Saving Energy with Air
Student Worksheet

We know that double and triple glazing our windows with glass saves energy and lower heating costs, and the cool thing is, air is the magic in between the glass! But how much of a difference does glazing make?

Complete the activity below to investigate the effects of double-glazing to reduce heat escaping through windows.

ACTIVITY - EFFECT OF DOUBLE-GLAZING ON HEAT LOSS

What are you going to do?

To investigate if double-glazing reduces heat loss from a beaker of water.

What do you think will happen? Make a prediction
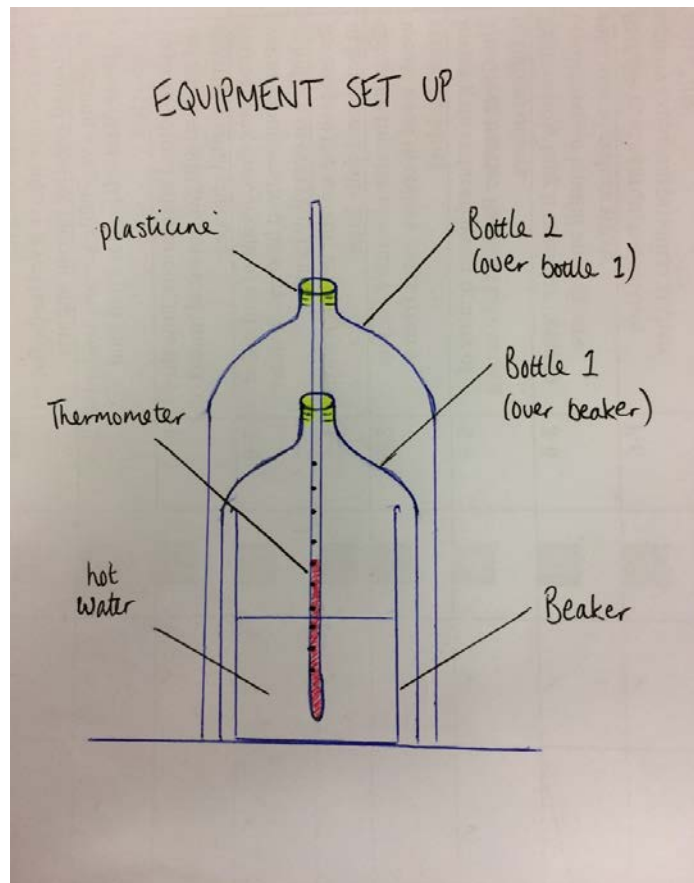
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Equipment

- 2 x clear and empty 1 litre plastic drink bottles without cap
- 1 x clear and empty 2 litre plastic drink bottle without cap
- Scissors
- 2 x 250ml beakers (or anything without a handle that is narrow enough to fit inside the smaller bottle)
- Hot water
- 2 thermometers
- Plastecene
- Heat proof mat (optional)

Safety

Refer to your teacher for safety instructions

CERES SCHOOL OF NATURE AND CLIMATE

Procedure

EQUIPMENT SET UP

plasticine

Bottle 2 (over bottle 1)

Bottle 1 (over beaker)

Thermometer

hot water

Beaker

1. Cut the bottoms off both the 1 litre plastic drink bottles so that each fits completely over one of the beakers

2. Cut the bottom off the 2 litre drink bottle so that it fits completely over one of the 1 litre plastic drink bottles over the beaker – this creates the double-glazing over one of the jars

3. Remove the plastic drink bottle and add the same amount of hot water into each beaker. Replace the bottles

4. Place a thermometer through the top of the drink bottles and into the beaker of hot water – one thermometer for each experiment. Secure with plastecene so that no air can escape

5. Record the temperature in each beaker every minute for 10 minutes

Note - Remember to recycle your plastic bottles after the activity

Results

Use the table below to record the temperatures in each jar every minute.

Give everyone in the group a different job:

a) Timer (needs a watch and to let the observer know when each minute is up)

b) Observer (reads out the temperatures every minute)

c) Recorder (writes down the temperatures every minute in the table)

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Time (mins)	Water temp in beaker with single plastic bottle (single glazing) °C	Water temp in beaker with two plastic bottle (double glazing) °C
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Discussion Questions

1. Which experiment prevented the most heat from being lost? Why do you think that was the case?

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2. How could you improve this experiment to make it more accurate?

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