

Required Practical Infrared Radiation

GCSE Physics · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Identify the independent variable, the dependent variable and two control variables in the Leslie cube investigation. (4 marks)

Step 1 · Independent

The type of surface (colour and texture of each face).

Step 2 · Dependent

The amount of infrared radiated, shown by the detector reading.

Step 3 · Controls

Any two: the same distance from detector to face; the same water temperature for every face; the same detector; the same size of face.

Answer: IV: surface; DV: detector reading; controls: distance and water temperature

Check: All four faces are at the same temperature because the same water fills the cube.

2. Now try one with the steps

Use the example results to compare the surfaces of infrared radiation. (3 marks)

Step 1 · Best

Step 2 · Worst

Step 3 · Pattern

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. State the independent variable in the Leslie cube investigation. [1]

2. State the dependent variable. [1]

3. Give two control variables. [2]

4. State which surface is the best emitter of infrared radiation. [1]
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5. State which surface is the worst emitter of infrared radiation. [1]
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6. Give one safety precaution for this practical. [1]
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7. Explain why an infrared detector is used rather than holding your hand near each face. [1]
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8. Explain why the detector must be the same distance from each face. [1]
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9. In the example results, matt black gave 92 units and shiny silver 9 units. Calculate how many times more matt black emitted, to the nearest whole number. [1]
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10. Two plates, matt black and shiny silver, have pins stuck on with wax and are placed equal distances from a heater. Predict which pin falls first and explain. [2]
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11. Explain why emergency foil blankets are shiny and silver. [2]
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12. Explain why all the readings should be taken quickly after filling the cube. [1]
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13. A student finds that the surface that is the best emitter is also the best absorber. Suggest why this is expected. [1]
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14. Suggest two ways to make the results more repeatable. [2]
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4. Before you hand it in

"Black surfaces absorb heat."

Say matt black surfaces are good absorbers (and emitters) of infrared radiation.

"Shiny surfaces don't emit any infrared."

Shiny surfaces are poor emitters: they emit less infrared at the same temperature.

Changing the distance for each face

Keep the detector at a fixed, measured distance from each face.

Measuring faces at different water temperatures

Take all readings quickly from the same filling of hot water, or check the temperature.