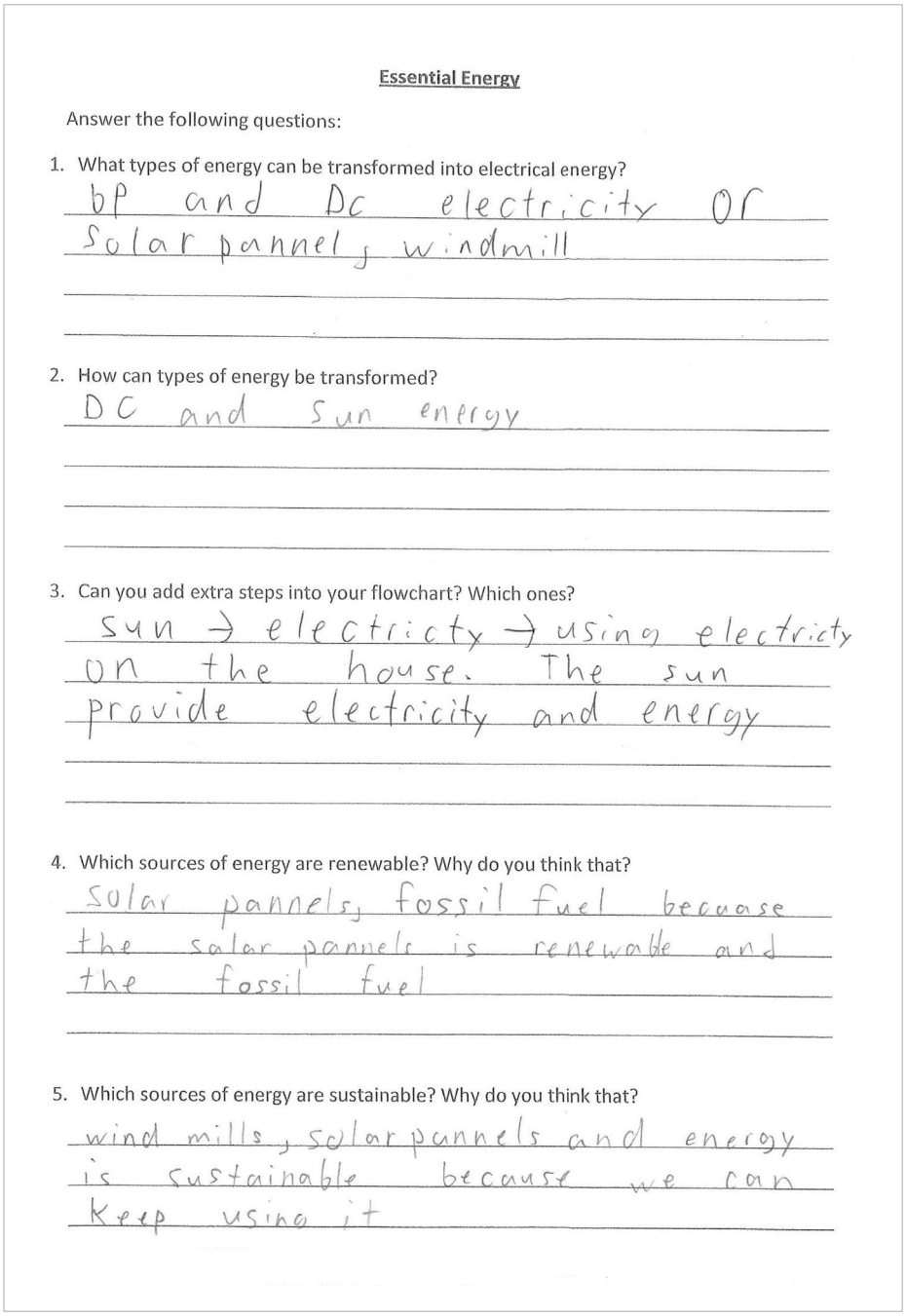
Worksheet: Energy transformations



Annotations

Constructs a flow chart to show that energy from the sun is captured by solar panels to generate electricity.

Worksheet: Energy transformations



Essential Energy

Answer the following questions:

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

bP and Dc electricity Or Solar pannel, windmill

2. How can types of energy be transformed?

DC and Sun energy

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

Sun → electricty → using electricty on the house. The sun provide electricity and energy

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

Solar pannels, fossil fuel because the solar pannels is renewable and the fossil fuel

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

wind mills, solar pannels and energy is sustainable because we can Keep using it

Annotations

Identifies that solar panels and windmills are related to electrical energy generation.

Science

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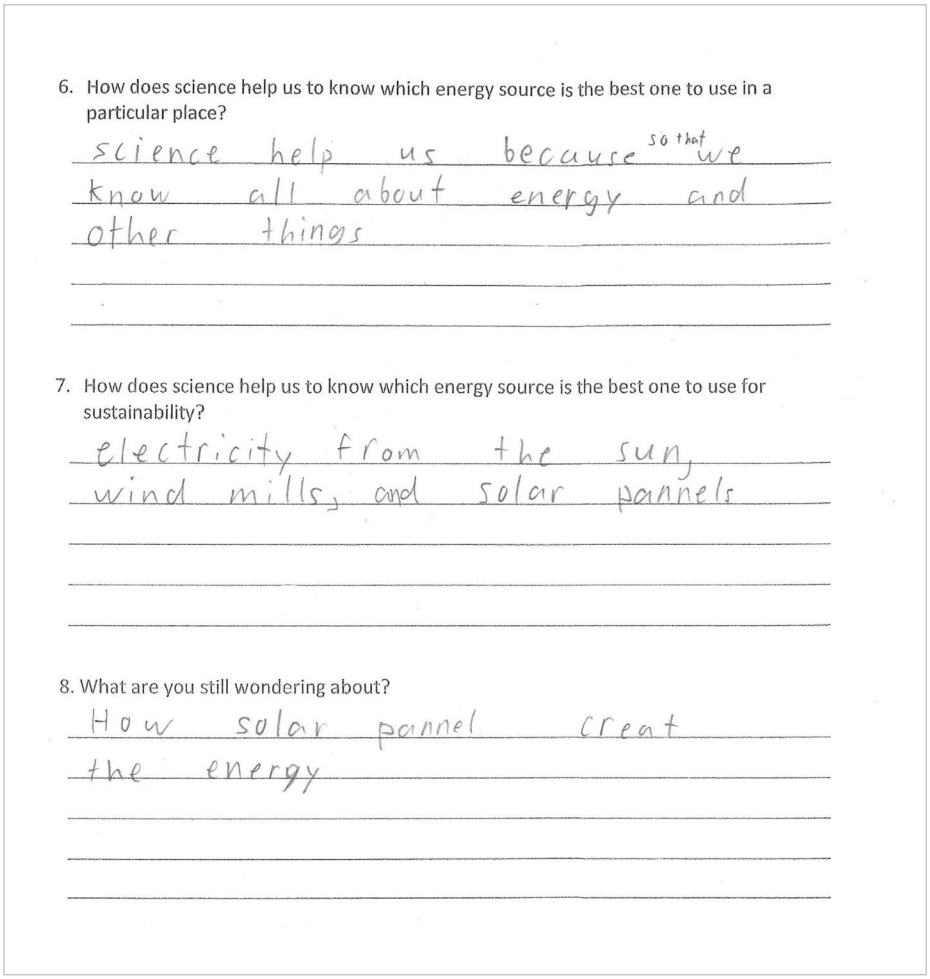
Worksheet: Energy transformations



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

science help us because so that we know all about energy and other things

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

electricity from the sun, wind mills, and solar pannels

8. What are you still wondering about?

How solar pannel creat the energy

Annotations

States that scientific knowledge is useful.

Annotations (Overview)

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

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.

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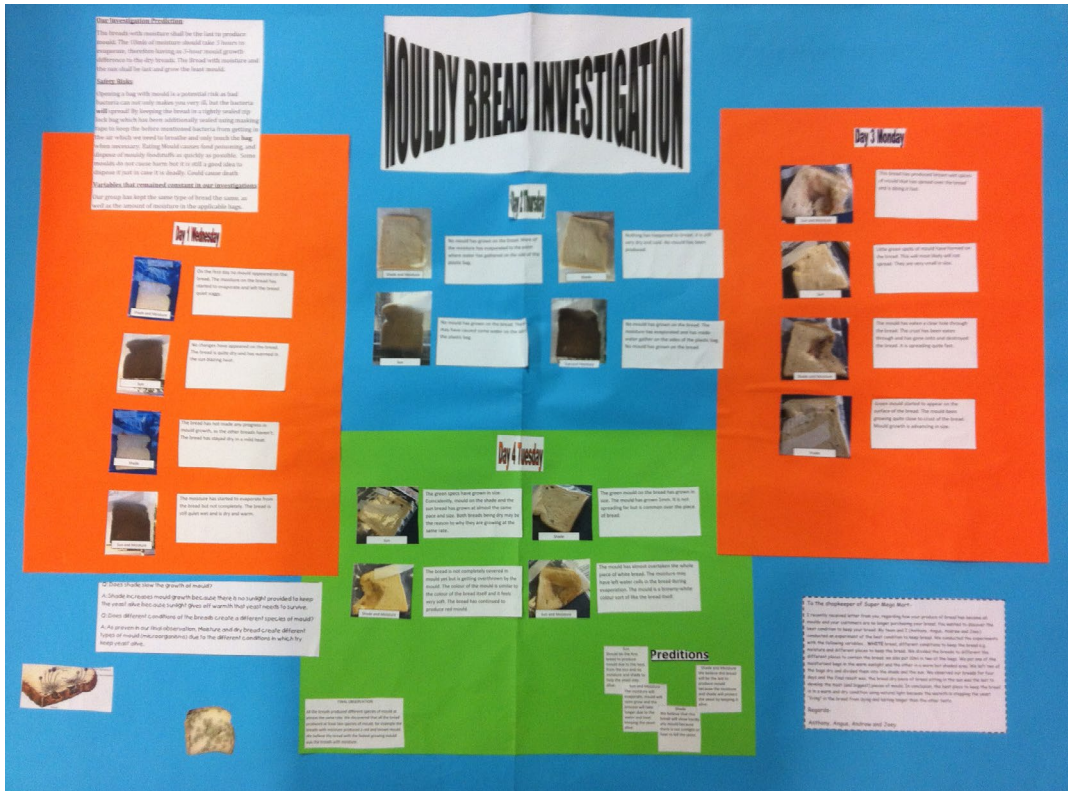
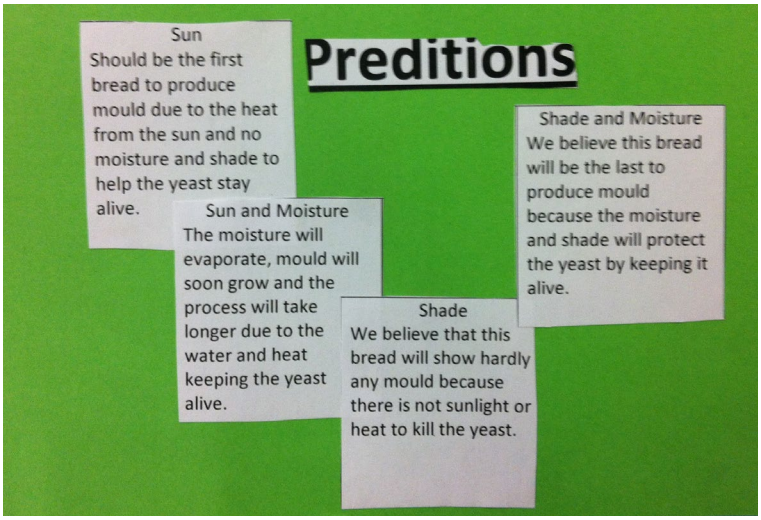
Investigation poster: Mouldy bread

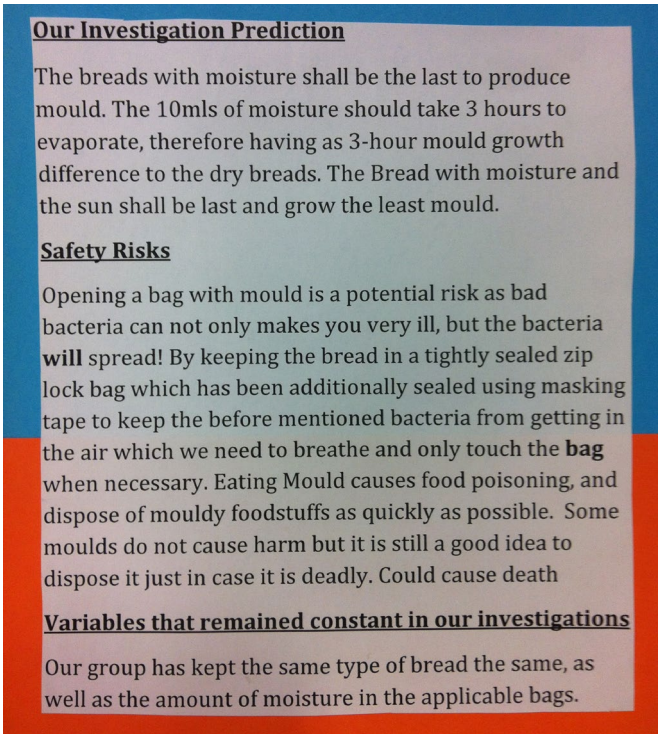


Annotations

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

Investigation poster: Mouldy bread





Our Investigation Prediction

The breads with moisture shall be the last to produce mould. The 10mls of moisture should take 3 hours to evaporate, therefore having as 3-hour mould growth difference to the dry breads. The Bread with moisture and the sun shall be last and grow the least mould.

Safety Risks

Opening a bag with mould is a potential risk as bad bacteria can not only makes you very ill, but the bacteria **will** spread! By keeping the bread in a tightly sealed zip lock bag which has been additionally sealed using masking tape to keep the before mentioned bacteria from getting in the air which we need to breathe and only touch the **bag** when necessary. Eating Mould causes food poisoning, and dispose of mouldy foodstuffs as quickly as possible. Some moulds do not cause harm but it is still a good idea to dispose it just in case it is deadly. Could cause death

Variables that remained constant in our investigations

Our group has kept the same type of bread the same, as well as the amount of moisture in the applicable bags.

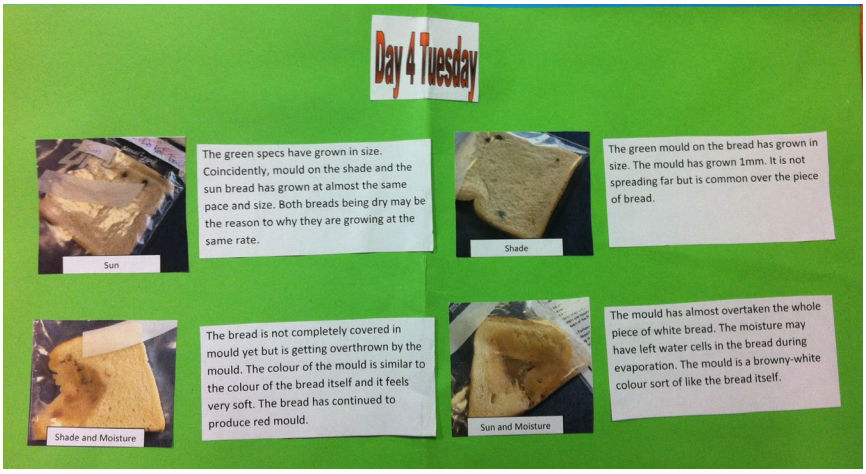
Annotations

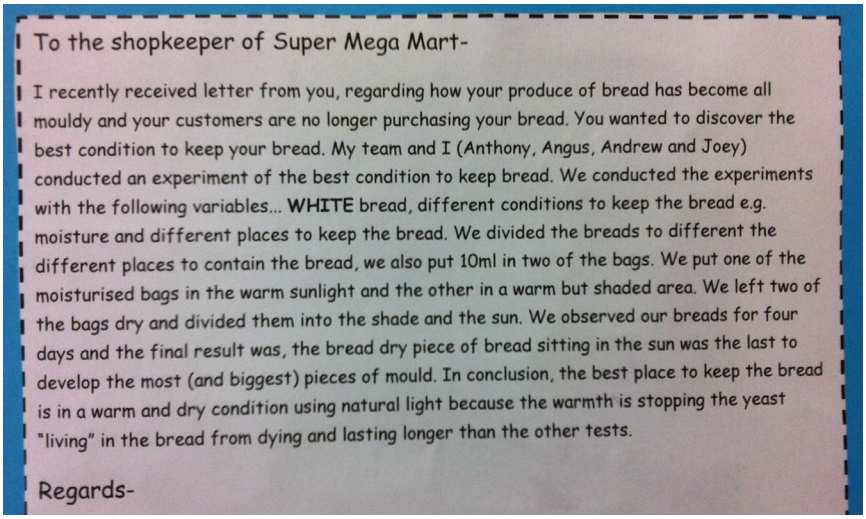
Attempts to use scientific reasoning to predict that sunlight will be the most influential variable on the growth of the mould.

Identifies safety risks (attempting a scientific explanation) and plans methods to reduce the risks.

Identifies variables to be kept the same (bread type, amount of moisture).

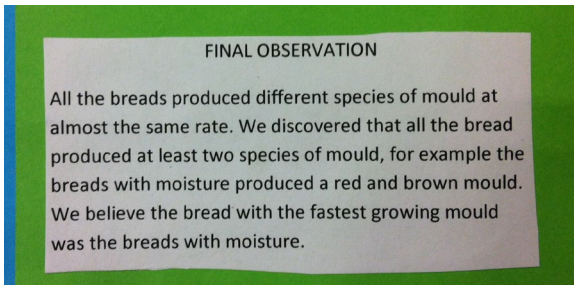
Investigation poster: Mouldy bread




To the shopkeeper of Super Mega Mart-

I recently received letter from you, regarding how your produce of bread has become all mouldy and your customers are no longer purchasing your bread. You wanted to discover the best condition to keep your bread. My team and I (Anthony, Angus, Andrew and Joey) conducted an experiment of the best condition to keep bread. We conducted the experiments with the following variables... **WHITE** bread, different conditions to keep the bread e.g. moisture and different places to keep the bread. We divided the breads to different the different places to contain the bread, we also put 10ml in two of the bags. We put one of the moisturised bags in the warm sunlight and the other in a warm but shaded area. We left two of the bags dry and divided them into the shade and the sun. We observed our breads for four days and the final result was, the bread dry piece of bread sitting in the sun was the last to develop the most (and biggest) pieces of mould. In conclusion, the best place to keep the bread is in a warm and dry condition using natural light because the warmth is stopping the yeast "living" in the bread from dying and lasting longer than the other tests.

Regards-


FINAL OBSERVATION

All the breads produced different species of mould at almost the same rate. We discovered that all the bread produced at least two species of mould, for example the breads with moisture produced a red and brown mould. We believe the bread with the fastest growing mould was the breads with moisture.

Annotations

Collects data and provides a visual representation of raw data.

Analyses data to form a conclusion.

Indicates how scientific knowledge can inform decision-making.

Annotations (Overview)

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

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 will investigate what materials will keep a single ice cube cool and refridgerated for the longest rate and which will not.

Can you write it as a question? Which materials will keep a single ice cube & which will not.

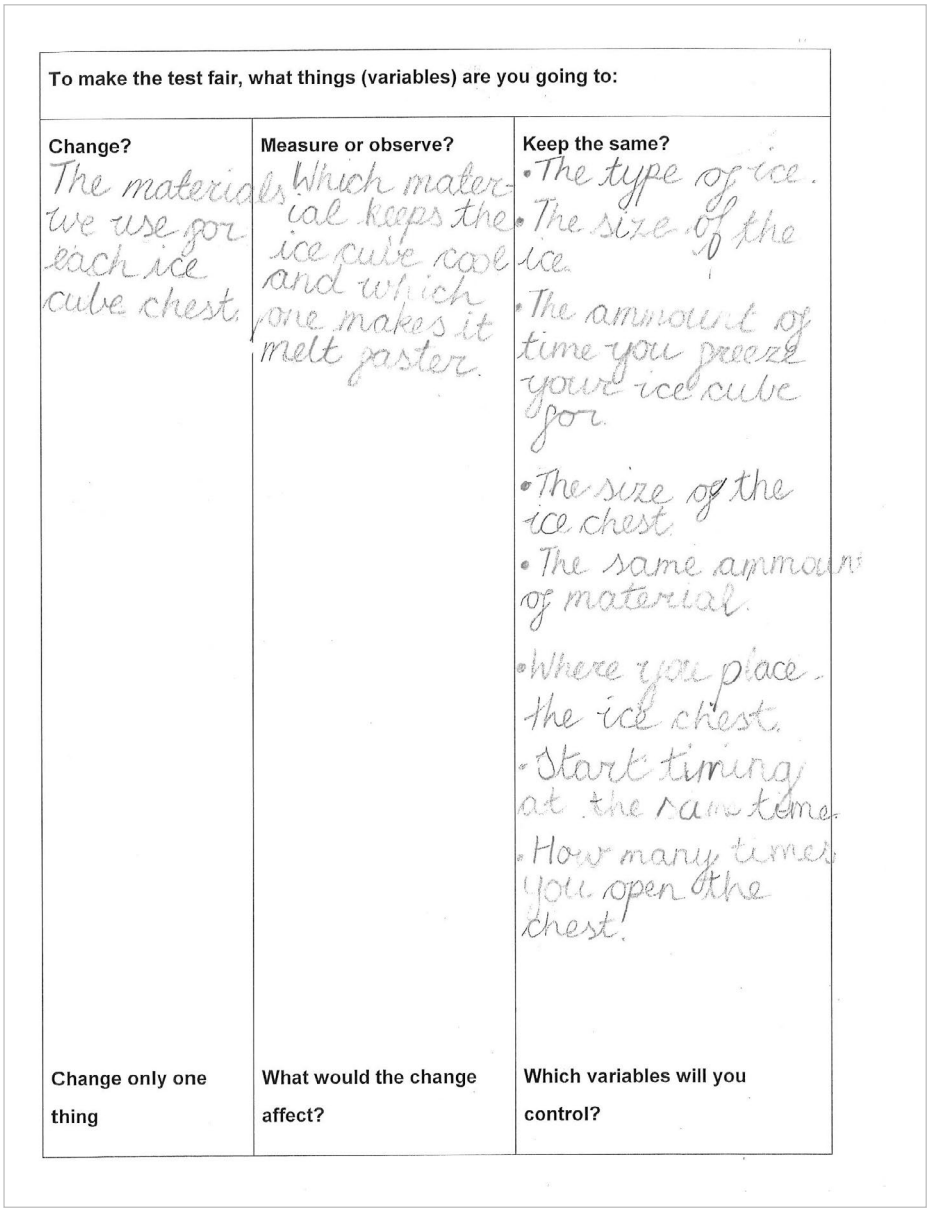
What do you predict will happen? Explain why. I predict that bubble wrap will be the most successful in keeping the ice cube refridgerated, because it has air pholes

Give scientific explanations for your opinion.

Annotations

Constructs an investigable question.

Investigation report: Insulation



To make the test fair, what things (variables) are you going to:		
Change?	**Measure or observe?**	**Keep the same?**
The materials we use for each ice cube chest.	Which material keeps the ice cube cool and which one makes it melt faster.	• The type of ice. • The size of the ice. • The ammount of time you freeze your ice cube for. • The size of the ice chest. • The same ammount of material. • Where you place the ice chest. • Start timing at the same time. • How many times you open the chest.
Change only one thing	**What would the change affect?**	**Which variables will you control?**

Annotations

Identifies variables to be changed and some variables to be controlled.

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Investigation report: Insulation

Describe how you will set up and conduct the investigation.

① Choose the materials that you are going to use.

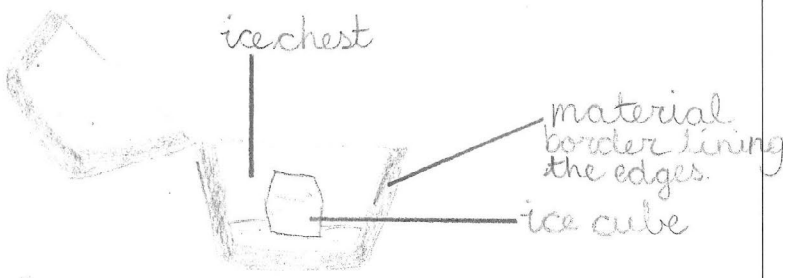
② Use a gluegun to glue the materials on the inside of the ice chest.

③ Transport one single ice cube from the freezer and place in ice chest.

④ Start timing.

⑤ Record how long it takes for each ice cube to melt using a piece of paper.

⑥ Record the material that works the best/worst.

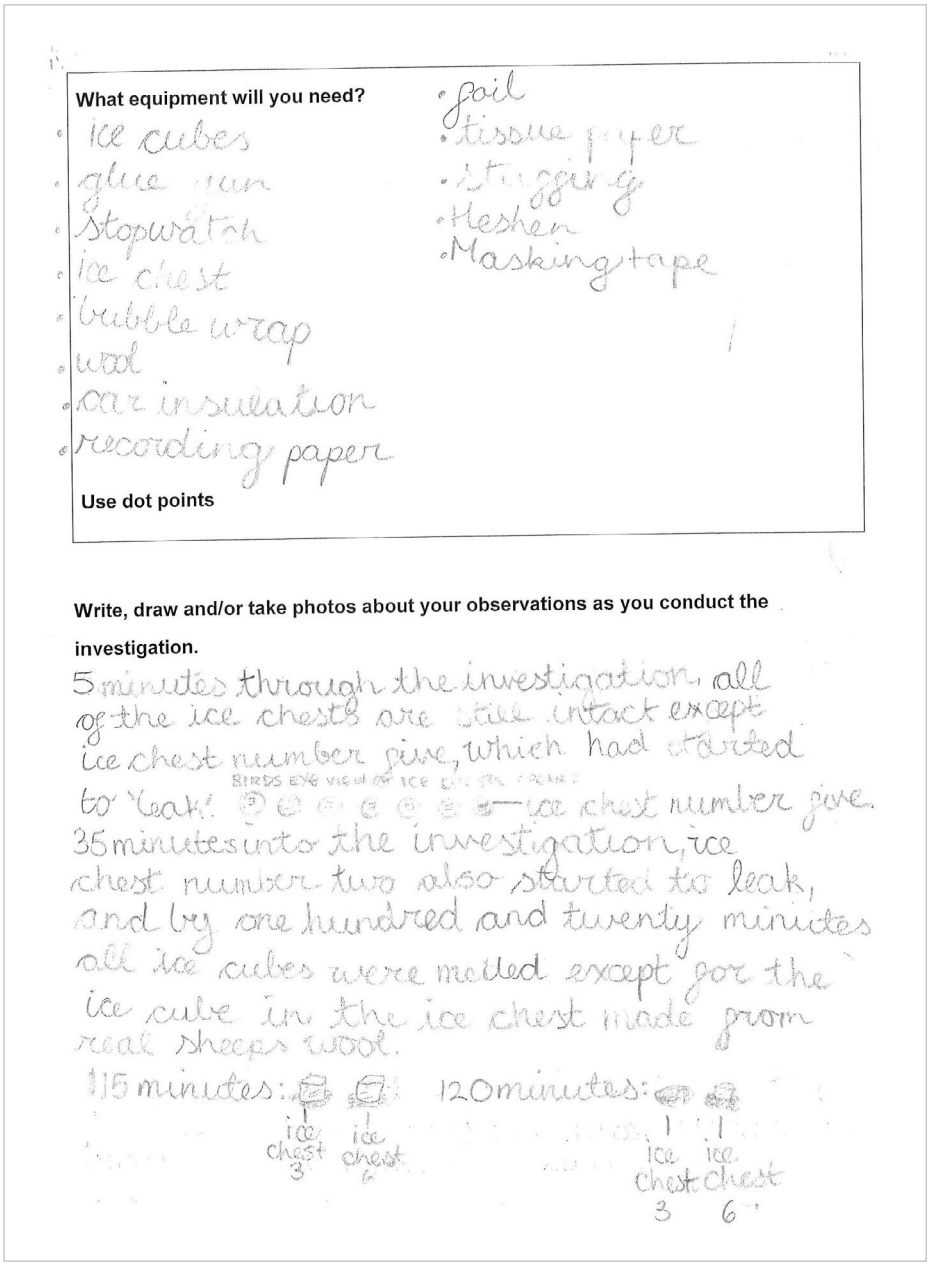


Use drawings, label and explain in steps.

Annotations

Designs an investigation method including collection of data.

Investigation report: Insulation



What equipment will you need?

- ice cubes
- glue gun
- stopwatch
- ice chest
- bubble wrap
- wool
- car insulation
- recording paper
- foil
- tissue paper
- stuffing
- Meshen
- Masking tape

Use dot points

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

5 minutes through the investigation, all of the ice chests are still intact except ice chest number five, which had started to leak.

35 minutes into the investigation, ice chest number two also started to leak, and by one hundred and twenty minutes all ice cubes were melted except for the ice cube in the ice chest made from real sheep's wool.

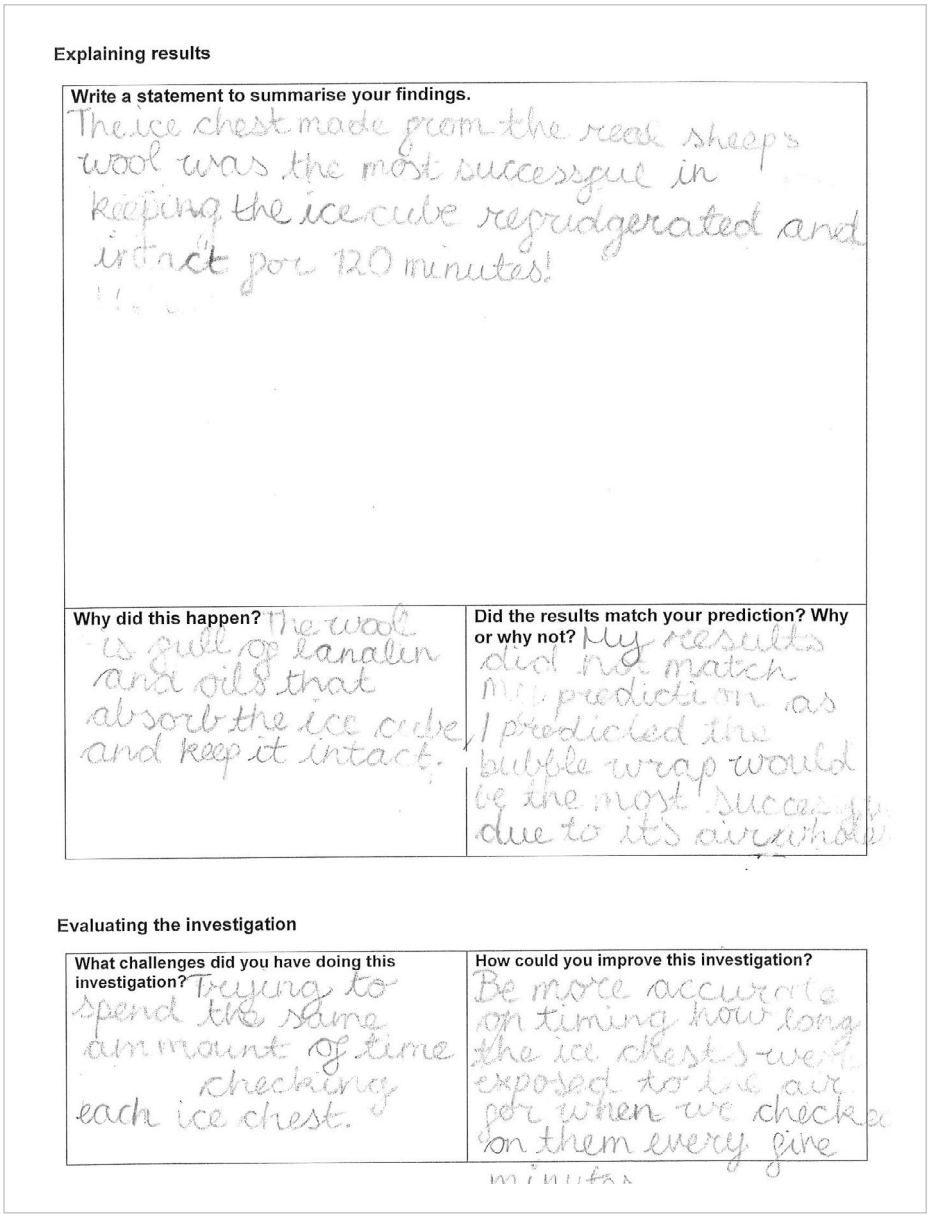
15 minutes: ice chest 3, ice chest 2

120 minutes: 1 ice chest 3, 1 ice chest 6

Annotations

Describes data collected.

Investigation report: Insulation



Explaining results

Write a statement to summarise your findings.

The ice chest made from the real sheep's wool was the most successful in keeping the ice cube refridgerated and intact for 120 minutes!

Why did this happen?	Did the results match your prediction? Why or why not?
The wool is full of lanalin and oils that absorb the ice cube and keep it intact.	My results did not match my prediction as I predicted the bubble wrap would be the most successful due to its air pockets

Evaluating the investigation

What challenges did you have doing this investigation?	How could you improve this investigation?
Trying to spend the same ammount of time checking each ice chest.	Be more accurate on timing how long the ice chests were exposed to the air for when we checked on them every five minutes

Annotations

Interprets data to identify the most effective insulation.

Identifies that greater measurement accuracy could improve the data.

Annotations (Overview)

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