

## EXTENSION ACTIVITY 0.4 INVESTIGATING MATERIALS

Supporting the Pre-launch Chapter of  
the Principia Space Diary  
[http://principiaspacediary.org/  
activities/design-your-spacesuit](http://principiaspacediary.org/activities/design-your-spacesuit)

### LEARNING LEVEL

Can be adapted for all primary levels



### Resources Required

- Measuring cylinder
- Thermometer
- 250ml beaker
- Stopwatch
- Kettle
- A range of materials: bubble wrap, black card, white card, tin foil, cardboard, felt. You could adapt this for students to choose their own materials.

### Background to this Activity

For high attaining pupils in Year 4, or for pupils in Years 5 and 6, it is possible to extend the spacesuit design challenge to investigating materials. This could provide an excellent curriculum link to units in both Years 4 and 5.

### Learning Objective

To find the best insulator for my spacesuit.

### Running the Activity

- Boil the kettle.
- Wrap the beaker in one layer of chosen material.
- Put 100ml of hot water into the beaker.
- Using the thermometer measure the temperature every 30 seconds for 5 minutes. Plot your results on the attached log template.
- Repeat this with no material – the control test. Discuss why it is important to do a control.

### Risk Assessment

Boiling water can scald. Care must be taken when pouring the water into the measuring cylinder. The measuring cylinder will also become very hot so take care when pouring the hot water into the beaker.

Spilled water can also cause a slipping hazard, to prevent this clean up spillages promptly.

### Extension Ideas

- Fair testing: Discuss how they could keep the test fair by controlling variables. Compile a list of variables that can affect the reliability of your results (amount of water, layers of material, classroom temperature etc). Your students should explain how they will control each of these and take steps to do so.
- Graphing results: Students could plot the results of each material and the temperature drop over 5 minutes in order to look at data analysis help with choice.
- Written explanation of spacesuit: Write a letter to us at Curved House Kids ([info@curvedhousekids.com](mailto:info@curvedhousekids.com)), explaining your material choice for the space suit. Explain the results of your investigation and how well it worked as an insulator compared to your control. You could even send us your graph or some photographs of your experiment.
- Research: What are spacesuits really made of? Can you use a range of sources to find out about the materials ESA use for their spacesuits? Why do they work? What makes a good spacesuit?



**ACTIVITY 0.4: EXTENSION ACTIVITY  
INVESTIGATING MATERIALS**

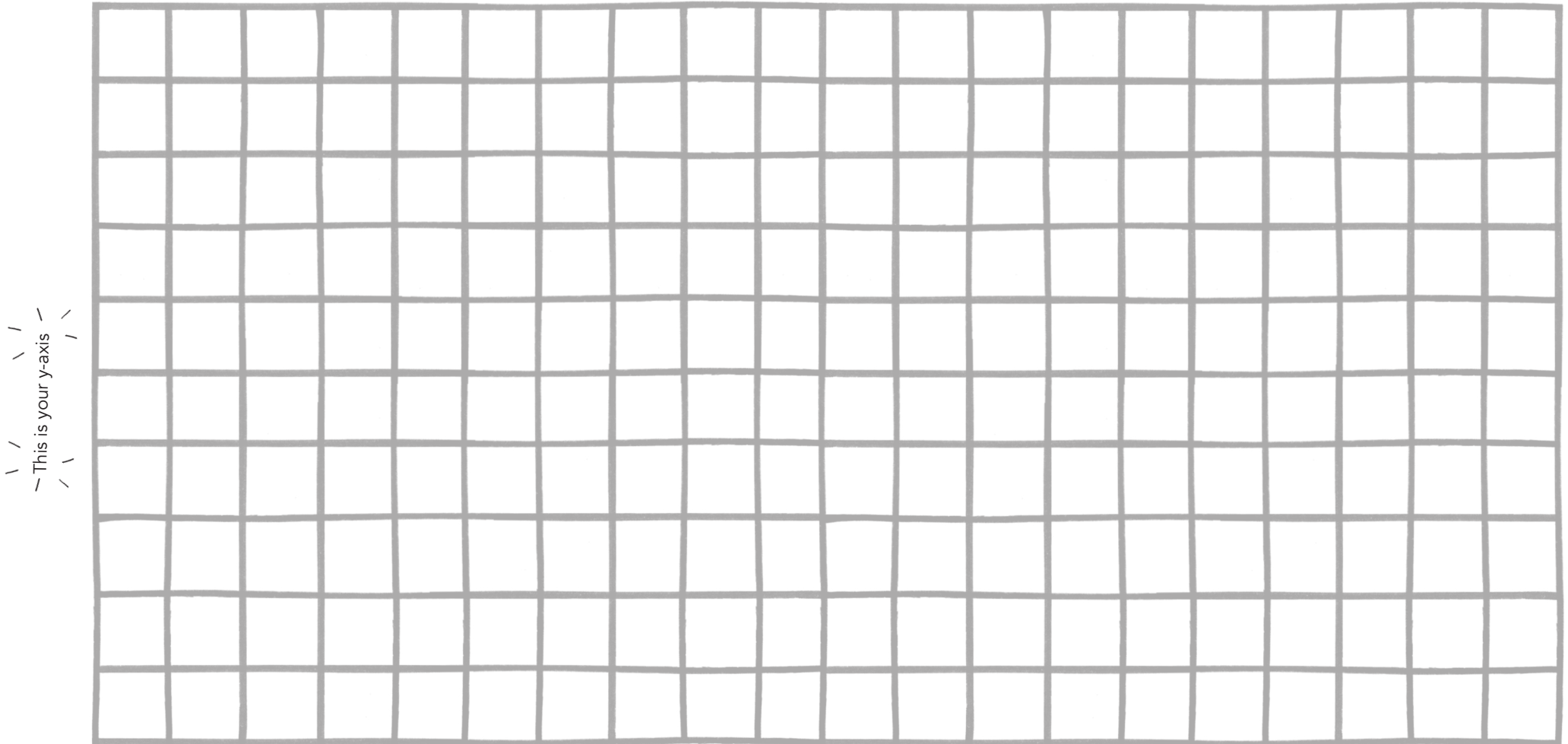
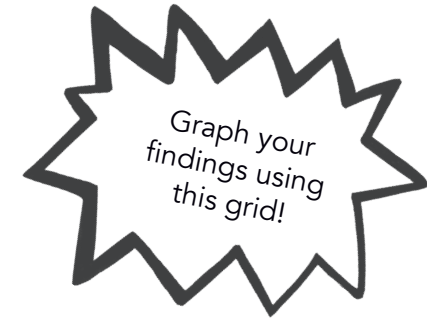
**EXPERIMENT RESULTS LOG**



<b>TIME (secs)</b>	<b>Control (no material):</b>	<b>Material 1:</b>	<b>Material 2:</b>	<b>Material 3:</b>
0				
30				
60				
90				
120				
150				
180				
210				
240				
270				
300				
<b>Total temperature loss after 5 mins (°C)</b>				



**ACTIVITY 0.4: EXTENSION ACTIVITY  
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EXPERIMENT RESULTS GRAPH**



— This is your y-axis —

— This is your x-axis —