11–14 years

Rate of evaporation

ROYAL SOCIETY OF CHEMISTRY

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The problem

Evaporation is the conversion of liquid to vapour without the boiling point necessarily being reached.

How will this puddle change as the water evaporates?

In today's lesson you will investigate the time taken for a drop of propanone to evaporate under different conditions.

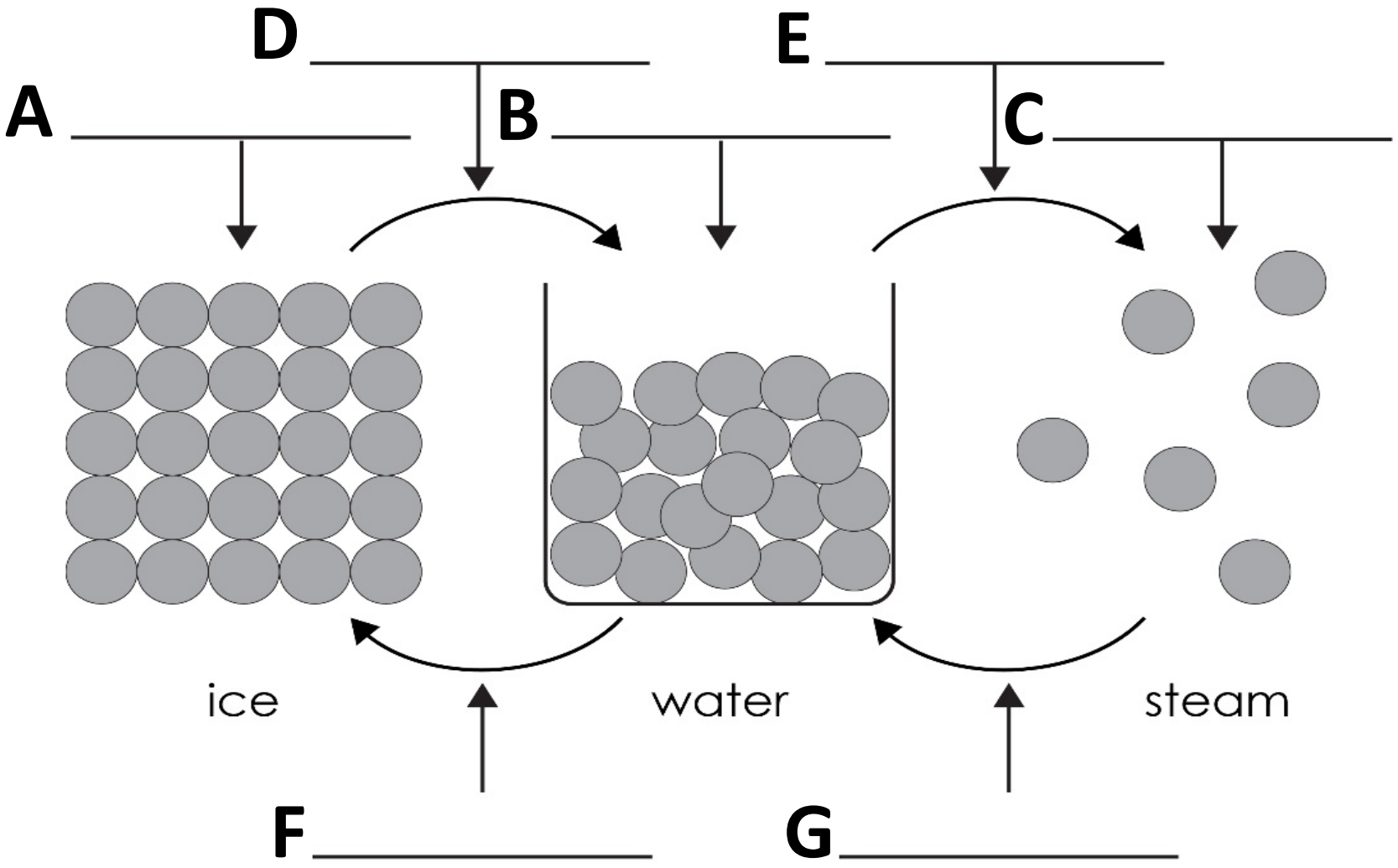
Source: Shutterstock/Mentor Beqiri

Learning objectives

During this lesson you will:

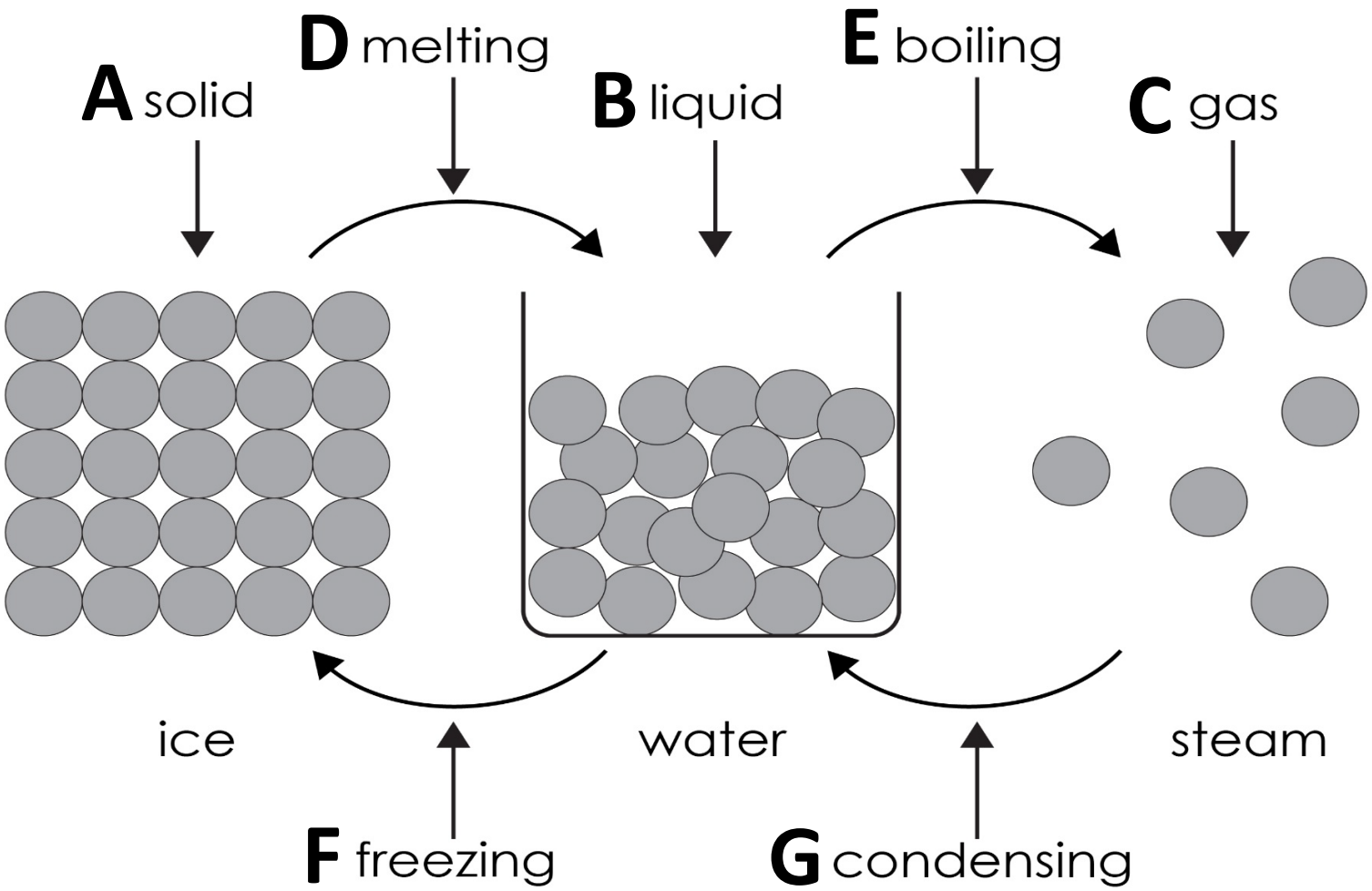
- carry out an investigation into the rate of evaporation of propanone.
- make and record observations.
- use particle theory to explain your results.

Revisiting changes of state



Starter

Revisiting changes of state: answers



Planning

Conditions	How to achieve
Warm	Warm slide in hands and hold on a flat palm. Alternatively, place the slide in warm water then dry it.
Cool	Room temperature. Or keep the slides in a fridge, cool box or between two bags of cooling gel.
Spread out	Spread the drop of propanone on the slide with a matchstick.
Unspread	Drop to be left as one drop on the slide.
Air flow	Blow across drop, fan with book or use a hairdryer on a cool setting.

Method

1. Put a drop of propanone onto a microscope slide and time how long it takes to evaporate.
2. Change the conditions and repeat the experiment, ensuring that you record the conditions used and the time taken for each one.

Results table

Conditions			Evaporation time (s)
Warm?	Spread out?	Air movement?	

Results table

Conditions			Evaporation time (s)
Warm?	Spread out?	Air movement?	
✓	x	x	
x	x	x	
✓	✓	x	
x	✓	x	
✓	x	✓	
x	x	✓	
✓	✓	✓	
x	✓	✓	

Questions

1. Draw a particle diagram to show how the particles rearrange during evaporation.
2. For your investigation state the following:

(a) The control variables

(b) The dependent variable

(c) The independent variable

3. Draw a bar chart of your results.
4. List the conditions in order, from those taking the shortest time to evaporate to those taking the longest time to evaporate.
5. Use your results to answer the following questions. Suggest a reason for your answer.

(a) Which conditions resulted in the fastest rate of evaporation?

(b) Which conditions resulted in the slowest rate of evaporation?

Questions

6. Explain why it takes less time for the washing to dry on a sunny, windy day than on a dull, calm day.

Source: Shutterstock/New Africa

Learning objectives

During this lesson you will:

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Have you met all of the learning objectives?