

The Particle Model of Matter

This worksheet checks what you know about how particles behave in solids, liquids, and gases, and how their movement and arrangement explain physical properties like density and compressibility ([Outcome](#), [Knowledge](#), [Knowledge](#)). Read each question carefully and use full sentences where asked.

Exercises

1. Fill in the blanks

Use these words to complete the sentences: *close together, spaces, moving, slide, vibrate*

All matter is made up of small particles, and particles of matter are always _____ ([PDF p.1](#)).

In a solid, the particles are _____ and _____ in place ([Knowledge](#)).

In a liquid, the particles are separated by _____ and can _____ past each other ([Knowledge](#)).

2. Matching

Draw a line from each state of matter to the correct description of its particles ([Knowledge](#)).

State of Matter	Description
A. Solid	1. Particles have large spaces between them and move in all directions
B. Liquid	2. Particles are close together and vibrate in place
C. Gas	3. Particles are separated by spaces and can slide past each other

3. Multiple choice

Attractive forces between particles are strongest in which state of matter? ([Knowledge](#), [PDF p.6](#))

- A) Gas
- B) Liquid
- C) Solid
- D) All three are equal

Explain your answer in one sentence: _____

4. Short answer

A helium tank holds gas that has been squeezed into a small metal cylinder. Water is much harder to squeeze into a smaller space.

Using the word *compressibility*, explain why gas can be compressed more easily than water ([Knowledge](#), [PDF p.6](#)).

5. Comparing density

Two balls have the same volume. Ball A has a mass of 120 g. Ball B has a mass of 80 g.

Which ball is denser? _____

Explain how you know, using the words *mass* and *volume* ([Knowledge](#)).

A ball made of foam floats when placed in water. What does this tell you about the foam's density compared to water's density? ([Knowledge](#))

6. Draw and label

In the three boxes below, draw circles to represent particles in a solid, a liquid, and a gas. Space your circles correctly for each state, then label each box ([Skills](#)).

Solid:

[]
[]
[]

Liquid:

[]
[]
[]

Gas:

[]
[]
[]

Under your drawings, write one sentence describing what happens to the attractive forces between particles when a substance is heated ([PDF p.6](#)).

Answer key

1. moving; close together, vibrate; spaces, slide
2. A, 2, B, 3, C, 1
3. C) Solid. Particles in a solid are closest together, so the attractive forces pulling them together are strongest.
4. Gas particles have large spaces between them, so those spaces can be squeezed smaller under pressure. Water's particles are already close together with little space, so there is not much room to compress.
5. Ball A is denser. Since both balls have the same volume, the one with more mass (120 g) has more matter packed into the same space, giving it a higher density. The foam floating shows that foam is less dense than water.
6. Solid: circles close together in a neat, tight pattern. Liquid: circles touching but in a looser, flowing pattern. Gas: circles spread far apart with lots of space between them. Heating a substance makes its particles move faster and farther apart, which weakens the attractive forces between them.