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).

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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 freeze it back into a solid and if you have a mould you can make it exactly the same.

An iron nail rusting is [irreversible] change because: You can’t take rust off a nail to make it look new, it would hurt your hand and is pretty much impossible.

Baking a cake is [irreversible] change because: You can’t un-bake 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

An 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.

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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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

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.

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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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.
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?

   - Solar panels
   - Windmills
   - DC and DC electricity

2. How can types of energy be transformed?

   - DC and Sun energy

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

   - Sun → Electricity → Using electricity on the house. The sun provide electricity and energy

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

   - Solar panels, fossil fuel because the solar panels is renewable and the fossil fuel

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

   - Windmills, solar panels and energy is sustainable because we can keep using it

Annotations

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

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 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

Designs an investigation to test the effect of changing light, heat and water on the growth of the organism.
Investigation poster: Mouldy bread

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).
**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

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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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 members of your team:

**What is to be investigated:**

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

**Can you write it as a question?**

Which materials will keep a single ice cube cold and refrigerated for the longest rate and 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 refrigerated, because it has air photos.

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:

<table>
<thead>
<tr>
<th>Change?</th>
<th>Measure or observe?</th>
<th>Keep the same?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The material we use for each ice cube chest.</td>
<td>Which material keeps the ice cube cold and which one makes it melt faster.</td>
<td>The type of ice.</td>
</tr>
<tr>
<td>The size of the ice cube.</td>
<td></td>
<td>The size of the ice.</td>
</tr>
<tr>
<td>The amount of time you place your ice cube for.</td>
<td></td>
<td>The amount of time you place the ice chest.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start timing at the same time.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>How many times you open the chest.</td>
</tr>
</tbody>
</table>

### Annotations

Identifies variables to be changed and some variables to be controlled.
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 glue gun 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.
Investigation report: Insulation

What equipment will you need?
- Ice cubes
- Glue gun
- Stopwatch
- Ice chest
- Bubble wrap
- Air insulation
- Recording paper

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 chest are still intact except ice chest number five, which had started to leak.

60 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 wool.

Describes data collected.
Investigation report: Insulation

**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.