

Name:	Grade level:
Date:	

Worksheet lesson 7. Properties and changes of materials 1

Some main topics that you should focus on:

- Changes of state
- Boiling **v/s** evaporation
- Thermal and electrical conductors
- Reversible and irreversible changes - Dissolving
- Chemical reaction

I. Changes of state

1 The three states of matter are solid, liquid and gas.

(a) The table shows the state of matter at room temperature of some substances.

Complete the table by putting ticks (✓) in the correct boxes.

Water has been done for you.

substance	state of matter at room temperature		
	solid	liquid	gas
carbon dioxide			
gasoline			
mercury			
water		✓	
wood			

[2]

(b) Copper has a melting point of 1083 °C.

What change of state happens when copper **melts**?

..... to [1]

(c) Copper has a boiling point of 2567 °C.

What change of state happens when copper **boils**?

..... to [1]

2 The three states of matter are solid, liquid and gas.

(a) What is the name of the process that occurs when a **liquid** turns into a **gas**?

..... [1]

(b) What change of state occurs during **freezing**?

..... to [1]

3 Here are some substances that are solids, liquids or gases.

butter chocolate ice orange juice steam water

solid	liquid	gas
.....
.....
.....
.....
.....
.....

(a) Write down the substances in the correct column, **solid**, **liquid** or **gas**. [1]

(b) When ice is warmed, it changes.

Write down the name of this process.

..... [1]

(c) If water was cooled to 0°C it changes.

Write down the name of this process.

..... [1]

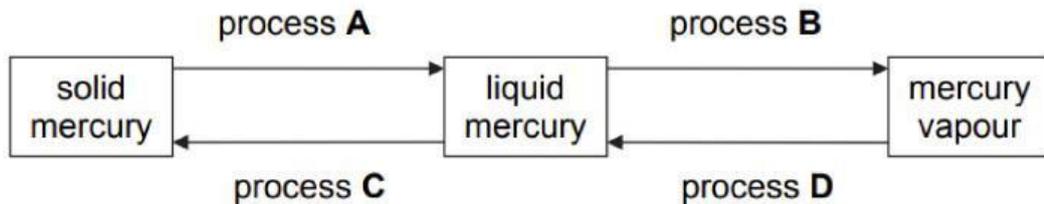
(d) What will happen to water if it boils?

..... [1]

4 Mercury vapour is very poisonous.

Mercury is a silver coloured liquid at room temperature.

Liquid mercury has to be cooled to make solid mercury.



Complete the sentences.

(a) Process **A** changes solid mercury into liquid mercury.

This process is

(b) Process **B** changes liquid mercury into mercury vapour.

This process is

(c) Process **C** changes liquid mercury into solid mercury.

This process is

(d) Process **D** changes mercury vapour into liquid mercury.

This process is

5 A candle is made from a solid called wax.

At the top of the candle **solid** wax changes into **liquid** wax.

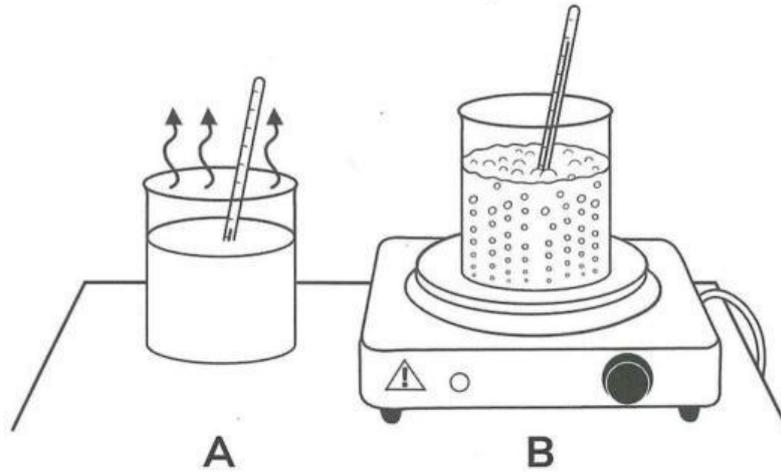
What is the name of this process?

.....



II. Boiling and evaporation

1. Look at the pictures of beakers of water in a classroom.



a Which drawing shows boiling?

b What process does the other drawing show?

c i Write down one thing that is the same about the two processes.

ii Write down two things that are different about the two processes.

2. These are the boiling points of three liquids:

Liquid	Boiling point in °C
Water	100
Olive oil	300
Vinegar	118

- a Order the liquids from the one with the highest boiling point to the one with the lowest boiling point.

- b If 100 ml of all three liquids are heated on the same Bunsen burner for the same amount of time, which one will turn into a gas first? Do not heat any liquids yourself.

III. Thermal and electrical conductors

3. The table shows how well some common metals conduct heat. A high value means that the metal conducts heat very well.

Metal	Measure of how well the metal conducts heat
silver	420
brass	109
copper	400
iron	80
stainless steel	15
aluminium	250

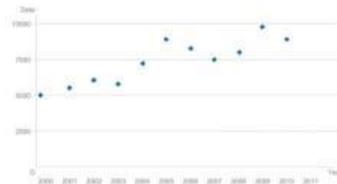
- a i List the metals in order from the best conductor of heat to the worst conductor of heat.

4. Answer the question

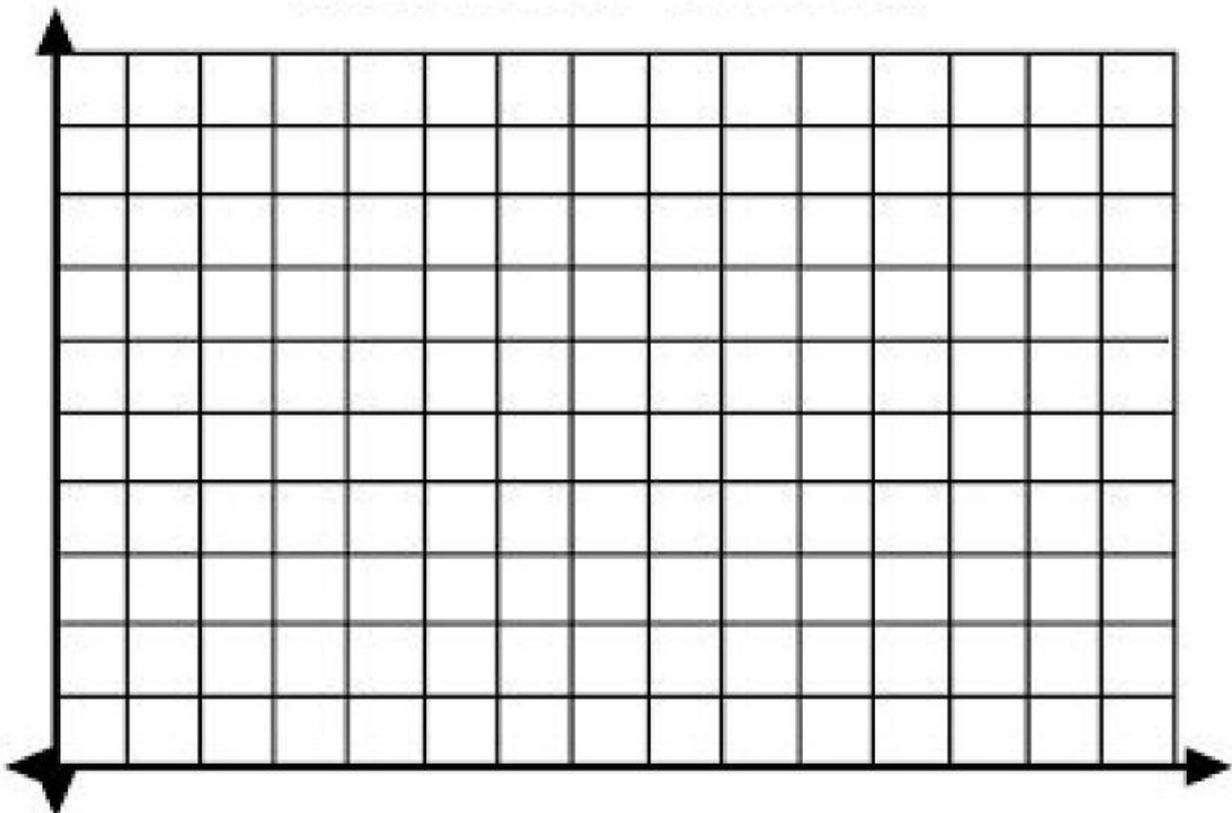
The table shows measurements of how well some substances conduct heat and electricity. Substances with higher values are better conductors.

Substance	How well the substance conducts...	
	Heat	Electricity
aluminium	237	37
copper	386	59
graphite	168	1
brass	150	16
steel	80	10

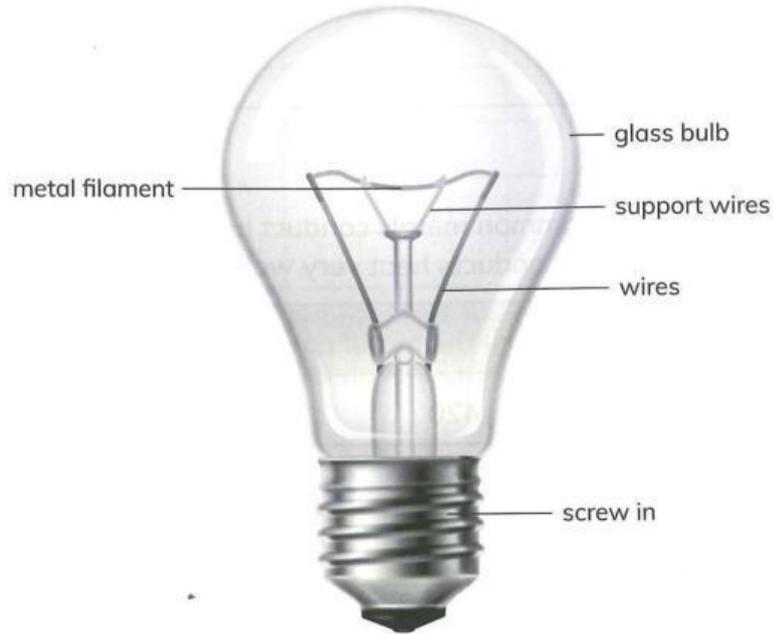
- 1 Draw a scatter graph of the measurements.
Label each data point you plot with the name of the substance.
- 2 Which substance is:
 - a the best conductor of heat?
 - b the best conductor of electricity?
 - c the worst conductor of heat?
 - d the worst conductor of electricity?



Scatter graph example



2. Look at the picture of a lamp.

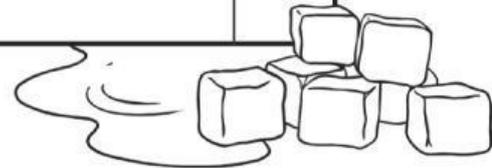


- a i Which parts of the lamp are electrical conductors?
- _____
- _____
- ii Which part of the lamp is not an electrical conductor?
- _____
- b Why are electrical plugs made of plastic?
- _____
- c i Why could your hand get burnt if you stirred hot soup with a metal spoon?
- _____
- ii Why is a wooden spoon good for stirring soup that is cooking in a pot?
- _____

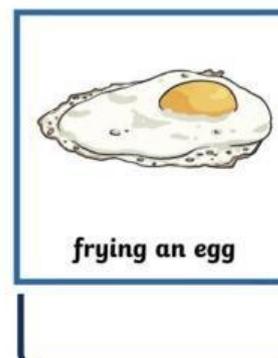
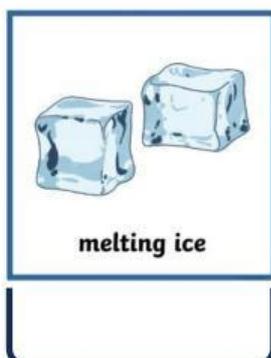
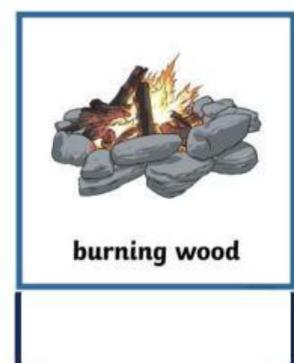
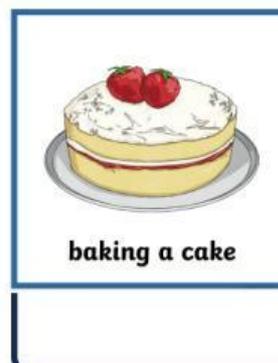
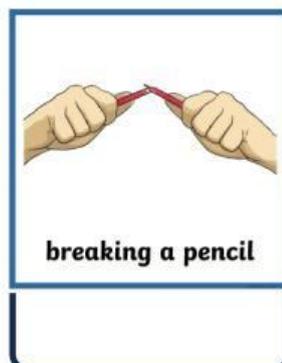
IV. Reversible and irreversible changes

1. Write "R" for reversible changes and "I" for irreversible changes.

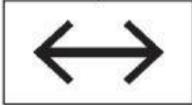
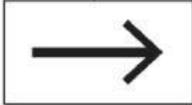
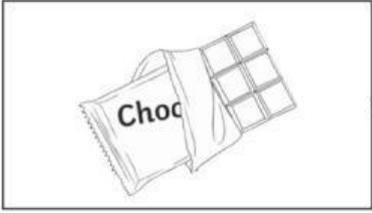
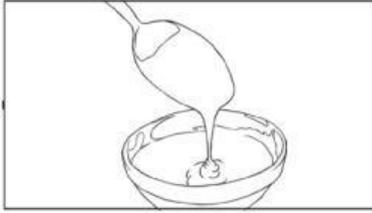
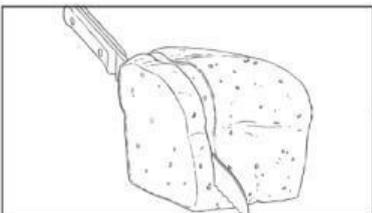
Water turned to ice in the freezer.	
Flour, eggs, sugar and butter made into a cake.	
Bread made into toast.	
Chocolate melted in a pan.	
Butter melted in the sun.	
Jelly hardened in the fridge.	
Wood burnt on the fire.	
Ice cubes melted.	



2. Decide if there are reversible or irreversible changes.



3. Draw the correct arrow between the pictures.

reversible		irreversible
		
		
		
		

4. Put tick to the correct answer.

1. Burning is an example of what type of change?

- reversible irreversible

2. Melting is an example of what type of change?

- reversible irreversible

3. 'Most reversible changes are physical changes.' True or false?

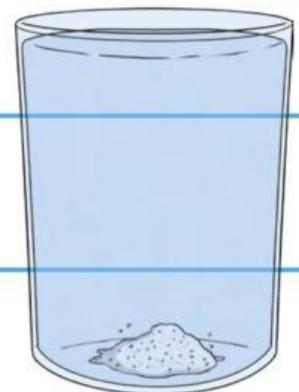
- true false

4. Which one of these changes is reversible?

- frying an egg melting chocolate burning wood

5. Which one of these changes is irreversible?

- freezing water dissolving salt in water making bread into toast



Answer the questions

1 The table shows the melting points of some substances.

Substance	Melting point in °C
gold	1064
candle wax	60
silver	962
copper	1083
ice	0
aluminium	660

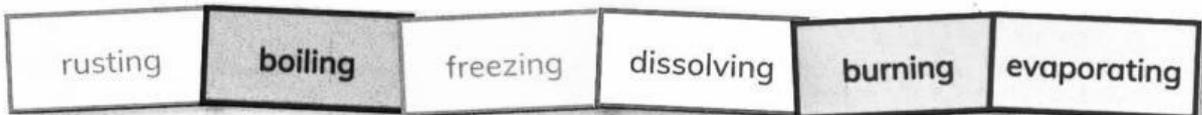
- What is a melting point?
- List the substances in order from highest to lowest melting point.
- Describe a pattern you can see in the melting points.
- Does the melting point of a substance change? Say why or why not.

2

- Why does food cook faster in the oven in a metal dish than in a glass dish?
- If you used a dish made of a different metal, would the cooking time change? Explain why.

3

- Sort the following processes into two groups: reversible processes and irreversible processes

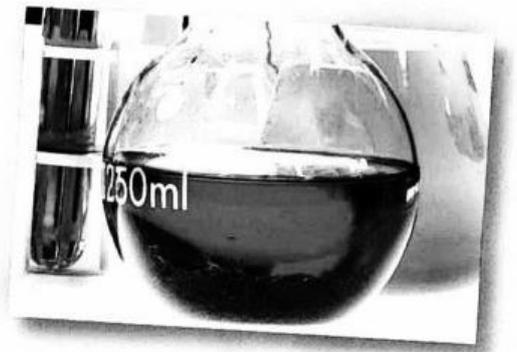


- Add another process that you know of to each of the groups.

4

- Will a solid usually dissolve faster in cold water, warm water or hot water?
- Explain your answer to 4a by describing how temperature affects the movement of particles in a solution.

5 Class 6 put an iron nail in a saucer of water. A few days later they observed that the nail had rusted.



- What evidence for a chemical reaction did class 6 observe?
- Name the reactants in the reaction.
- Find out the chemical name for the product that formed in the reaction.

