

Year 5 Science

Solid, liquid and gas

Australian Curriculum links: Year 5 Science

Solids, liquids and gases have different observable properties and behave in different ways (ACSSU077)

In this activity, students explore the states of water through a range of familiar practical activities. Water has a range of properties that can be observed by changing the temperature. The following activities serve as starting points or overview demonstrations to discuss water in its state as a solid, liquid or gas.

The 'Freezing' activity demonstrates the difference in time it takes for clear water to freeze compared with coloured water.

Similar activities (**What can water do** and **How does water change**) can be found in the Preparatory to Year 2 activities.

Equipment

For the class

- [The water cycle](#) poster
- buckets
- water
- food colouring
- plastic cups
- access to a freezer
- ice cubes and tray
- eye dropper or pipette
- Optional: kettle, plate

For each student

- chalk
- paintbrush

Preparation

Decide how you will conduct the investigations: as a demonstration or hands-on activity and prepare accordingly. You could discuss the results of each investigation as the students perform them or discuss the results when students have completed all three tasks.

Freeze trays of ice cubes.

Find an area on concrete that students can draw on with chalk.

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Activity steps

1. Display 'The water cycle' poster and discuss Whizzy the water drop's journey through the water cycle. The water in the poster exists mostly in gas and liquid. However, explain that precipitation can be hail or snow (solid).
2. Explain that students will investigate how temperature change affects water. Explain each task and ask them to predict what will happen.

Temperature change: Solid to liquid

3. Students hold an ice cube in their hand to see what happens to the ice. Record their observations in their journal.
4. Set up three cups:
 - very cold water
 - water at room temperature
 - hot water
5. Place an ice cube in each cup and observe the different in time it takes for the ice cube to melt. Students record their observations.

Painting with water: Liquid to gas

6. Find a concrete area in the sun. Ask students to draw an outline drawing with chalk. They then colour it in with water and a paintbrush. Depending on the weather and cloud coverage, watch the water evaporate. If there is not much sun, you may like to leave your drawings and come back later. Check the stage of evaporation at intervals. You could record the rate of evaporation with a video camera, phone or tablet device. Students record their observations.
7. Optional: Evaporation and condensation can also be demonstrated by boiling a kettle and catching the steam on an angled plate or tile.

Freezing: Liquid to solid

8. Students half fill four plastic cups with clear water. Number the cups from 1 to 4. Explain that cup 1 is the control: it has no food colouring.
 - cup 2, add one drop of food colouring
 - cup 3, add two drops of food colouring
 - cup 4, add three drops of food colouring
9. Place all four cups in the freezer and monitor over the next few hours. Observe and record when each cup is frozen solid. What is the difference between lighter and darker liquids?
10. Students could also investigate how adding different coloured food colourings to water affects the rate of freezing.
11. Students record their observations.
12. Discuss students' finding as a class. Highlight key points and make links to real-world effects of these phenomena. For instance, discuss the evaporative effects of sun on water and its impact on water supplies from large reservoirs or lakes.



Learning about evaporation—see Resources 7 and 9 for other ideas