

STEM Activity 1:

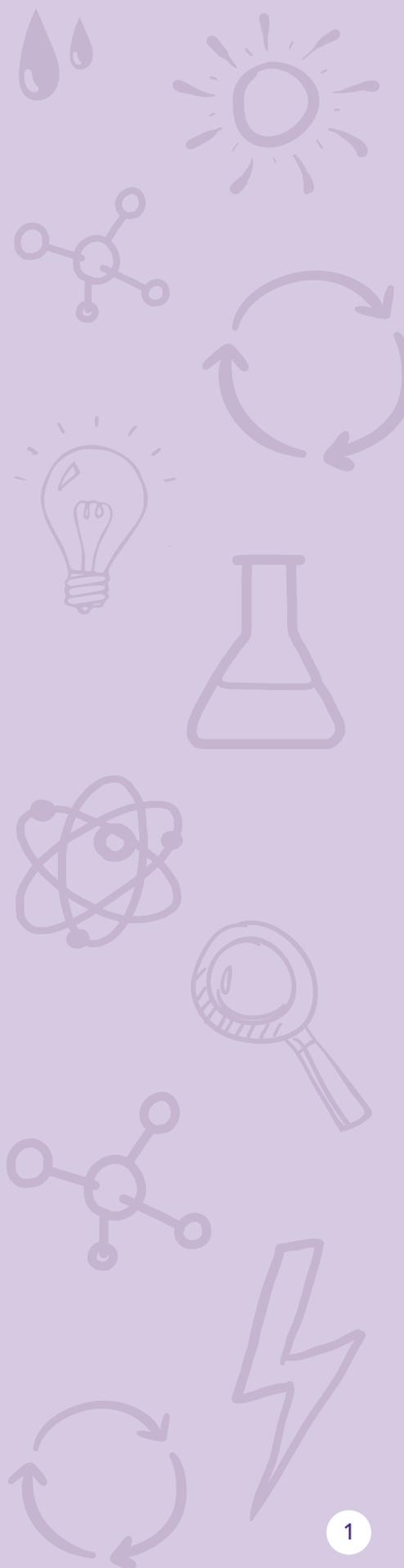
What melts in the heat of the sun?

Background information and Science information

All solids have a melting point: the temperature when they change from solid to liquid. Most substances have different melting points.

Water is 0 degrees Celsius, butter 58 degrees Celsius, and jelly 18 degrees Celsius.

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.



Method

Introduction

Examine the liquids and solids. Talk about the similarities and differences.

As a class, decide what are the main features of a solid, and what are the main features of a liquid.

Development

- Gather the materials for testing. The sample pieces need to be small enough to fit in the bun tin.
- Put each sample piece into a different section of the bun tin.
- Place the bun tin in direct sunlight.
- Check the items after ten minutes. Check three more times at intervals of ten minutes.
- Record any changes in the materials at each time interval by taking a picture with a digital tablet or camera.
- Discuss the results.
 - Which items melted completely?
 - Which ones did not melt at all?
 - Which ones changed in another way?

Discussion

Talk again about liquids and solids. Can some everyday items change from liquid to solid?

Extension

Can the learners think of any other items they might test?

Is it possible for the melted items to change back to a solid? How might this be done?



Scientific Inquiry

What materials and substances melt in the heat of the sun?

Learning Intention

Some everyday materials and foods will melt in the heat from sun. Some will not.

Equipment

- Bun tin
- A sunny day
- Materials to test, suggestions include:
 - Solids (1p coin, wood, stone, marble, crayon, Lego, butter, ice, cheese, chocolate, bread, ice cream)
 - Liquids (water, milk, juice, cooking oil)

STEM Activity 2:

How can people and things keep cooler?

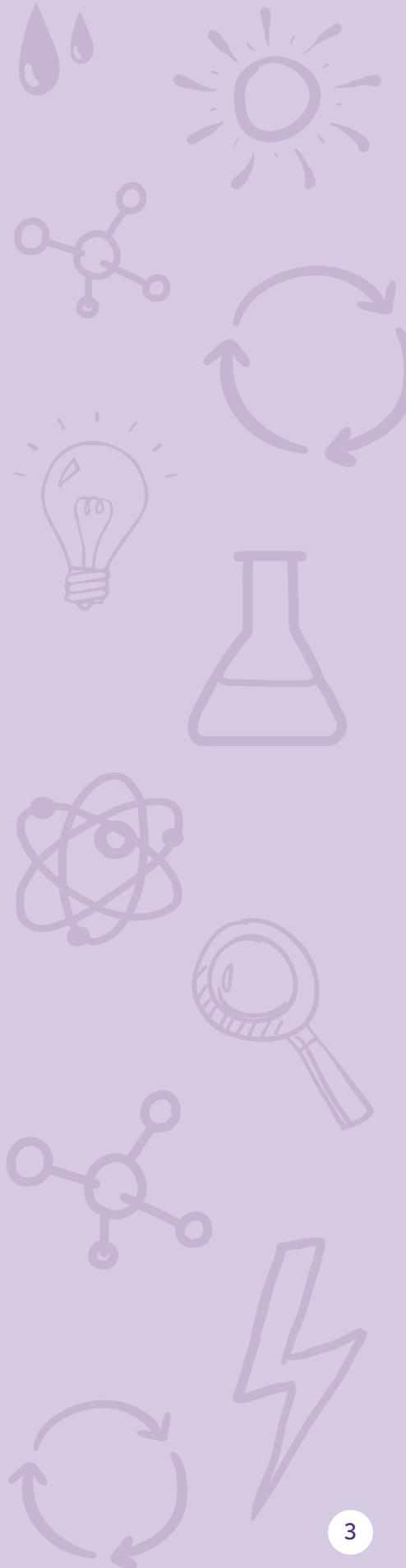
Background information and Science information



Our body sweats (which is mostly water) when we are hot to help cool us down. The cooling effect comes when it evaporates from our skin. When water evaporates (is heated), it changes from a liquid to a gas. The gas carries away heat in it, which helps our body feel cooler.

It may be useful to show the learners an example of this by boiling a kettle. The steam is hotter than the water. This is how we know it carries away heat.

Take photos at key points during the activity. These can be used later for activities such as sequencing, recalling and improving vocabulary.



Method

Introduction

Remind the class of how some solid objects can melt. Discuss whether chocolate can melt.

Development

- Take one strip of paper towel and soak it in the bowl of water. Lightly wring it out. Wrap one of the packets of chocolate in the wet piece of paper towel and one in the dry strip of paper towel.
- Place the two wrapped packets of chocolate side by side under the lamp. Make sure they do not touch each other and that the dry strip stays dry.
- Adjust the lamp so that its bulb is only 35 cm away from the chocolate packets evenly spaced between the two.
- When the lamp and packets of chocolate are in place turn on the lamp and set the timer for 10 minutes.
- Following the ten minutes switch off the lamp and remove it from over the chocolate packets.
- Unwrap the paper towels from the chocolate. Ensure not to mix up the chocolate. Then carefully open the wrappers of the chocolate to inspect the state of the chocolate.
- Record what you see by taking photos. Touch the chocolate to feel how melted it is.

Discussion

Which piece of chocolate melted the most?
Did the chocolate have 'sweat' on it? Both pieces or just the one wrapped in damp paper?

Extension

Repeat the above experiment only introduce a fan on the chocolate packets while the lamp is switched on to replicate a breeze on a hot day.



Scientific Inquiry

Can we use the concept of sweating to stop a chocolate bar melting?

Learning Intention

To understand that we can keep things cooler.

Equipment

- Paper towel (cut into two strips approximately 45cm wide)
- Scissors
- Small bowl of room-temperature water
- 2 packets of chocolate buttons or two small chocolate bars wrapped in plastic or foil
- Ruler
- Desk lamp (max 60 watt bulb) with adjustable height
- Timer

Safety

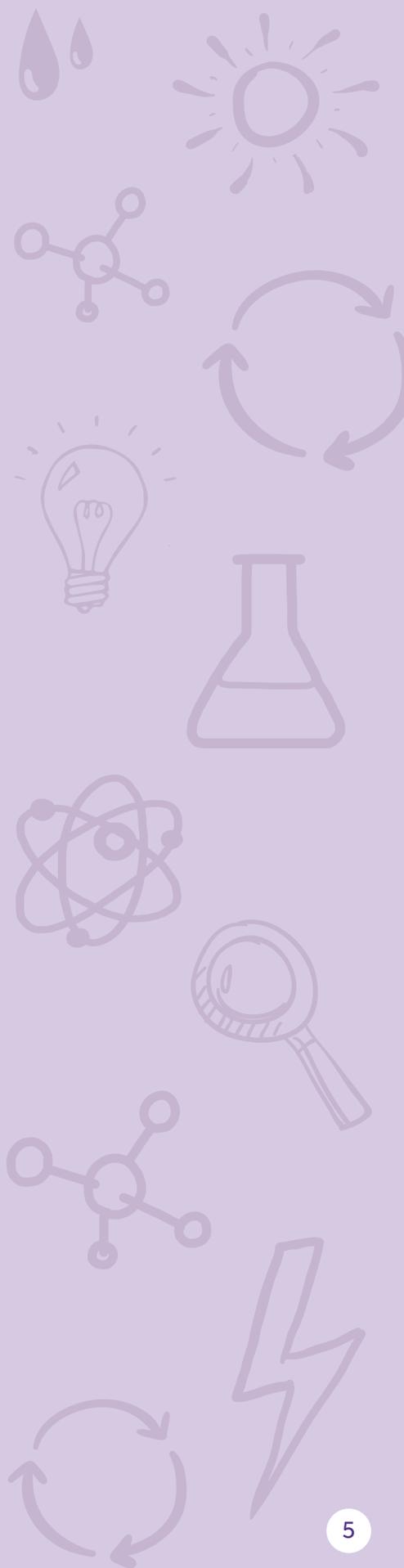
Be aware when a lamp has been switched on. It can still be hot to the touch, as this heat can remain in the lamp for some time after it is switched off.

STEM Activity 3: What melts ice the quickest?

Background information and Science information

This activity uses a fair test by ensuring that the same amounts of ice and water are used in each sample. If suitable for your class, then discuss the idea of fair tests.

Take photos at key points during the activity. These can be used later for activities such as sequencing, recalling and improving vocabulary.



Method

Introduction

Talk about how water can change from ice to water to steam. Watch videos of the changes happening on YouTube, for example [Ice Melting Time Lapse](#), [Ice Cubes Melting](#), [A Pot of Boiling Water on the Stove](#) or [Evaporating Water on a Stove Top](#) (water boiling and becoming steam).

Development

1. Label the three empty containers (hot, cold and room) to indicate the initial temperature of the water.
2. Fill each container with 200ml of the water (or the same in each container depending on the size of container you have selected).
3. Measure the temperature of the water using the thermometer and record.
4. Then add the same amount of ice to each container – five same sized ice cubes or if it is easy to weigh the ice, 50g.
5. Start a stopwatch every time you add ice to a container. Stop the stopwatch when the ice has completely disappeared. (For some classes it may be more appropriate to simply check the order of fastest to slowest to melt.)
6. Measure the temperature of the water again at the end of the experiment and record.

Discussion

Discuss the results of the experiment. In which temperature of water does ice melt fastest?

Scientific Inquiry

What temperature of water will melt ice the quickest?

Learning Intention

To understand that varying the temperature of water can make ice melt more quickly or more slowly.

Equipment

- Ice cubes or chips in 3 containers
- 3 containers with spouts to hold 3 different temperatures of water
- 3 stop watches
- Thermometer
- Room-temperature water
- Cold water (coldest tap water)
- Hot water (hottest tap water)

Safety

Be careful when using hot water.

STEM Activity 4:

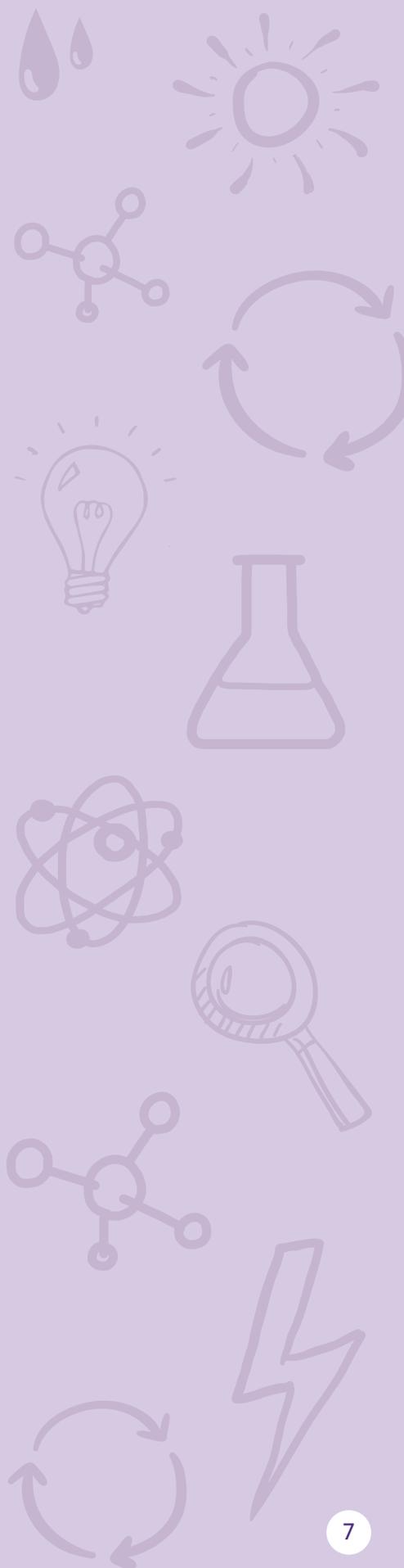
Making our streets and paths safer

Background information and Science information

This activity would be best suited to winter time, especially during a period of snowy or icy weather.

Salt lowers the freezing point of water and is used to melt ice and prevent freezing.

Take photos at key points during the activity. You can use these later for activities such as sequencing, recalling and improving vocabulary.



Safety

Be careful not to spill substances or ensure they are cleaned up immediately to prevent a slip.

Method

Introduction

Discuss the substances to be tested.

- Are they solid or liquid?
- What do we usually use these substances for?

Introduce the idea of a control: In this experiment the control is an ice block with no additional material to assist the melting process.

Development

1. Remove frozen ice blocks from the cups (run a small amount of warm water over the outside of the cup to aid removal of the ice block).
2. Place each block of ice into each labelled bowl.
3. Then add $\frac{1}{2}$ a cupful of each test material to the relevantly labelled containers.
4. Start the timer and observe what happens to the ice.
5. Continue to observe and record at five minute intervals until the ice has melted.

Scientific Inquiry

Which added material/substance will melt ice fast?

Learning Intention

We can use a number of materials to speed up the natural process of melting ice.

Equipment

Ice frozen in plastic cups (one for each substance to be tested plus one for the control)

- Plastic disposable cups
- Freezer
- At least the day before the experiment prepare the blocks of ice. You will need one cup per substance to be tested and an additional one for a control. Place the same amount of water into disposable cups. Place the cups of water into the freezer overnight to freeze.
- Measuring cup
- Water
- $\frac{1}{2}$ a cupful of each materials to test: salt, sugar, vinegar, water
- Large labelled bowls with high sides (one for each ice block)
- A large waterproof area to conduct the experiment in and catch any spills
- Timer

Discussion

Discuss the outcomes.

Sort the substances by how quickly the ice melted.

Which substance is most useful for using on roads and paths in icy weather?



Extension

Is the salt used on the roads in the winter the same ice we put on our food? Is it possible to test both?

Does having the materials in the water to start with slow down the speed at which the water freezes?

Test the substances on an outside area that is icy. (It should be an area that is not used by pedestrians or vehicles.)

This could be linked to a topic or theme by freezing small objects linked to the topic in the ice blocks.