Independent and Dependent Variables

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

The independent variable is deliberately changed. The dependent variable is measured in response. Controlled variables are kept the same.

1 A student changes water temperature and measures how long a sugar cube takes to dissolve. What is the independent variable?

(1) Sugar cube mass

(2) Water temperature

(3) Dissolving time

(4) Beaker shape

2 A team changes the thickness of insulation around a cup and measures its temperature after 10 minutes. What is the dependent variable?

(1) Insulation thickness

(2) Cup volume

(3) Elapsed time of 10 minutes

(4) Final temperature

3 A team changes stirring speed to measure its effect on sugar-dissolving time. Identify one condition the team should hold constant and describe how to control it. [1]

Answer and work

4 One trial uses warmer water and smaller sugar crystals than another. Explain why these two trials cannot determine the effect of temperature alone. [1]

Answer and work

Comparing Cooling Cups

Use the information below to answer the questions.

A team measures temperature drop in water over 10 minutes. All cups contain the same volume of water at the same initial temperature. Room temperature and cup size are held constant.

Trial	Cup material	Lid	Temperature drop (°C)
1	Paper	Off	12
2	Paper	On	7
3	Foam	On	4

5 Which pair isolates the effect of adding a lid?

(1) 1 and 2

(2) 1 and 3

(3) 2 and 3

(4) No pair does.

6 For a paper cup, by how much did adding a lid reduce the measured temperature drop? Show your calculation. [1]

Answer and work

7 Describe one new trial to compare foam and paper cups with both lids off. State which original trial to use for the comparison. [1]

Answer and work

8 Which action best checks whether the difference between trials 1 and 2 is repeatable?

(1) Measure the temperature of the room only.

(2) Repeat both trials under the same conditions.

(3) Change both cups to foam and remove both lids.

(4) Use a smaller volume in trial 1 than in trial 2.