

Particles States Matter

KS3 Chemistry · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Use the particle model to explain why you can pour orange juice but not a wooden spoon.

Step 1 · Particles in the juice (liquid)

They are close together but can move and slide past each other.

Step 2 · Particles in the spoon (solid)

They are held in fixed positions in a regular pattern and can only vibrate.

Step 3 · Link to the property

Flowing needs particles to move past each other, so only the liquid can be poured.

Answer: Liquid particles slide past each other; solid particles are fixed in place

Check: Always describe arrangement AND movement.

2. Now try one with the steps

A syringe full of air can be pushed in, but a syringe full of water cannot. Explain.

Step 1 · Spacing in a gas

Step 2 · Spacing in a liquid

Step 3 · Conclusion

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Name the three states of matter. [1]

2. In which state are the particles furthest apart? [1]

3. In which state do the particles only vibrate in fixed positions? [1]

4. Which TWO states can flow? [1]
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5. Which state has a fixed volume but no fixed shape? [1]
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6. Describe the arrangement of particles in a liquid. [2]
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7. Explain why a gas fills any container it is put in. [2]
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8. Explain why solids have a fixed shape. [2]
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9. Do the particles themselves get bigger when a solid turns into a gas? Explain. [2]
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10. Explain why a liquid is very hard to compress. [2]
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11. Water has a density of 1 g/cm^3 and steam about 0.0006 g/cm^3 . Which has its particles closer together? [1]
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12. A 2 cm^3 block of copper has a mass of 18 g. What is its density in g/cm^3 ? [2]
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13. Give TWO limitations of drawing particles circles in diagrams. [2]
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14. Explain, using particles, why the smell of a cake spreads through the air but a bar of chocolate keeps its shape in a cool room. [3]

4. Before you hand it in

Drawing liquid particles spread out with big gaps.

Draw liquid particles touching their neighbours, but in a jumble rather than neat rows.

"Particles expand when they are heated."

When heated, particles move or vibrate more and the gaps between them get bigger.

"Solid particles don't move."

Say they vibrate about fixed positions and cannot move past each other.

"Gas particles are lighter than solid particles."

Gases have a lower density because the particles are far apart, not because each one weighs less.