

Saving Energy with Air

Student Worksheet

Secondary (7-10)

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

Purpose

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

Hypothesis

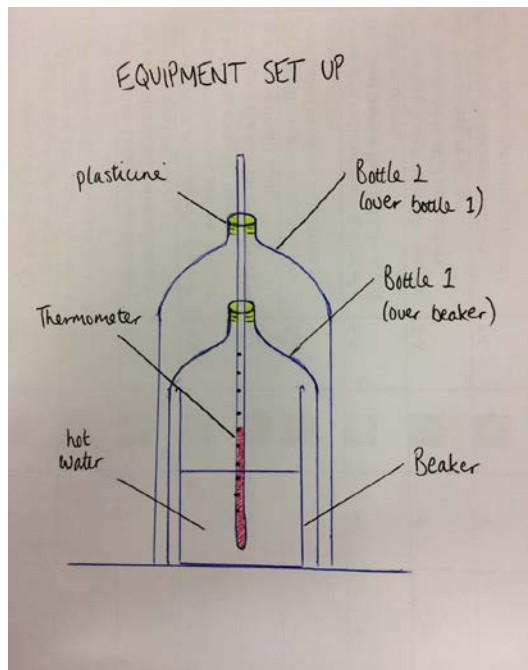
Equipment

- 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

Procedure



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.

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. Did the addition of the 2 litre plastic bottle have an effect on the heat loss from the beaker?

2. How can double-glazed windows reduce energy losses from a house?

3. What are some extraneous variables that may have effected your results? How could you control those variables?

Conclusion
