

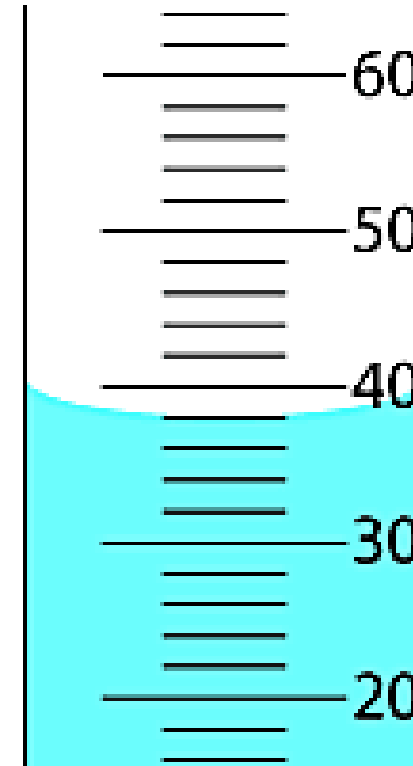


STATES OF MATTER

What is the volume of this liquid?

Pair-Share

Whiteboards



Unscramble the following words using the definitions:

YPTHOHEIS Prediction about the outcome of the experiment

SODISLVES Mixing into a liquid

Pair-Share

Whiteboards

Match the word with its definition:

- | | |
|--------------|---|
| 1. Dissolves | A. The curved surface of a liquid in a container. |
| 2. Corrosion | B. Mixing into a liquid. |
| 3. Meniscus | C. Destroy or weaken over time. |

Pair-Share

Whiteboards



What word matches this definition?

What something is made of and how it behaves.

Pair-Share

Whiteboards

Describe the use of a **protective mat**.

Pair-Share

Whiteboards

Describe the use of a **beaker**.

Pair-Share

Whiteboards



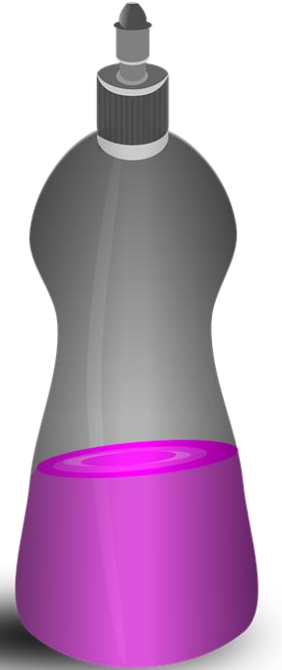
Daily Review

Detergent has the following properties:

1. Liquid at room temperature
2. It is a base not an acid
3. Dissolves in water

Task: Sort these properties into physical or chemical properties.

Pair-Share
Whiteboards



Learning Objective

Students will be able to describe the changing states of matter using the particle model.

Success Criteria

- Students will be able to explain the difference between solids, liquids and gas using the particle model.
- Students will be able to describe the changes of state during heating.
- Students will be able to describe the changes of state during cooling.

TRACK WITH ME

READ WITH ME

CFU

What are we going to learn?

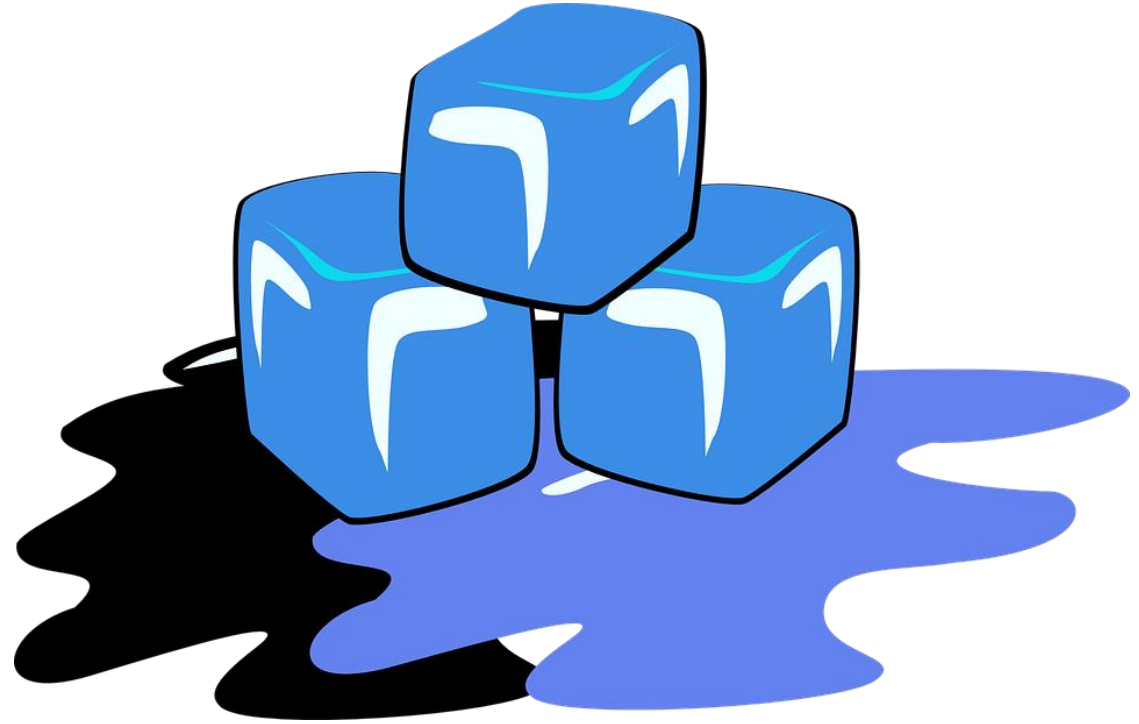
CFU

What will we be able to do by the end of the lesson?

Activate Prior Knowledge

Think of a substance where you have seen it in its solid form, liquid form and gas form.

Pair-Share



Concept Development

The particle model is a way to explain **properties** of substances.

The particle model says that every substance is made up of tiny **particles**₁ that are too small to see.

These particles always have energy and are moving. If we add energy they speed up and if we take energy away they slow down.

CFU

What is the meaning of properties in chemistry?

VOCABULARY

1 – A small portion of matter.

TRACK WITH ME

READ WITH ME

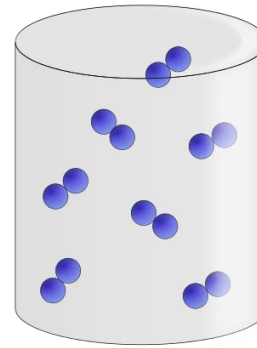
CFU

What happens when we add energy?

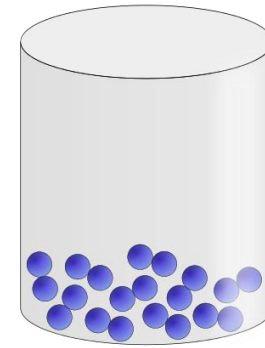
Concept Development

Solids

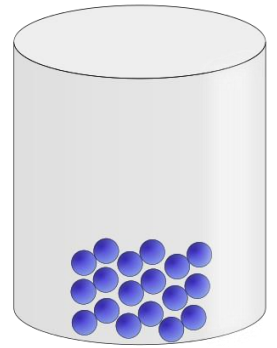
- The particles in solids are packed closely together.
- The particles have strong **bonds**₂ between them.
- This is why solids have a **fixed** shape and volume.
- The particles stay in the same position but vibrate.



Gas



Liquid



Solid

CFU

Why do solids have a fixed shape?

VOCABULARY

2 – Forces of attraction that hold particles together.

Example

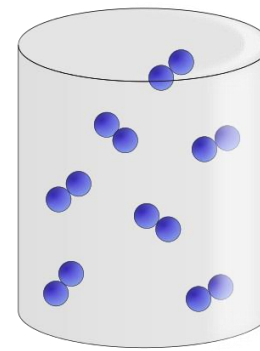


Non-Example

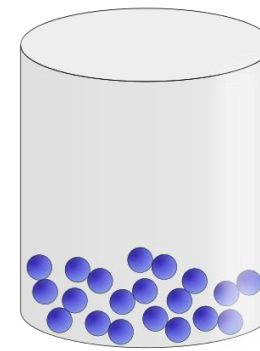


Liquids

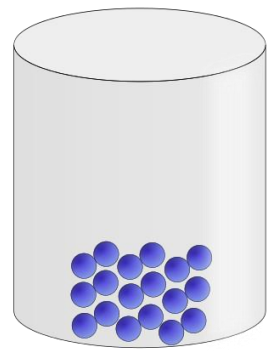
- The particles in liquids are still packed closely together.
- The particles are **more loosely bonded** than solids.
- The loose bonding allows particles to move over each other allowing the liquid to flow, drip and fill the bottom of the container it is in.
- Liquids have no fixed shape but have a fixed volume.



Gas



Liquid



Solid

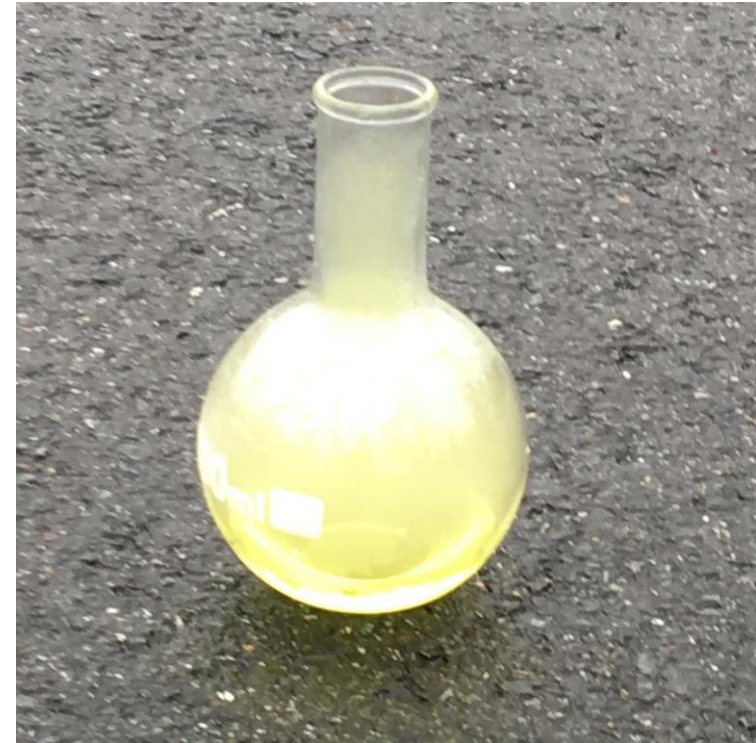
CFU

What are the differences in the particle bonds between solids and liquids?

Example



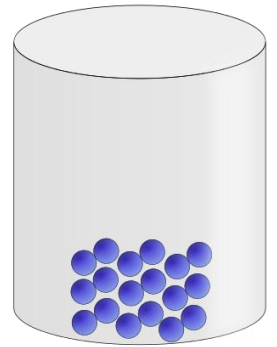
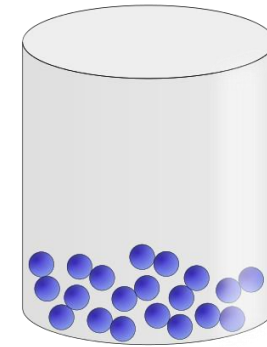
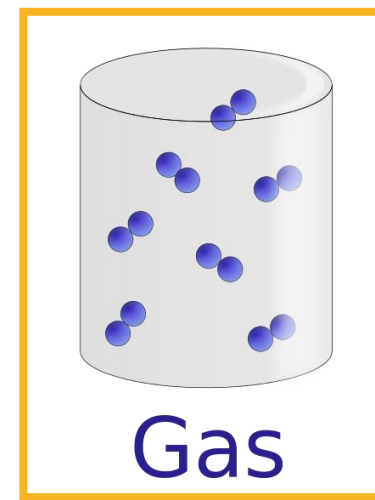
Non-Example



Concept Development

Gases

- The particles in gases are spread far apart and have no bonds.
- The particles move fast and in straight lines until they hit something. This is why they fill their containers.
- When the particles hit the walls of the container, this creates **pressure₃**.
- Particles are so spread apart that gases are often invisible.
- Gases have no fixed shape or volume.



CFU

Order solids, liquids and gases by the strength of their bonds from strongest to weakest.

VOCABULARY

3 – Combined push of gas particles bouncing off the walls of their container.

Example



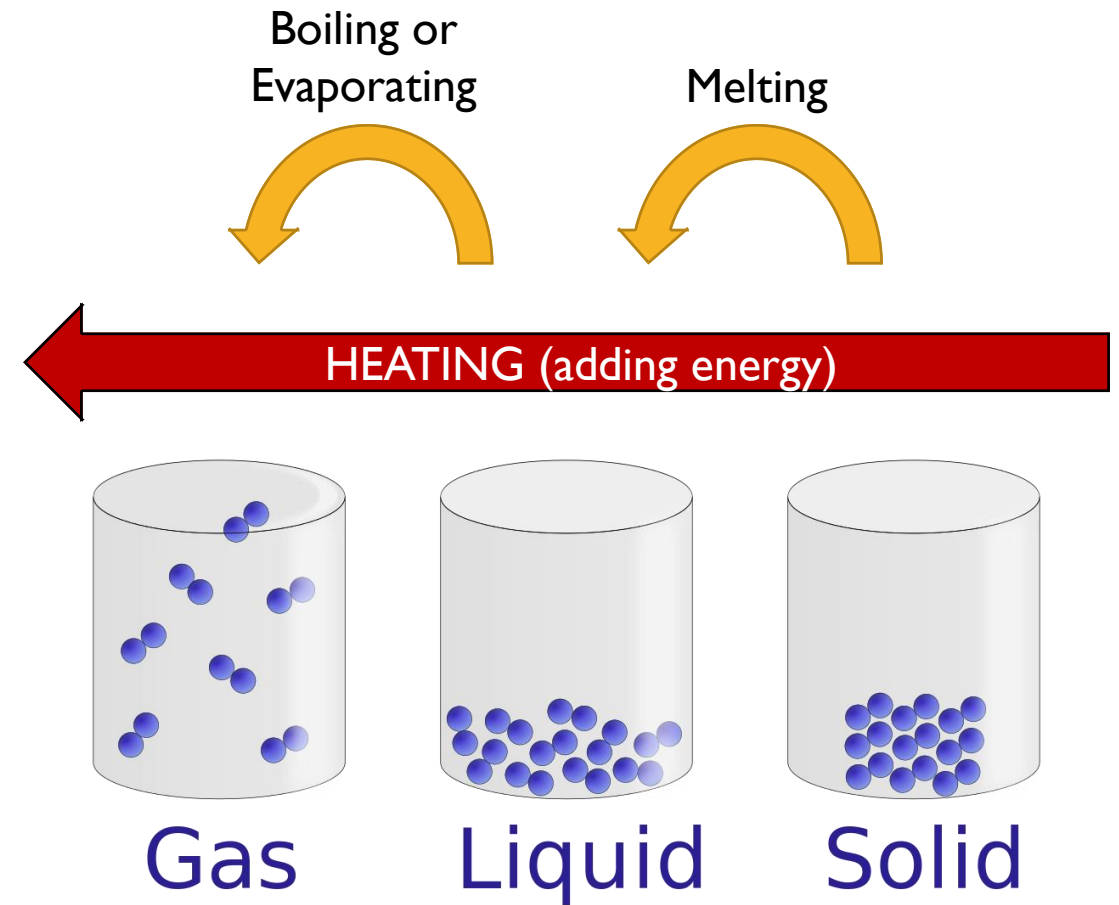
Non-Example



Concept Development

Heating

- Solids **melt** when they are heated and become a liquid.
- Liquids **boil** when they are heated and become a gas.
- Different substances have different temperatures that they melt or boil at. These are called **melting points** and **boiling points**.
- **Evaporation₄** is similar to boiling as liquids become gases, but this can happen at any temperature and is usually slow.



CFU

Are particles speeding up or slowing down as you heat substances?

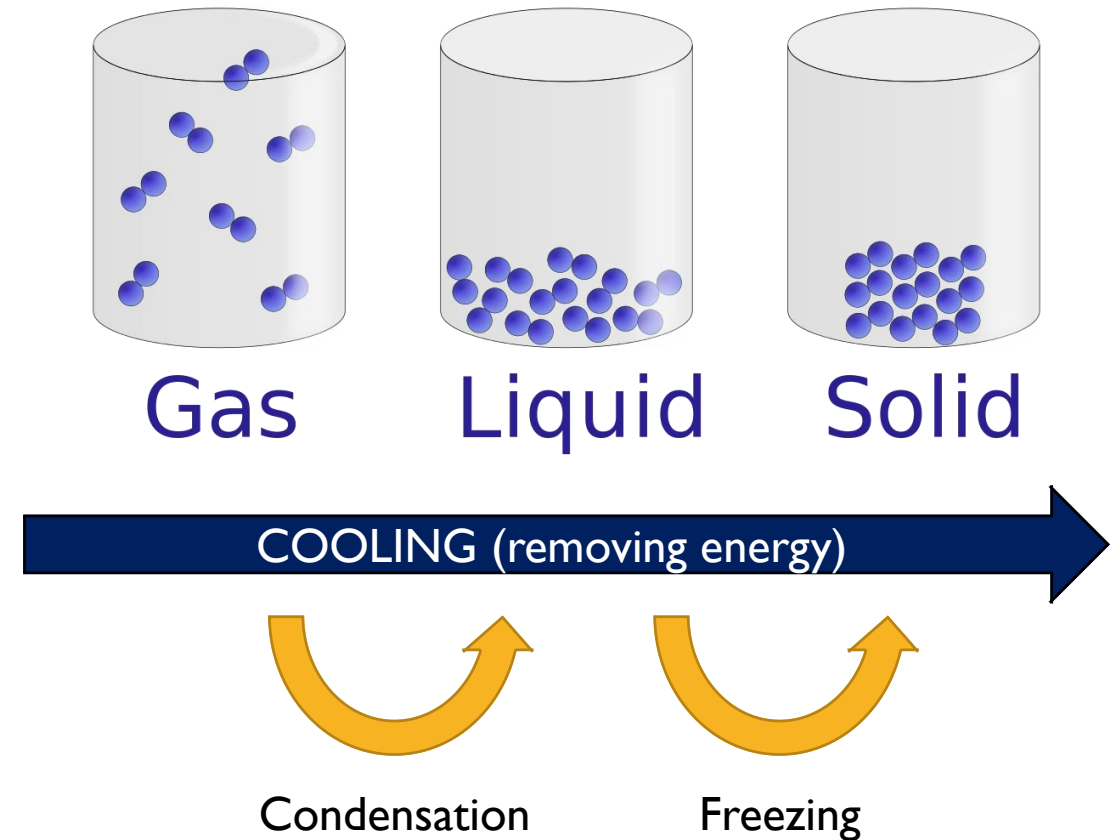
VOCABULARY

4 – Heat changing a liquid into a gas.

Concept Development

Cooling

- **Condensation** occurs when a gas loses heat and changes into a liquid.
- **Freezing** occurs when a liquid loses heat and changes into a solid.
- Different substances have different temperatures that they freeze at. This is called a **freezing point**.



CFU

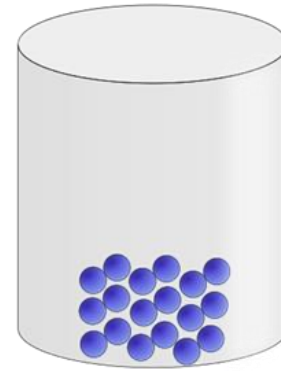
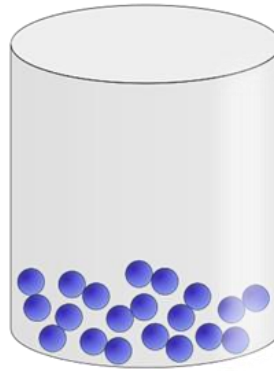
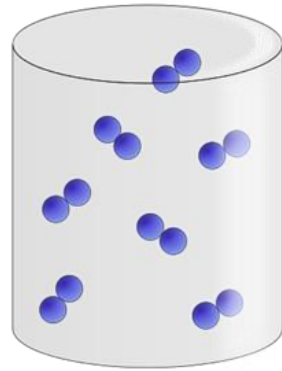
Are particles speeding up or slowing down as you cool substances?

VOCABULARY

5 – Removal of heat changes a gas into a liquid.

Boiling or
Evaporating

Melting



Gas

Liquid

Solid



Condensation

Freezing

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair				
Smoke				
Juice				
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			
Smoke				
Juice				
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke				
Juice				
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	
Juice				
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

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Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice				
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste				
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste		X		
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste		X		Toothpaste is a liquid because it has no fixed shape and a fixed volume.
Clouds				
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste		X		Toothpaste is a liquid because it has no fixed shape and a fixed volume.
Clouds			X	
Plastic				

Skill Development/Guided Practice

Task: State whether the following are a solid, liquid or gas and justify your answer.

Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste		X		Toothpaste is a liquid because it has no fixed shape and a fixed volume.
Clouds			X	Clouds are a gas because it has no fixed shape or volume.
Plastic				

Skill Development/Guided Practice

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Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste		X		Toothpaste is a liquid because it has no fixed shape and a fixed volume.
Clouds			X	Clouds are a gas because it has no fixed shape or volume.
Plastic	X			

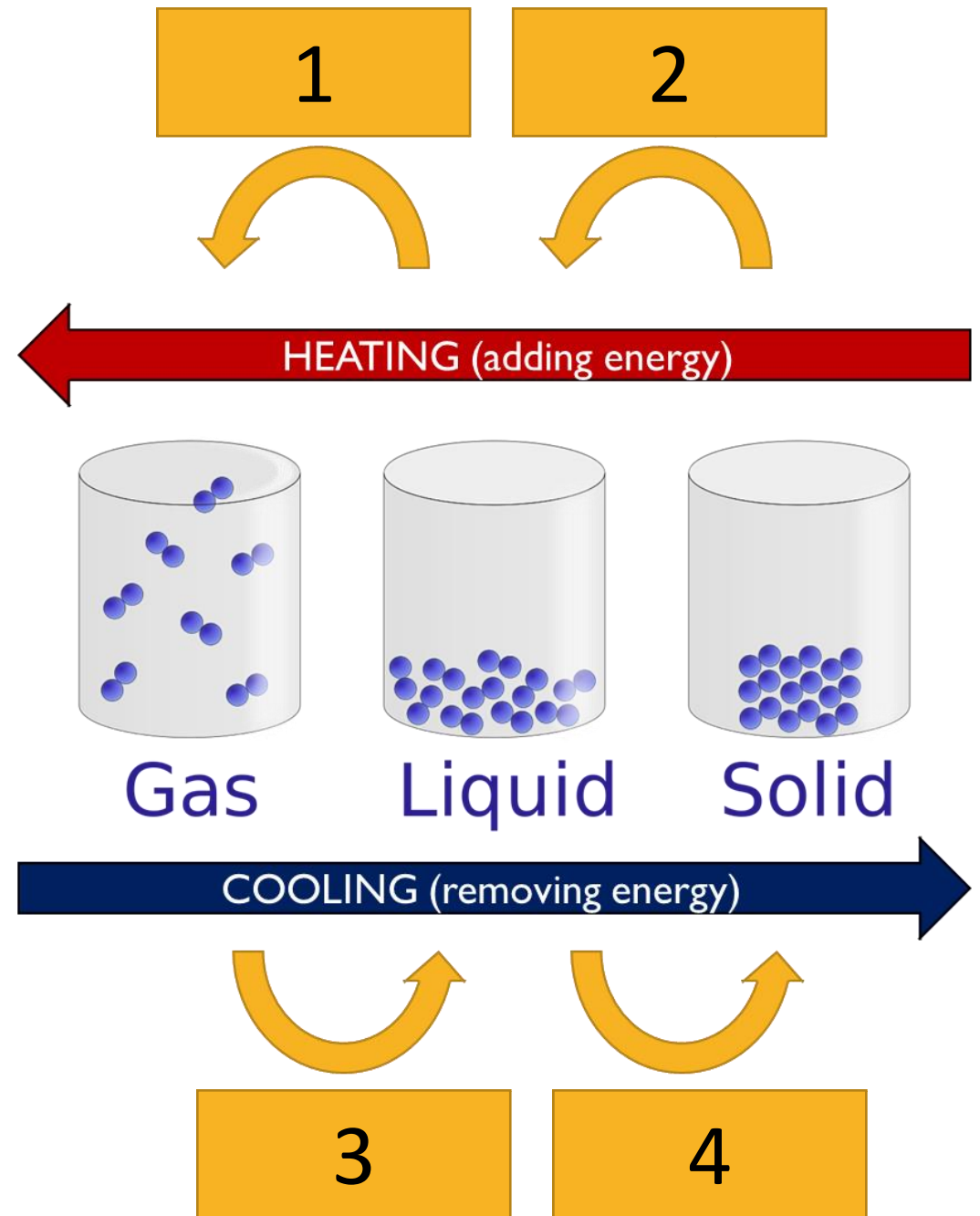
Skill Development/Guided Practice

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Substance/Object	Solid	Liquid	Gas	Justify your answer.
A chair	X			A chair is a solid because it has a fixed shape and volume.
Smoke			X	Smoke is a gas because it has no fixed shape or volume.
Juice		X		Juice is a liquid because it has no fixed shape and a fixed volume.
Toothpaste		X		Toothpaste is a liquid because it has no fixed shape and a fixed volume.
Clouds			X	Clouds are a gas because it has no fixed shape or volume.
Plastic	X			Plastic is a solid because it has a fixed shape and volume.

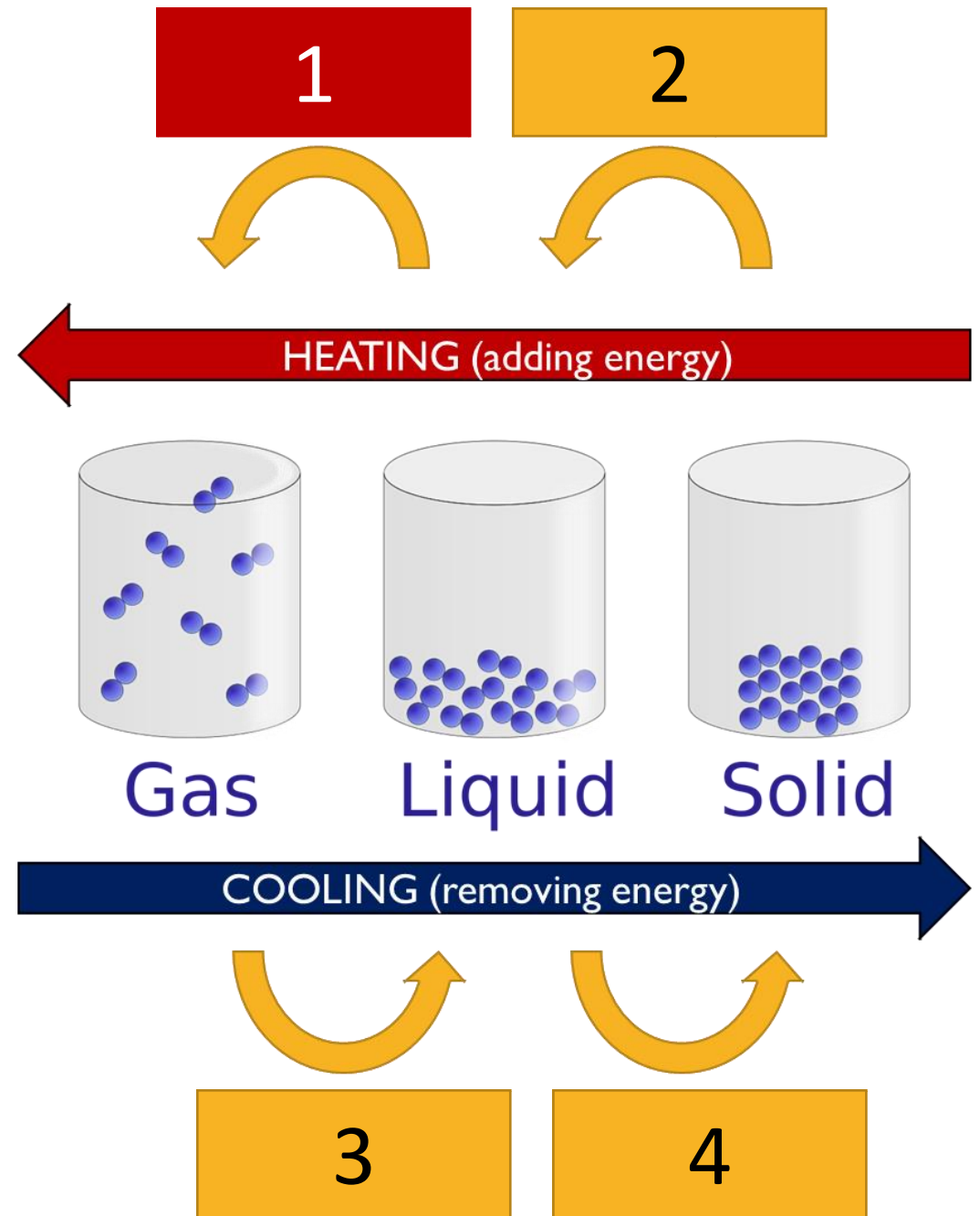
Skill Development/Guided Practice

Task: State the name we give the change in state for each number.



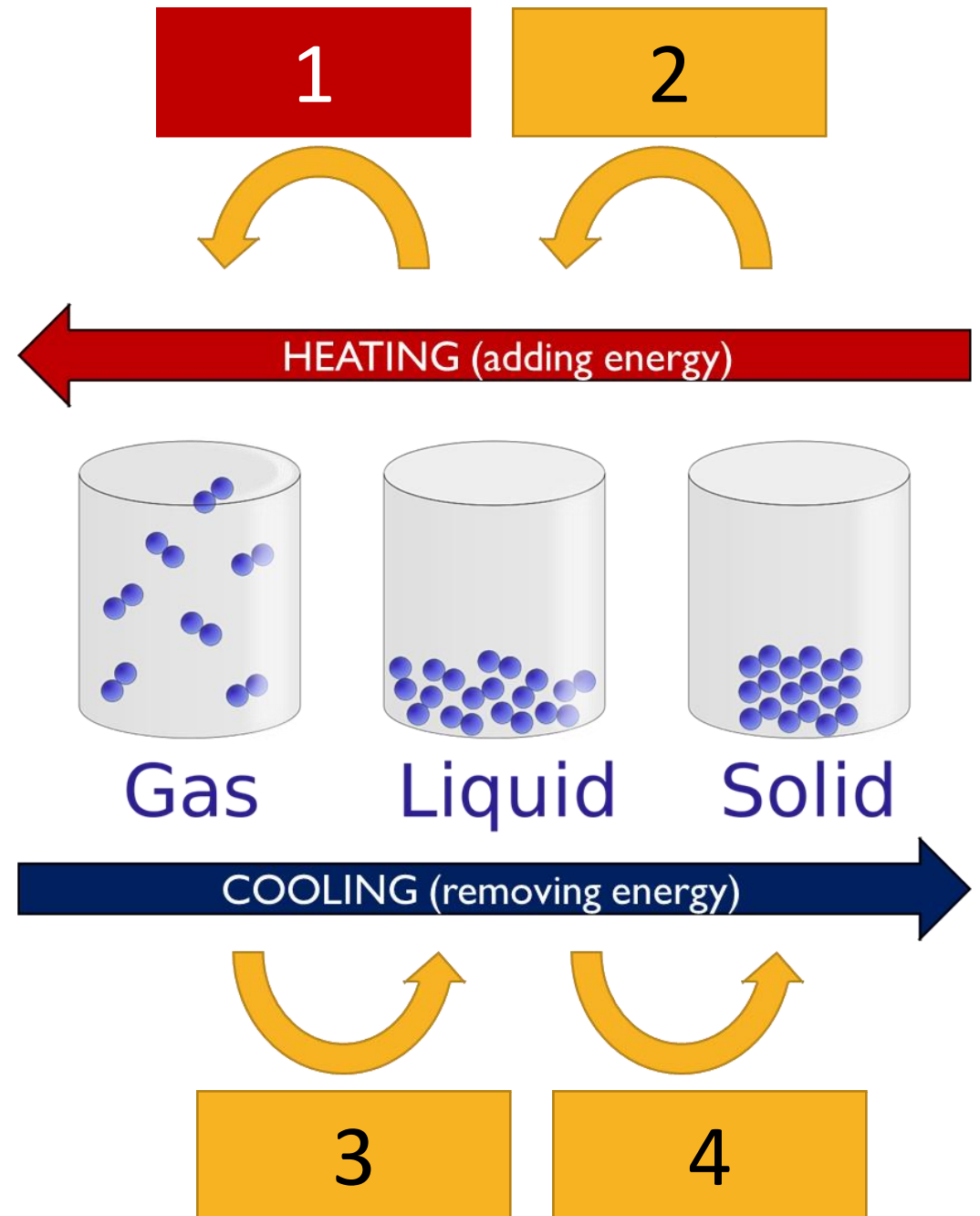
Skill Development/Guided Practice

Task: State the name we give the change in state for each number.



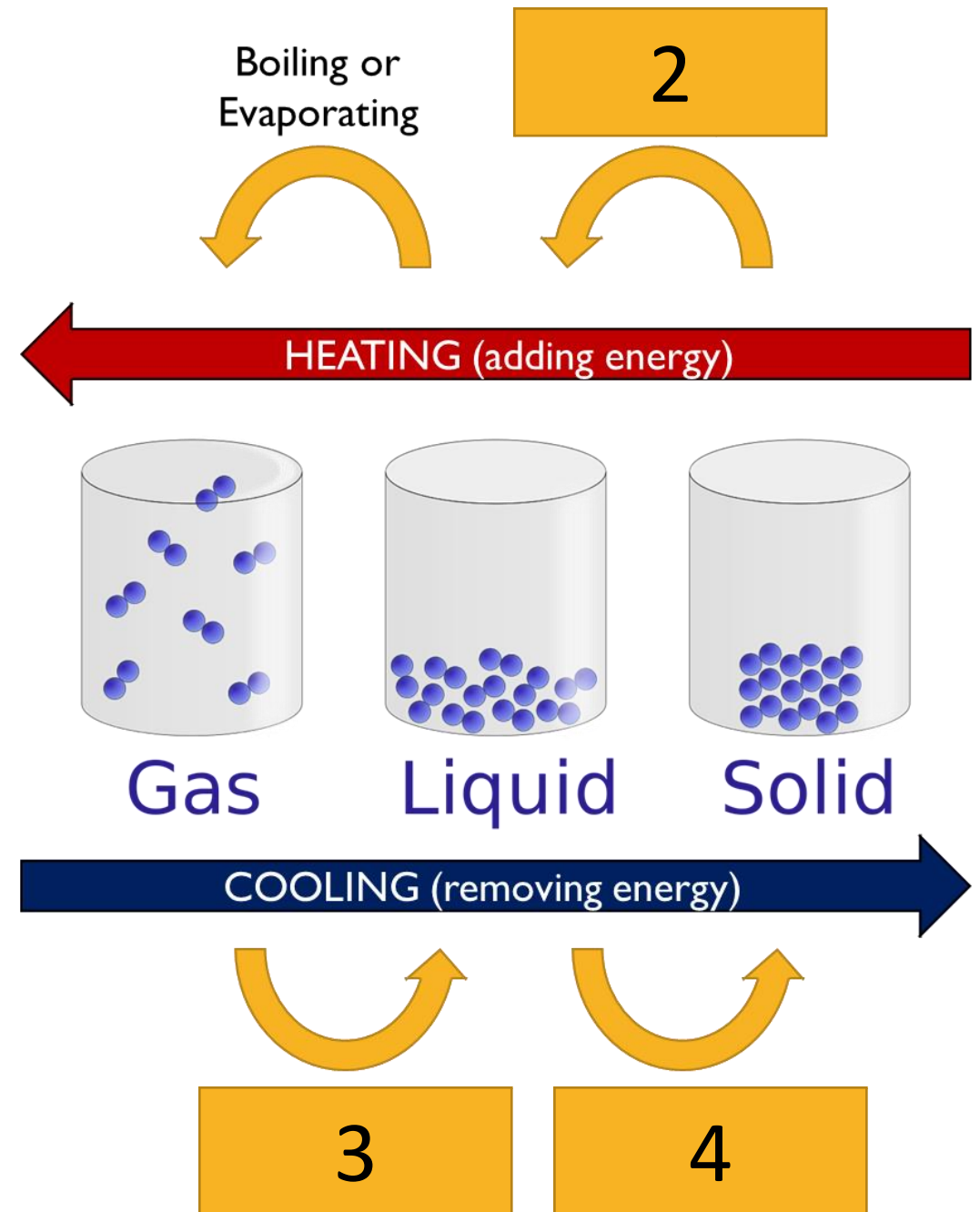
Skill Development/Guided Practice

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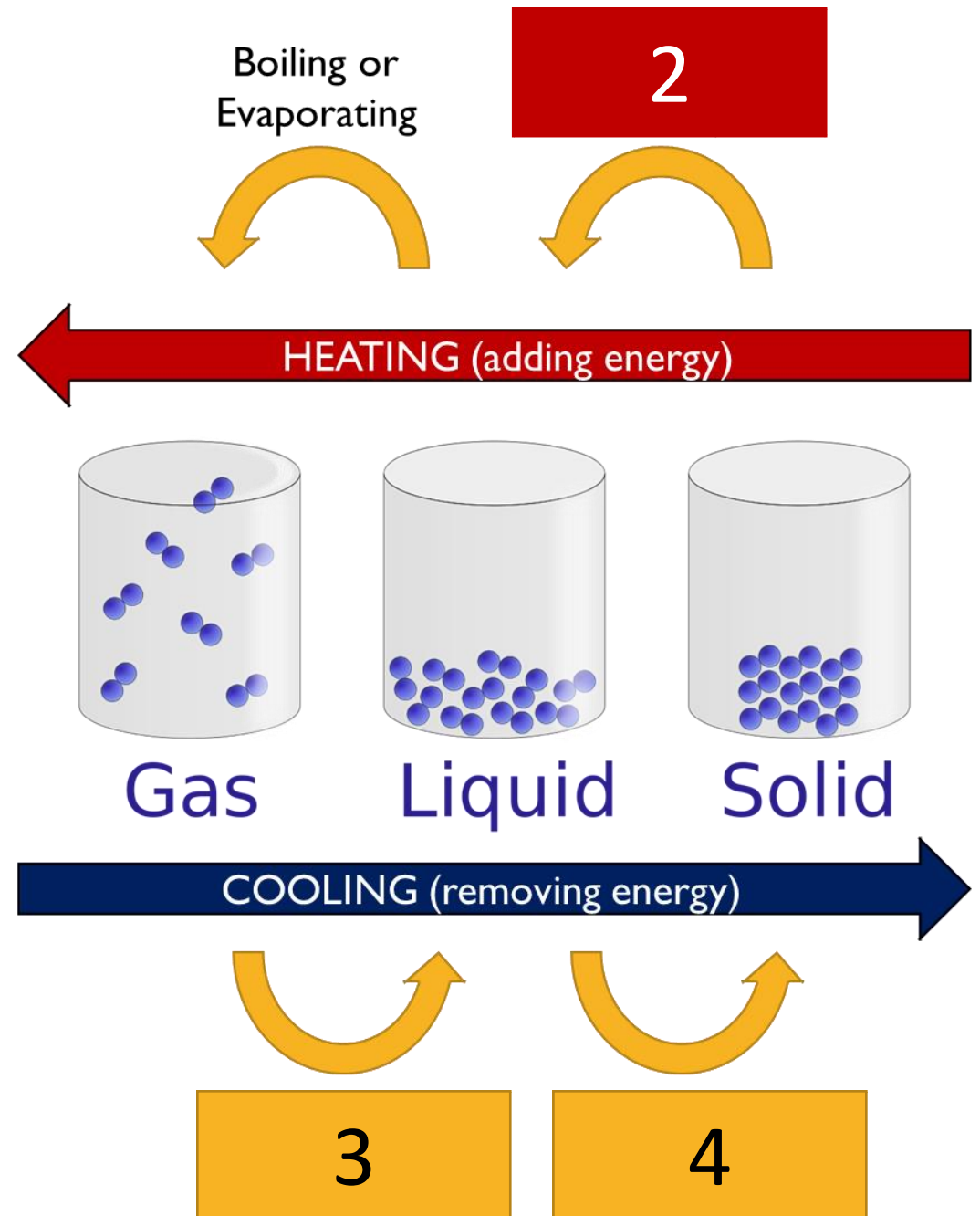
Skill Development/Guided Practice

Task: State the name we give the change in state for each number.



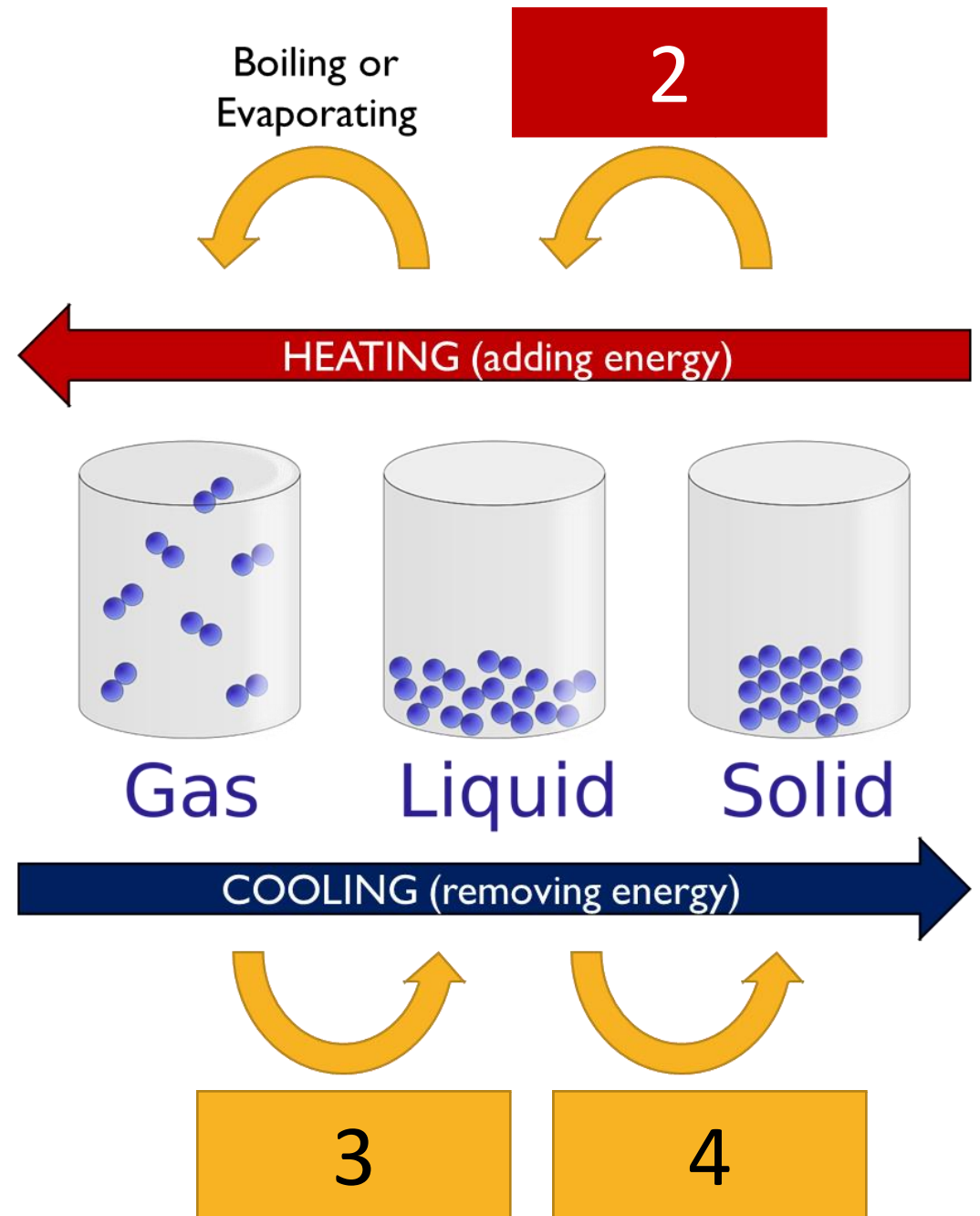
Skill Development/Guided Practice

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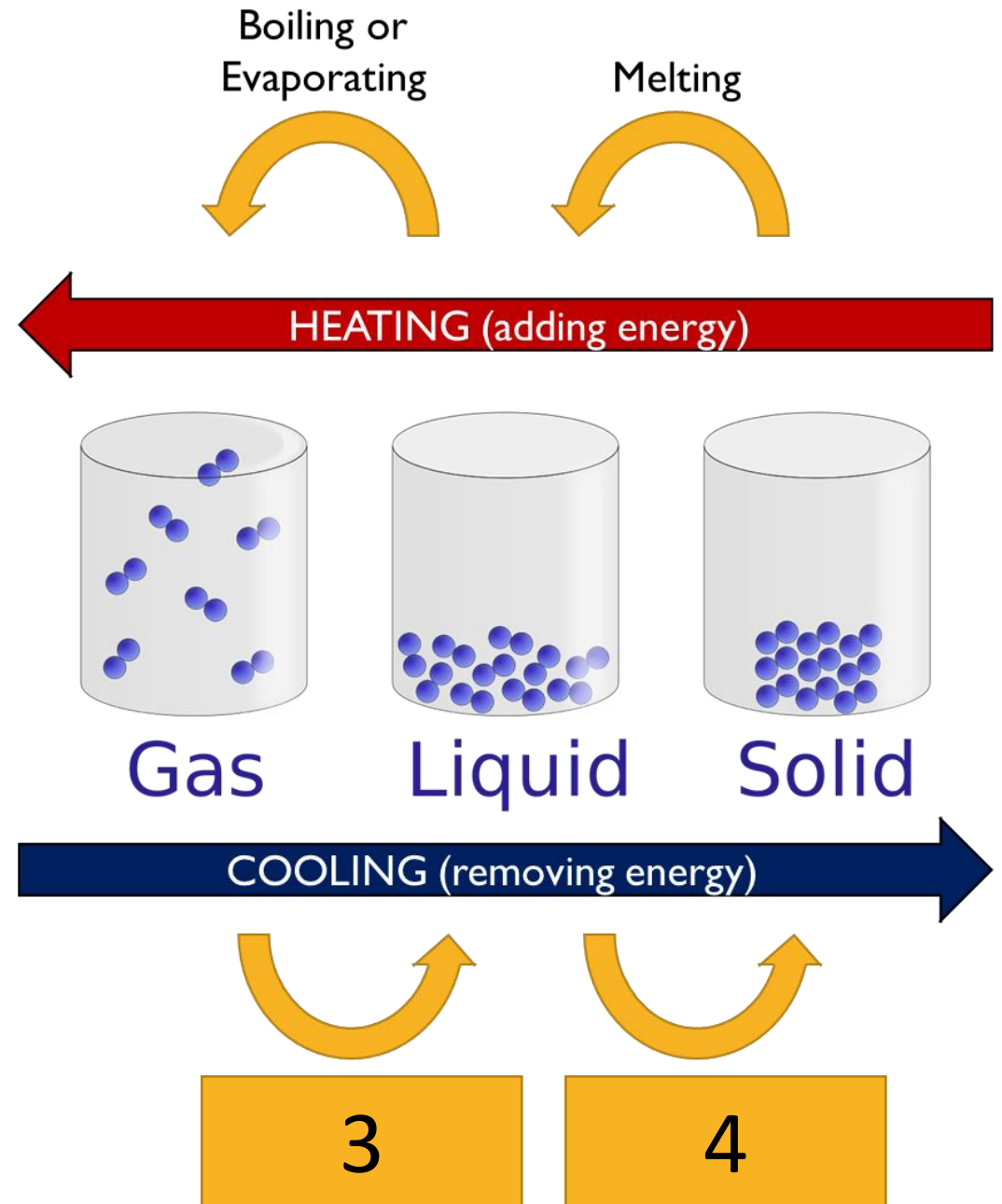
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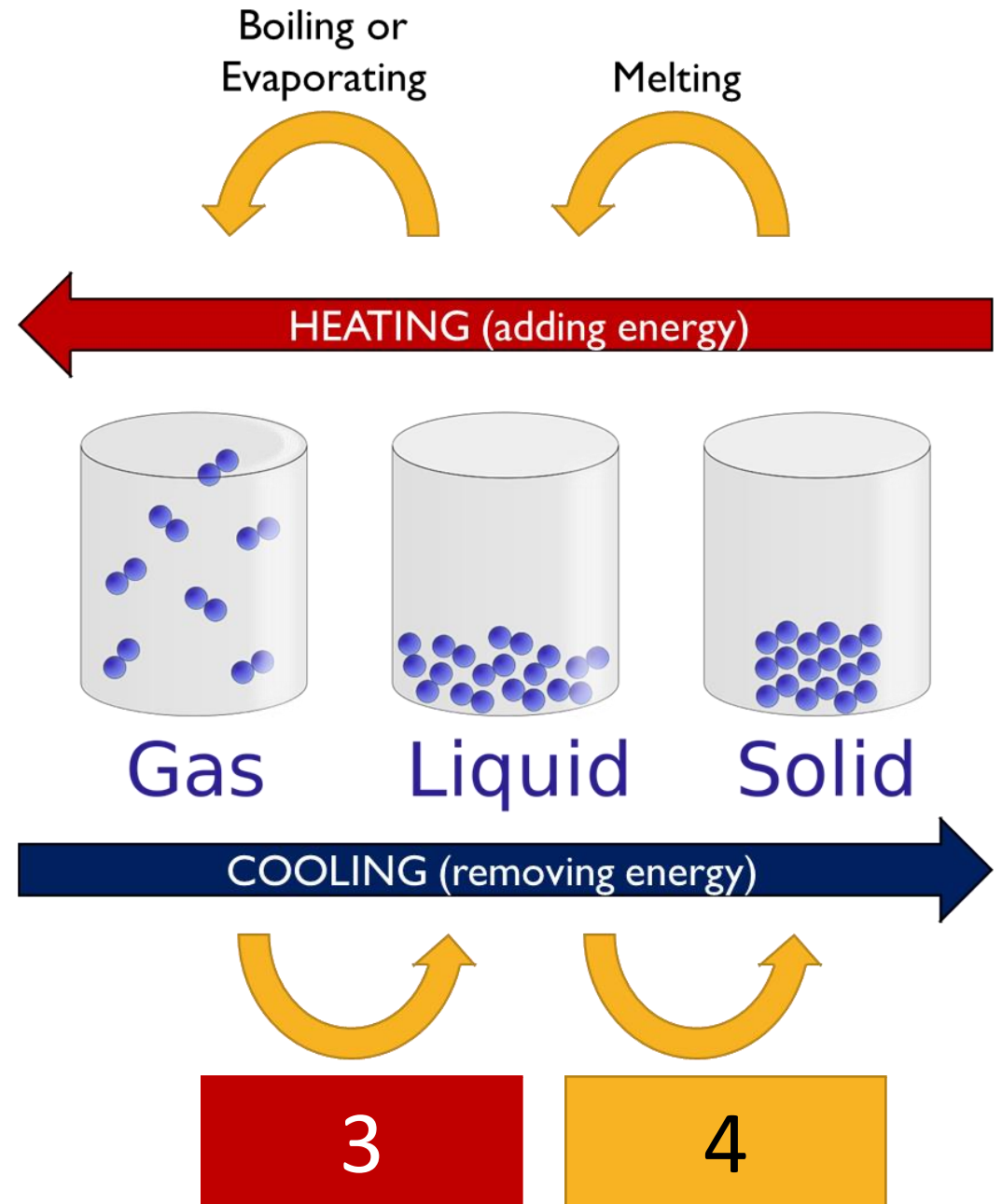
Skill Development/Guided Practice

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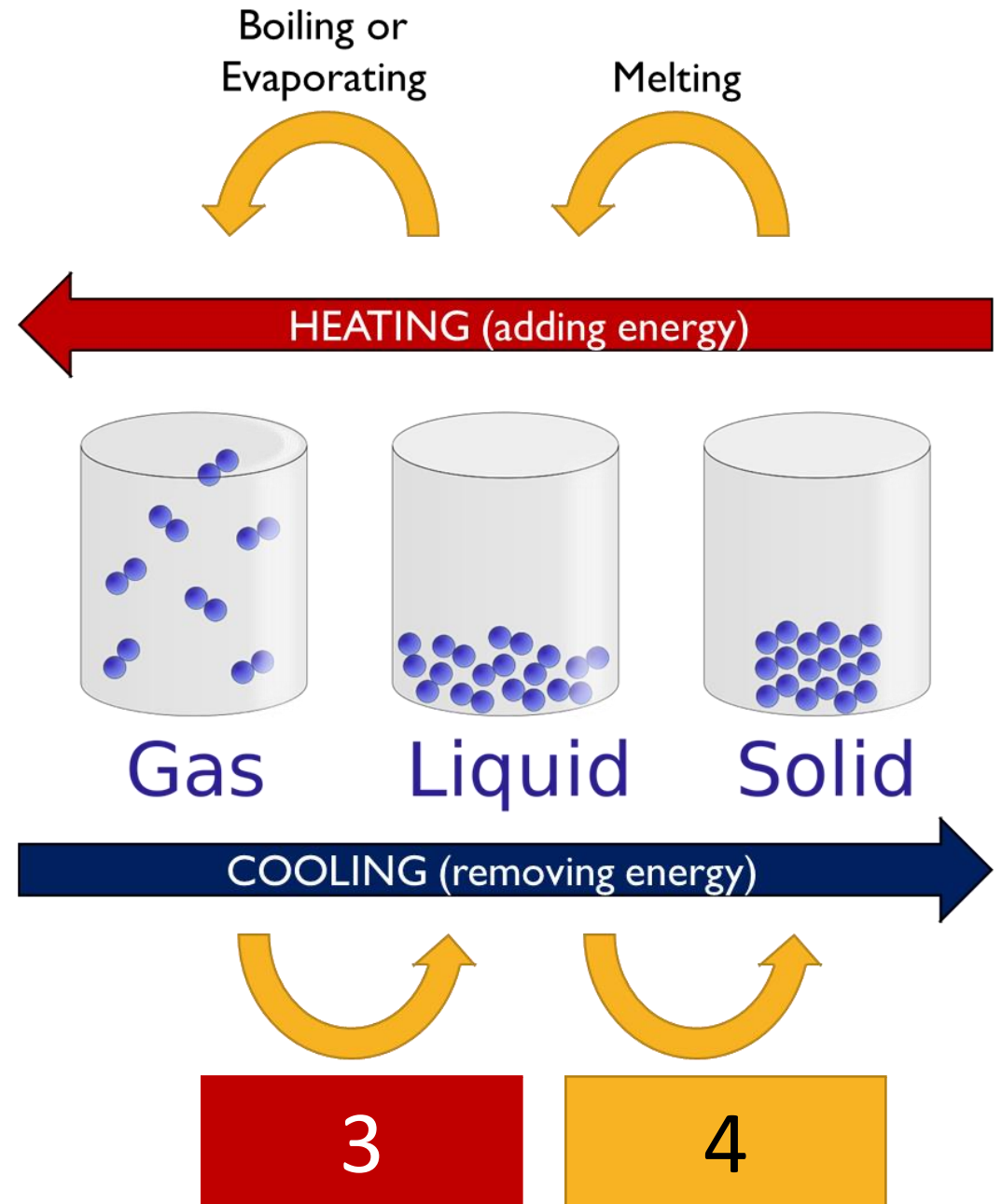
Skill Development/Guided Practice

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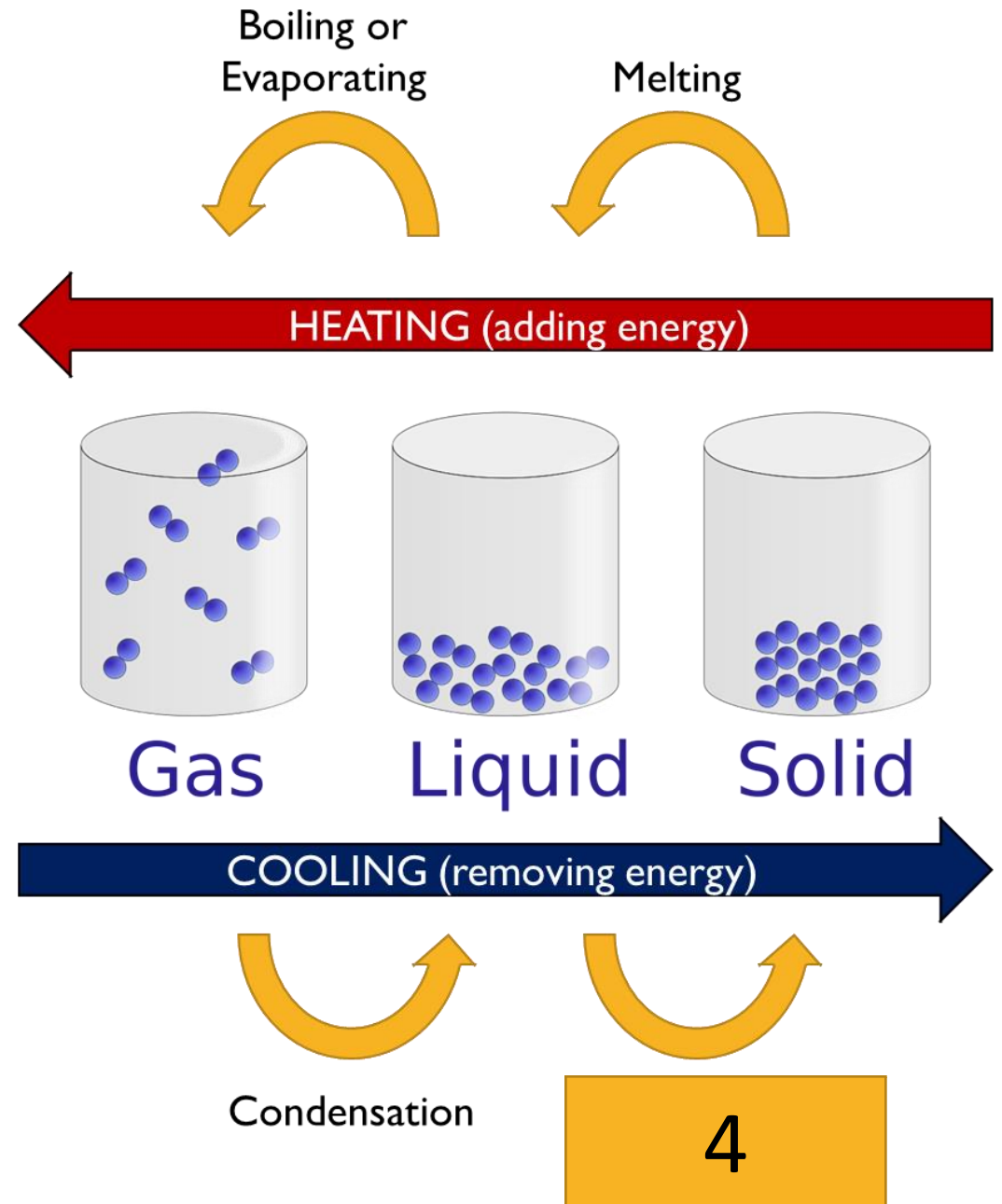
Skill Development/Guided Practice

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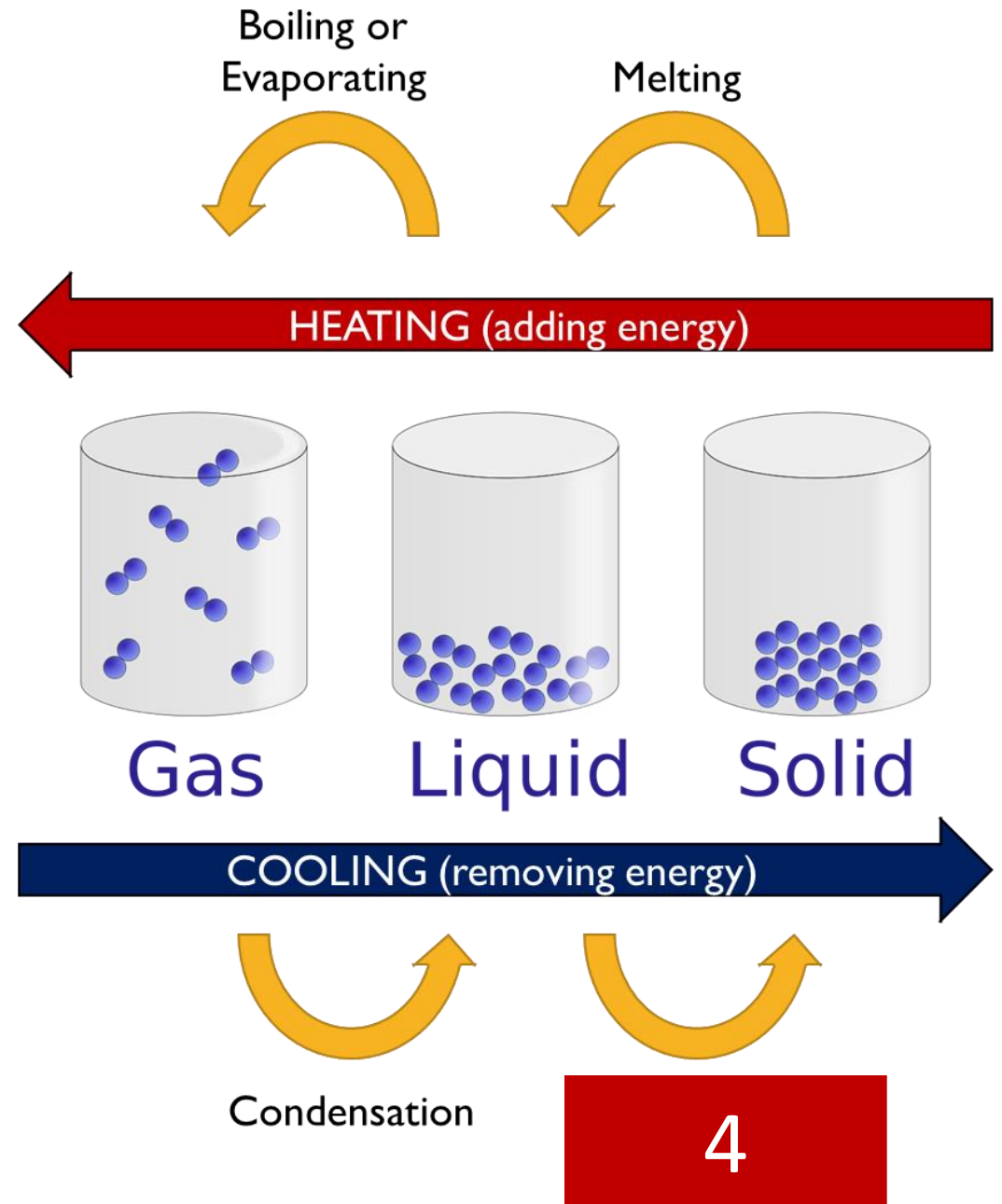
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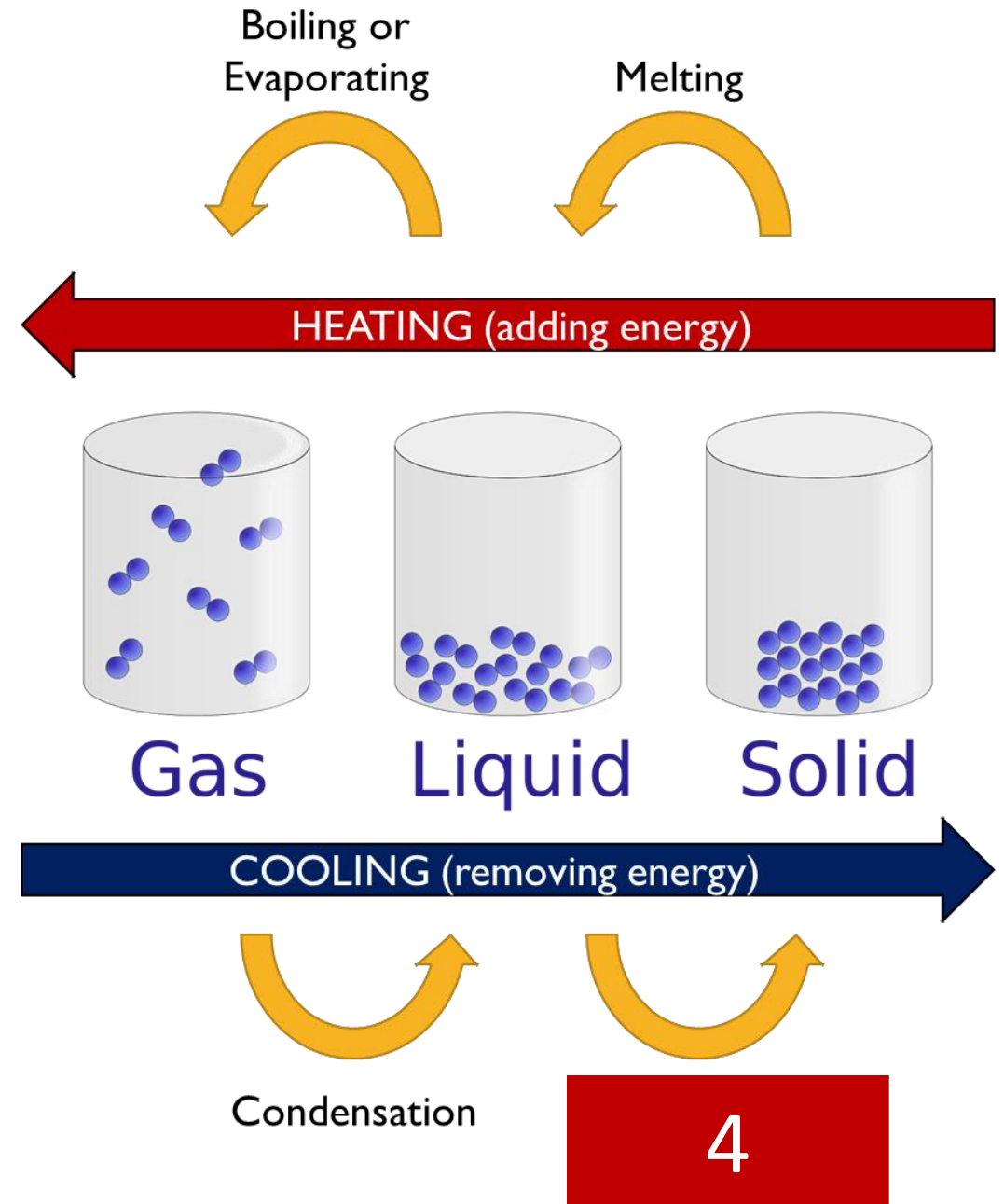
Skill Development/Guided Practice

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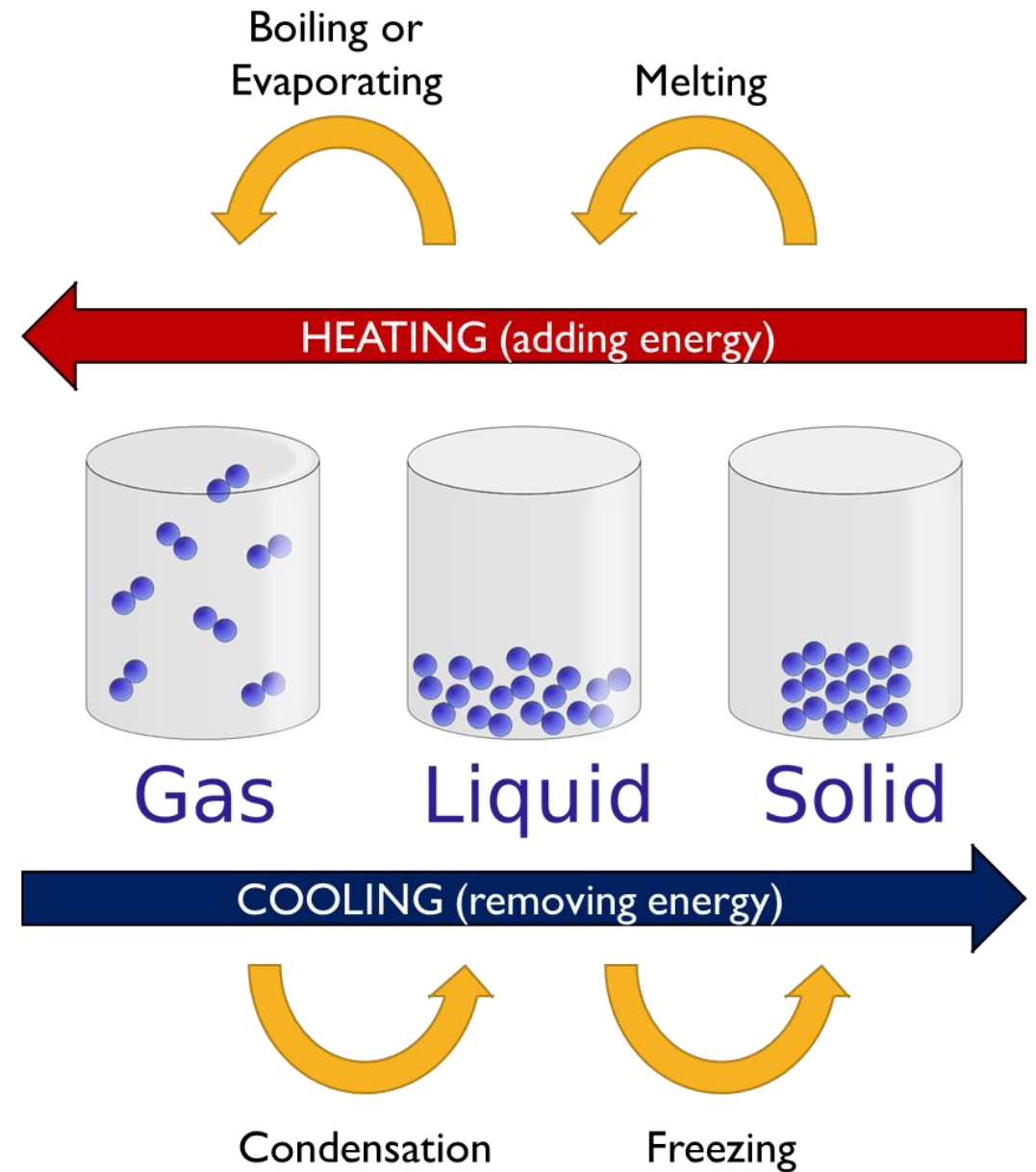
Skill Development/Guided Practice

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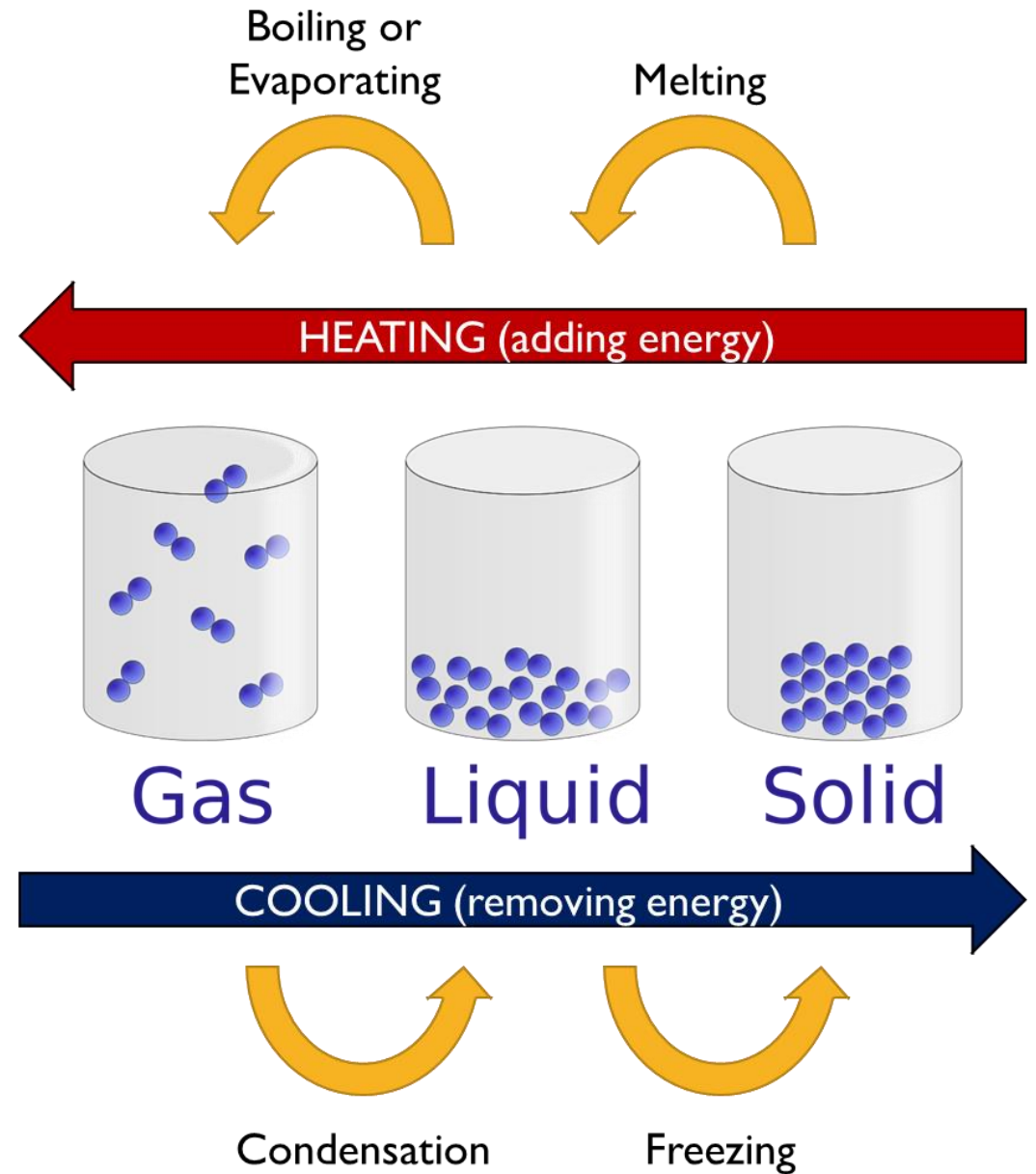
Skill Development/Guided Practice

Task: State the name we give the change in state for each number.



Skill Development/Guided Practice


Task: State the name we give the change in state for each number.



Relevance

- Everything around you is in a state of matter.
- You change the state of substances when you cook, such as boiling, baking or freezing ingredients.
- This term we will do experiments where we will be changing the state of substances.

Skill Closure

- Solids, liquids and gases have different properties and are known as the states of matter.
 - Substances change state by heating and cooling.
- 

Independent Practice

Task: Match the term with the definition.

1. Melting

A. When something changes from a **liquid into a solid**.

2. Condensation

B. When something changes from a **liquid into a gas**.

3. Freezing

C. When something changes from a **solid into a liquid**.

4. Evaporation and Boiling

D. When something changes from a **gas into a liquid**.



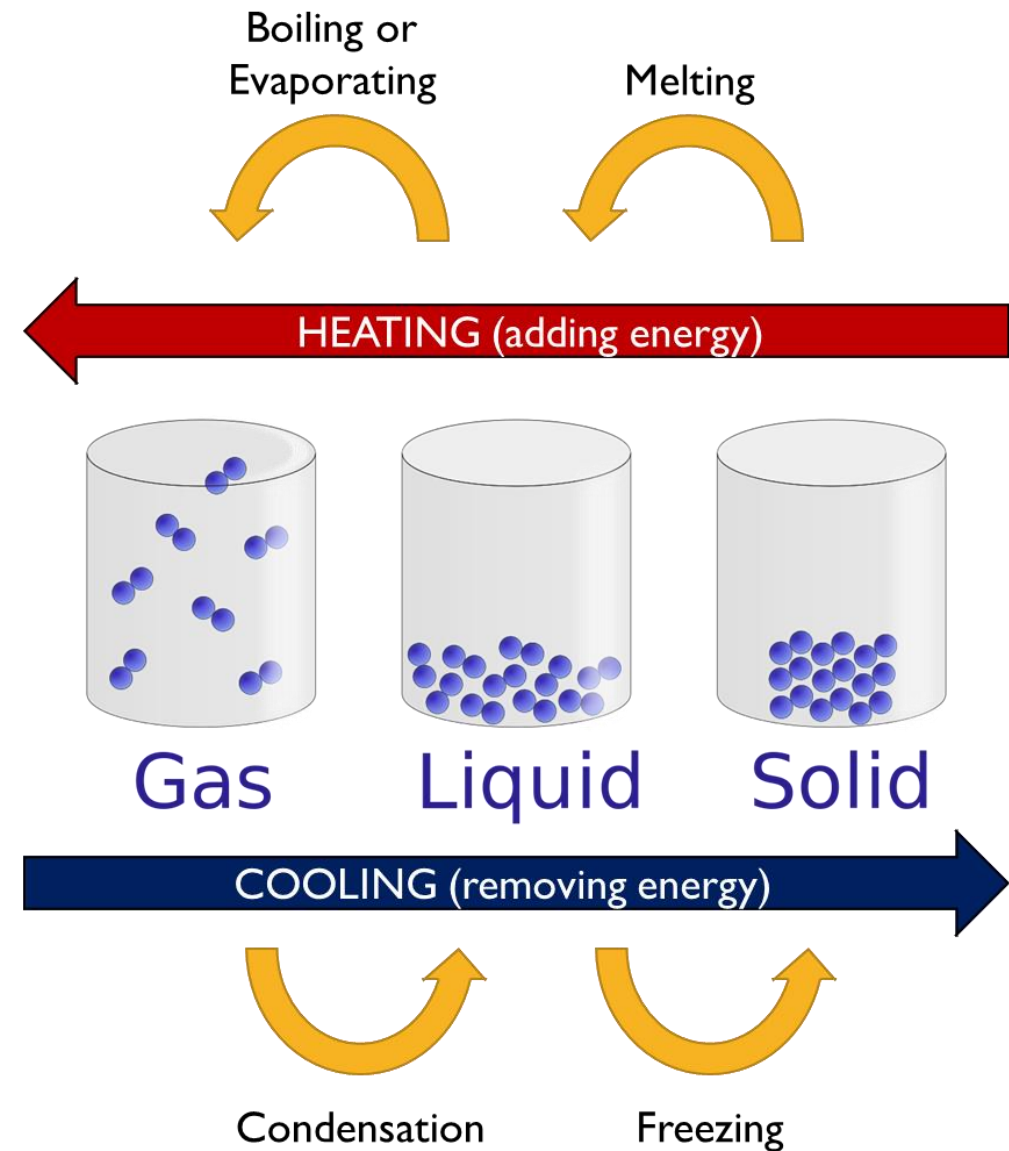
Independent Practice

Task: Identify the change of state (e.g. solid to liquid) that happens when:

1. ice-cream starts to drip
2. jelly sets in the fridge
3. the bathroom mirror gets foggy

Task: Now try and identify the word that describes the changes in state for each of the above (e.g. boiling).

If you have time: Create a poster on the states of matter using the picture on the right.



Learning Objective

Students will be able to describe the changing states of matter using the particle model.

Success Criteria

- Students will be able to explain the difference between solids, liquids and gas using the particle model.
- Students will be able to describe the changes of state during heating.
- Students will be able to describe the changes of state during cooling.

CFU

What is the difference between the particles of a solid and the particles of a gas?

CFU

Describe what happens to the particles when a liquid is cooled? What is this process called?

CFU

Describe what happens to the particles when liquid is heated? What is this process called?



Density

**NEXT
LESSON**

