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|  | Australian Curriculum Year 3 Science sample assessment ׀ Student booklet  Cool it! |

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| *\\file01\data\D_Curriculum_Services\B_Australian_Curriculum\BRANCH ADMIN\Photos\2013\2013-06-21 Year 3 Science\_SAM2557.jpg* |
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| Conduct an investigation to determine which insulator will keep ice solid for longer. |
| You will:   * make predictions * conduct an investigation * record results * explain your results * apply your science knowledge to a real-life situation. |

## Section 1. Making predictions

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| Question | *What you are trying to find out by doing the investigation.* |

**Which insulator will keep ice solid for longer: bubble wrap, newspaper or aluminium foil?**

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| Prediction | *What you think is going to happen in the investigation.* |

**I think the** ……………………… **will be the best insulator and will keep the ice solid for longer.**

**I think this because** ……………………………………………………………………………………….

## Section 2. Conducting the investigation

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| Materials and equipment | *The things you will need to do the investigation.* |

* three empty 250 mL plastic juice or water bottles
* one sheet each of bubble wrap, newspaper and aluminium foil — enough to cover the bottles
* sticky tape
* three drinking glasses/cups
* a 250 mL measuring cup
* a medicine glass
* water
* a stopwatch
* a freezer.

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| Method | *The steps you will follow during the investigation.* |

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| **Step 1**   * Use the measuring cup to measure exactly 150 mL of water. * Pour into one of the empty plastic juice or water bottles and replace the lid. * Repeat for the other two bottles.   \\file01\data\D_Curriculum_Services\B_Australian_Curriculum\BRANCH ADMIN\Photos\2013\2013-06-21 Year 3 Science\_SAM2586.jpg |  | **Step 2**   * Place the three bottles into the freezer and leave overnight until the water is completely frozen.   \\file01\data\D_Curriculum_Services\B_Australian_Curriculum\BRANCH ADMIN\Photos\2013\2013-06-21 Year 3 Science\_SAM2589.jpg |
|  |  |  |
| **Step 6**   * Repeat Step 5 after another 30 minutes (a total of 60 minutes or 1 hour). * Repeat Step 5 again after a further 30 minutes (a total of 90 minutes or 1 ½ hours). |  | **Step 3**   * Remove the bottles from the freezer. * Cover one bottle with bubble wrap, one with newspaper and one with aluminium foil. Do not cover the lid. * Remove the lid from each bottle. |
|  |  |  |
| **Step 5**   * After 30 minutes, carefully pour any water collected from the bottle wrapped in bubble wrap into the medicine glass. * Place the bottle upside-down on top of the drinking glass again. * Record the amount of water collected in the recording table. * Repeat for the other two bottles.   \\file01\data\D_Curriculum_Services\B_Australian_Curriculum\BRANCH ADMIN\Photos\2013\2013-06-21 Year 3 Science\_SAM2635.jpg |  | **Step 4**   * Gently place each bottle upside-down on top of a drinking glass. * When all three bottles are in place, start the stopwatch.   \\file01\data\D_Curriculum_Services\B_Australian_Curriculum\BRANCH ADMIN\Photos\2013\2013-06-21 Year 3 Science\_SAM2631.jpg |

## Section 3. Recording results

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| Results | *A record of the data you collect during the investigation.* |

1. Write the volume of water you collect at 30 minutes, 60 minutes and 90 minutes in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **30  minutes** | **60  minutes** | **90  minutes** |
| Volume of water collected from the bottle wrapped in **bubble wrap**  (mL) |  |  |  |
| Volume of water collected from the bottle wrapped in **newspaper**  (mL) |  |  |  |
| Volume of water collected from the bottle wrapped in **aluminium foil**  (mL) |  |  |  |

1. You need to find out how much water was collected from each bottle **in total**. To do this, you need to add the three water measurements for each bottle.

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| Bottle wrapped in **bubble wrap:**  ............ mL + ………… mL + ………… mL = ………… mL in total  Bottle wrapped in **newspaper:**  ............ mL + ………… mL + ………… mL = ………… mL in total  Bottle wrapped in **aluminium foil:**  ............ mL + ………… mL + ………… mL = ………… mL in total |

1. Draw a column graph to show the total volume of water collected from each of the three insulated bottles.

## Section 4. Explaining your results

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| Discussion | *Describe and explain your results.* |

1. Which insulator kept the ice solid for longer?

Use the evidence from the results tables and the column graph to explain how you know this.

1. Why do you think this insulator was the best at keeping the ice solid?

1. Which insulator caused the ice to melt most quickly?

Use the evidence from the results tables and the column graph to explain how you know this.

1. Why do you think this insulator caused the ice to melt most quickly?

1. Was your prediction correct? (Circle one)

Yes / No

|  |  |
| --- | --- |
| Conclusion | *Answer the investigation question.* |

1. Choose the correct words from the word bank to complete the passage.

You will **not** need to use all of the words.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| heat | bubble wrap | liquid | less | freeze |
| newspaper | more | solid | melt | aluminim foil |

The ................................................................... was the best insulator because it kept the

ice in a ................................................................... state for longer. This is because it allowed

................................................................... heat to enter the plastic bottle.

The ................................................................... was the worst insulator because the ice

turned into a ................................................................... state more quickly. This is because

it allowed more ................................................................... to enter the plastic bottle which

caused the ice to ................................................................... .

## Section 5. Applying your science knowledge

In this investigation, we discovered which insulator will keep ice solid for longer.

Insulators can slow down the change of a substance from a solid state to a liquid state.   
They can also help to keep things cold.

1. Describe how and why (explain) the science knoweldge you have learned in this investigation might be helpful in **one** of the following real-life situations.

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| Yr 5 Science_Keep it cool_backyard party | Yr 5 Science_Keep it cool_icecream shop | weather_report_bitmap |
| Keeping drinks cool at a party | Stopping an ice-cream from melting | Keeping vegetables fresh on a camping trip |