

Dissolving jelly

Why do this?

This activity could be used to support learning about dissolving and solutions, along with the effect that temperature has on both. It also provides an opportunity for children to make scientific observations, collect data and to learn how to read a thermometer.

Curriculum links: *dissolving and solubility, solutions, temperature, measuring*

Suitability

Years 4-6

Practical details

This activity has been prepared using CLEAPSS guidance. If in doubt, or for further information, contact CLEAPSS.

Safety

- Clear up any spillages straight away.
- Children must not put the materials or liquids near their mouths.
- The water temperature must not exceed 50°C.
- Primary school children must not use kettles to heat or transfer water.



Equipment per group of 4 children

- 3 insulated coffee cups
- 3 thermometers
- 1 stopwatch
- 3 squares of jelly
- 3 pairs of scissors
- 3 sheets of paper and pencils

Equipment per class

- 2L of water at 50°C and 40°C in insulated flasks
- 2L of cold water in jugs
- 3 x 250ml measuring jugs
- Kitchen towel/paper towels for spills

Equipment notes

- Before the lesson prepare flasks of water at 50°C and 40°C.
- A dark coloured jelly eg black cherry or blackcurrant works well for this activity.
- Insulated cups are important because they prevent heat loss. The temperature of the 50°C water will drop significantly if plastic cups/beakers are used.
- Cardboard insulated coffee cups work well and can be bought cheaply online.

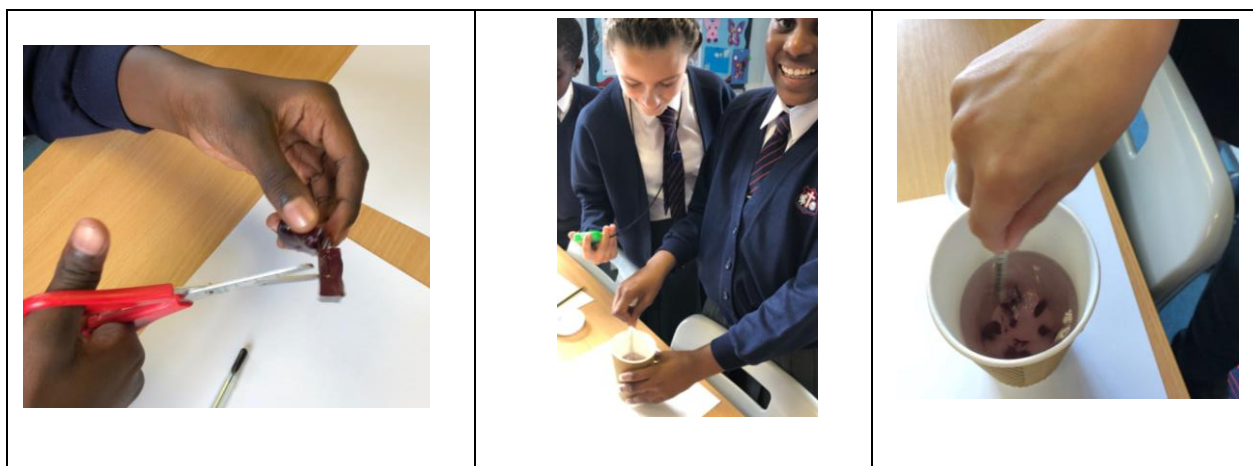
Method for preparing water at 50°C and 40°C

50°C water: Fill a large measuring jug $\frac{1}{2}$ full with boiling water. Top it up with cold water, stirring with a thermometer to check the temperature. When it is approx. 55°C, pour it into an insulated flask.

40°C water: Check the temperature of the water from a hot water tap as a first option. If this is not around 40°C, use the same method as for 50°C water but mix less hot with more cold water. Transfer to a flask when the water temperature is approximately 45°C.

Procedure

1. Set up 3 water stations around the classroom with the water labelled either A, B or C and a measuring jug at each:
 - A is cold water
 - B is water at 40°C
 - C is water at 50°C.
2. Each group marks their 3 sheets of paper as either A, B or C. Put 1 square of jelly on each sheet.
3. Cut the squares of jelly into 8 smaller cubes.
4. Assign each sheet 1 insulated cup and mark them either A, B or C.
5. 3 of the children take 1 cup each to the corresponding water stations and as quickly as possible collect 200ml of water.
6. Place the 3 cups of water on the corresponding sheets of paper (A, B or C)
7. Take the temperature of each cup of water and record it on the paper.
8. Note what the jelly and water look like at the start of the activity.
9. Simultaneously, place the smaller jelly cubes (8 per cup) into the 3 cups of water.
10. Use the thermometers to continuously stir the cups for 3 minutes.
11. Observe what happens during this time and note down any changes on the sheets of paper.



Be aware when doing this practical:

Before the activity begins, recap or teach how to use a thermometer to measure temperature accurately. This activity works best if a group of 4 children share out the roles such that they are all involved in the practical elements.

If when the children initially read the temperature of cup C it has dropped below 45°C, discard and refill it with water at 50°C.

It's important to get the water into the insulated cups as quickly possible. Focus on supporting this being done rapidly rather than accurately measuring 200ml. A slight difference in the volume of water in the cups will not dramatically affect the results.

Expected observations and results

At the start the water in all 3 cups is clear (transparent) and colourless and the jelly is in solid cubes.

After 3 mins:

Cup A (cold): the jelly and liquid remain unchanged from the start of the activity.

Cup B (40°C): the jelly is reduced in size; the liquid is a pale purple/black colour.

Cup C (50°C): the jelly is reduced in size more than in cups A & B. Some pieces are no longer visible, and the liquid is coloured dark purple/black.



Possible further activities

- Does the jelly dissolve in the same way without stirring?
- Compare how much jelly dissolved at each temperature by weighing it before and after the 3 minutes. To do this you will need to sieve out and dry off any remain jelly with paper towels before reweighing it.

Background notes

A solution is formed when a solid dissolves in a liquid. A solution is transparent (you can see through it). Solids dissolve quicker in liquids at higher temperatures.

In this activity;

- In cold water (cup A) the jelly did not dissolve and no solution formed because the temperature of the water was too low.
- In water at 40°C (cup B) the jelly partially dissolved because of the increased temperature. This was evident because of the change in the colour of the water and because the jelly cubes were smaller than those in cup A.
- In water at 50°C (cup C) more of the jelly dissolved than in cups A & B. This was evident because the water had turned darker than that of cups A & B; because some of the cubes had completely dissolved and any remaining jelly cubes were smaller than those in A & B.

