












States of Matter: Wonderful Water

<p>Aim: To observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) by exploring how water can change its state to a solid, liquid or a gas. I can explore how water changes state.</p>	<p>Success Criteria: I can identify the different states water can be in. I can identify the temperatures at which water changes state. I can identify and observe the processes that cause water to change state.</p>	<p>Resources: Lesson Pack Container of warm water with cling film stretched over it (warm water may need to be replenished as groups move round the activities) Ice cubes Kettle Plate Beakers Teaspoon Salt</p>
<p>Key/New Words: Melt, freeze, condense, evaporate, process, state, water, ice, water vapour.</p>	<p>Preparation: Three States of Water Questions Activity Sheet - one per group. Three States of Water Answer Cards cut up and placed at the front of the classroom. Differentiated Changing State Activity Sheet - one per child.</p>	

Prior Learning: The children will have learnt about changes of state in lessons 1 and 3.

Learning Sequence

	<p>The Three States of Water: Children work in groups to find answers to the questions on their Three States of Water Questions Activity Sheet. Place the eight Three States of Water Answer Cards at the front of the classroom. Each group should choose one child to come to the front to choose an answer card, then bring it back to their group. The group should work together to decide which question it answers, then write the answer card's letter next to the question. Finally, they choose a different group member to take the answer card back and swap it for a new one. They should continue until they have matched all the answers with their questions.</p>	
	<p>Exploring the Processes: Explain and clarify the children's understanding of the process of melting, freezing, evaporation and condensation by discussing the slides on the Lesson Presentation.</p>	
	<p>Ice Cube Investigation, Reversing Changes and Salt and Ice: Organise the children into groups. The children should draw and label their observations on their differentiated Changing State Activity Sheet as they work through the carousel of activities as described on the Lesson Presentation. Look for children who can identify the different states that the water is in, and who can explain the processes that change the state of the water.</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div data-bbox="215 1411 574 1579">  <p>Children identify the different states of water in each activity. They should use the process prompts to help them.</p> </div> <div data-bbox="614 1411 941 1579">  <p>Children identify the different states of water and the processes that occurred in each activity.</p> </div> <div data-bbox="1013 1411 1372 1579">  <p>Children colour code the processes, using blue for those caused by cooling and red for those caused by heating.</p> </div> </div>	
	<p>Guess the Process: Children play this game in teams. Each group should choose an artist, who should come to you. Tell the artists the name of a process that causes a change of state. The artists go back to their groups, and without talking or writing words, draw a picture of the process for their group to guess. They group that guesses correctly first wins! This can be played several times.</p>	

Taskit

Answerit: Complete this worksheet by filling in the gaps to answer questions about changing state.

Actit: Work in groups to act as the water particles as it changes state. Think about how the particles behave as they are heated or cooled.

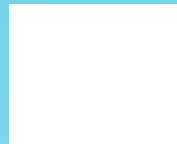
Explainit: Make a poster to explain the three states of water and the processes that change the states.



Science

States of Matter

Wonderful Water



Aim

- I can explore how water changes state.

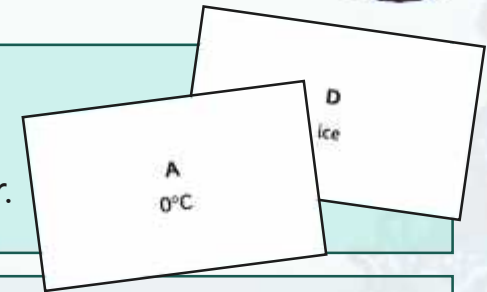
Success Criteria

- I can identify the different states water can be in.
- I can identify the temperatures at which water changes state.
- I can identify and observe the processes that cause water to change state.

The Three States of Water



Water can be in one of three states - solid, liquid or gas.
Your group has six questions about the three states of water.



At the front of the classroom are eight answers. Your task is to match the numbers of the questions with the letters of the answers!

Send one person from your group to the front to collect an answer card.

Bring it back to your group and decide which of your questions it answers.

Write the letter of the answer next to the question.

Send another person to put the answer card back and swap it for a different one.

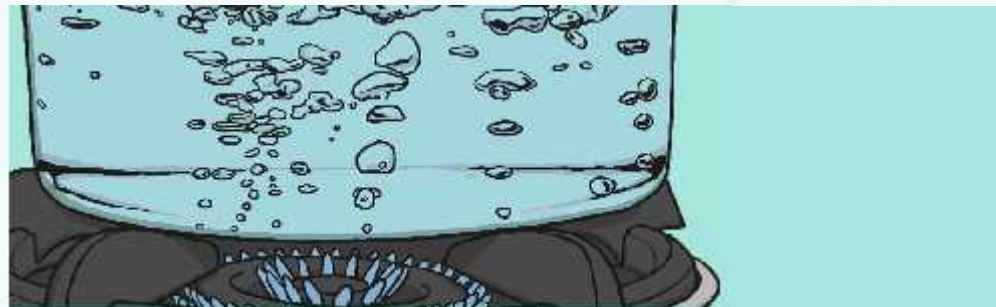
Two of the answers are trick ones - they don't match with any question!

Repeat until you have matched all the answers to your questions.

Exploring the Processes



Let's find out more about how water changes state, the processes that cause it to change and the temperatures at which it changes.



Exploring the Processes



Evaporation is when water turns into water vapour (a liquid turning to a gas).



Evaporation happens very easily when water reaches its boiling point of 100°C .



However, evaporation can happen more slowly at much lower temperatures. For example, when water in a puddle warms up, water from the surface of the puddle slowly changes to water vapour.

Exploring the Processes



Condensation is when water vapour is cooled down and turns to water (a gas turning to a liquid).



You can see that condensation has happened when you see droplets of water on a window or mirror in a warm room. The water vapour in the air has been cooled by touching the cold surface and this causes it to change to water.

Exploring the Processes



Freezing occurs when water is made very cold. When water reaches 0°C it turns to ice. (Freezing is a liquid turning to a solid.)



Exploring the Processes

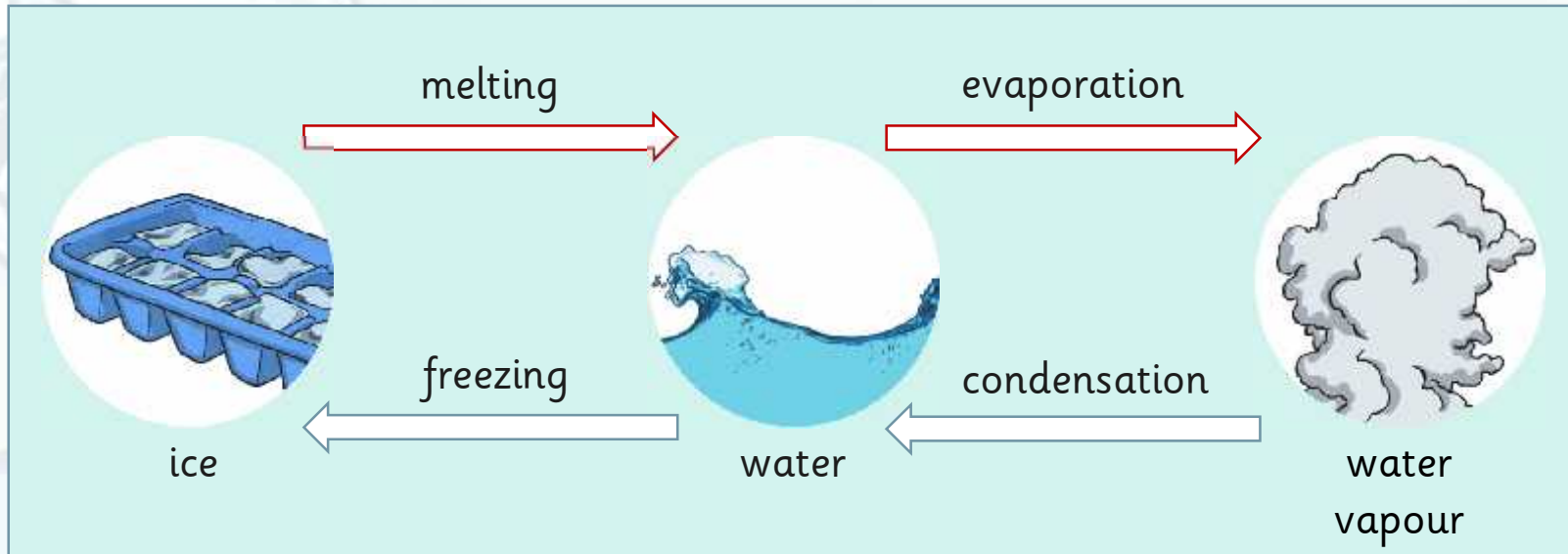


Melting occurs when ice warms up and changes to water (a solid changing to a liquid).

At temperatures above 0°C , ice will melt.



Exploring the Processes



Water changes state as a result of these processes.

You will move around the classroom to explore the different processes in a series of activities.

Keep a record of your observations on your Changing State Activity Sheet.

Ice Cube Investigation



In this activity, you will place two or three ice cubes on some cling film stretched over a container of warm water.

What do you see in the container?

What can you observe on the cling film?

What processes are occurring?



Reversing Changes

Work with an adult for this activity.

Your teacher will boil a kettle. Watch the water vapour form as it boils.

How can this gas be turned back into a liquid?

Can you reverse the change?

Watch your teacher demonstrate this process.

What can you see?

Which processes have you observed?

How has the temperature caused these processes?



Salt and Ice



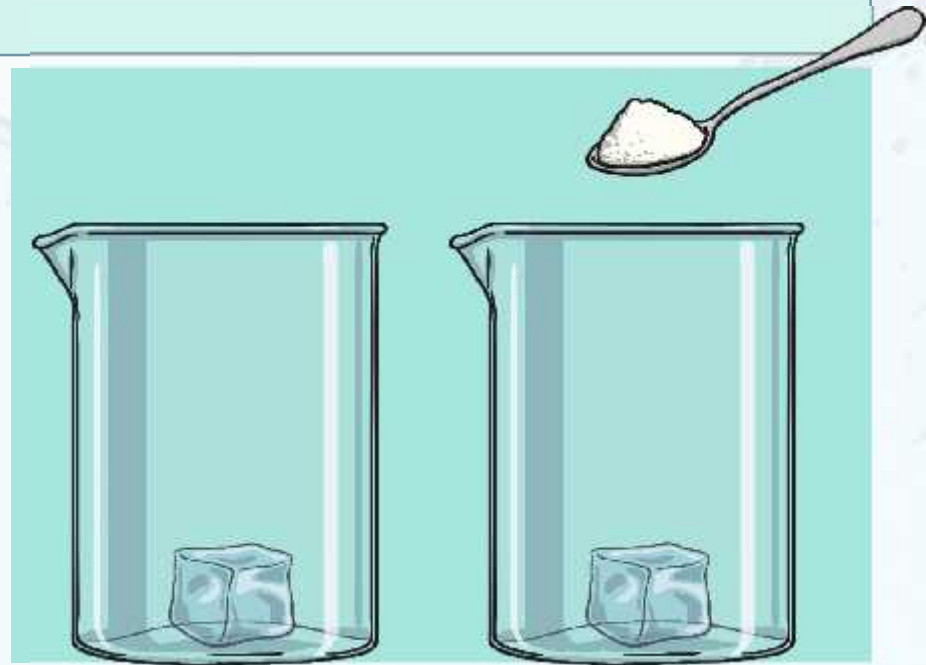
Put two ice cubes in two beakers. Put a teaspoon of salt on one ice cube, and observe what happens over a few minutes.

Use a thermometer to observe how the temperature in the beakers changes.

What do you notice happening to the two ice cubes?

What process is occurring?

What happened to the temperature in the different glasses?



Guess the Process



This is a team game in which you have to guess what your team member is drawing.

Choose one person from your group to be the artist.



The artists should go to the teacher, who will tell you the name of a process that causes a change of state.

The artists should go back to their groups, and when everybody is ready they should draw the process for their group to guess. The artist is not allowed to speak or write any words.

The first group to guess the process is the winner!

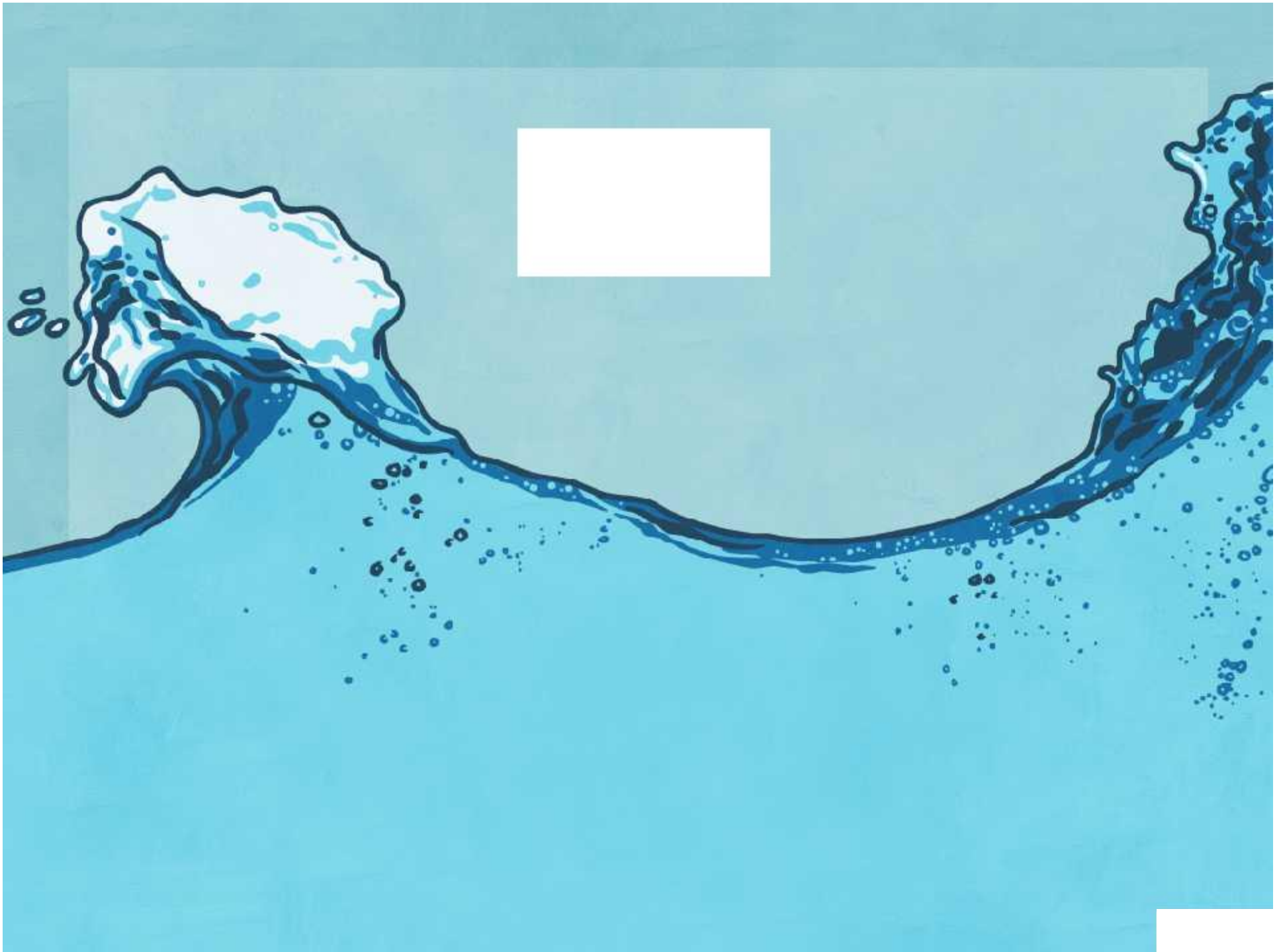
Aim



- I can explore how water changes state.

Success Criteria

- I can identify the different states water can be in.
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Changing State



Ice Cube Investigation

Draw a picture of this activity. Add labels to describe the different states of water.

Reversing Changes

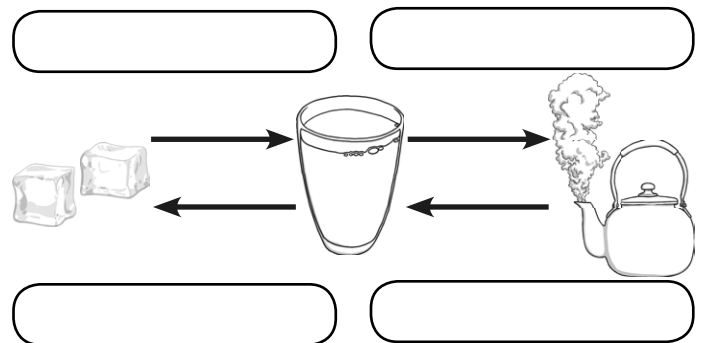
Draw a picture of the experiment your teacher carried out. Add labels to describe the different states of water.

Salt and Ice

Draw a picture of the investigation you carried out. Add labels to describe the different states of water.

Changing State Diagram

Add labels to this diagram to show the processes.



Use these words to help you:

evaporation freezing condensation melting



Changing State



Ice Cube Investigation

Draw a picture of this activity. Add labels to describe the different states of water and to identify the processes that are occurring.

Reversing Changes

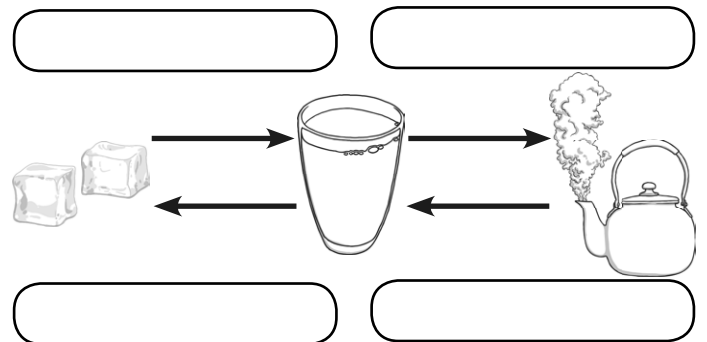
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Changing State Diagram

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Changing State



Ice Cube Investigation

Draw a picture of this activity. Add labels to explain how the water is changing state and to identify the processes that are occurring. Use blue pen for processes caused by cooling and red for ones caused by heating.

Reversing Changes

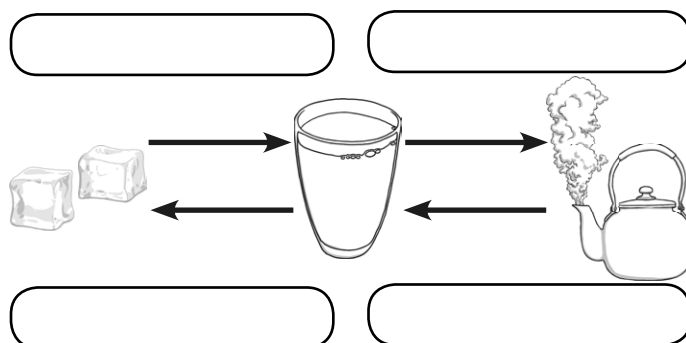
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Salt and Ice

Draw a picture of the investigation you carried out. Add labels to explain how the water changed state and to identify the processes that occurred. Use blue pen for processes caused by cooling and red for ones caused by heating.

Changing State Diagram

Add labels to this diagram to show the processes. Colour the box blue if cooling causes the process to occur, or red if heating causes the process to occur.



Three States of Water



Write the letters of the correct answer cards next to the questions below.

Questions	Answer Card Letter
1. What is the solid state of water called?	
2. At what temperature does water freeze?	
3. What is the process whereby ice turns to water?	
4. At what temperature does water boil?	
5. What is the name for water when it is in a gaseous state?	
6. What is the name of the process that turns water to water vapour?	

Three States of Water

A
0°C

B
water vapour

C
evaporation

D
ice

E
100°C

F
freezing

G
1000°C

H
melting

States of Matter | Wonderful Water

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