

Particle Model and Gas Pressure

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

What causes the pressure of a gas?

Step 1 · Particles

Gas particles move quickly in random directions.

Step 2 · Collisions

They keep colliding with the walls of their container, each one pushing on the wall.

Step 3 · Pressure

All these tiny pushes over the wall's area make the gas pressure.

Answer: Particles colliding with the walls

Check: The more often and harder they hit, the bigger the pressure.

2. Now try one with the steps

Why does pumping more air into a tyre increase its pressure?

Step 1 · More particles

Step 2 · More collisions

Answer:

3. Practice

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

1. What causes the pressure of a gas in a container? [1]

2. Describe the arrangement and movement of particles in a gas. [2]

3. Why does pumping air into a football make it firmer? [2]

4. What happens to gas particles when the gas is heated? [1]

5. A sealed container of gas is heated. What happens to the pressure, and why? [2]
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6. Why do aerosol cans warn 'do not expose to high temperatures'? [1]
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7. Why is a car's tyre pressure higher after a long, fast drive? [2]
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8. A blown-up balloon is put in a freezer. Explain why it shrinks. [2]
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9. Explain why a gas can be compressed but a liquid can hardly be compressed at all. [2]
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10. A sealed syringe of air is pushed in to half its volume at the same temperature. What happens to the number of collisions with the walls each second? [1]
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11. A container at 100 kPa has the number of gas particles doubled, at the same volume and temperature. Predict the new pressure, in kPa. [2]
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12. Use the particle model to explain atmospheric pressure. [2]
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13. Give one limitation of drawing gas particles in a box. [1]
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14. A plastic bottle is sealed at the top of a mountain and carried down to sea level. It is crushed slightly. Explain why. [2]
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4. Before you hand it in

"The particles expand when heated."

Particles move faster and (if free to) spread further apart; they don't grow.

"Gas pressure is caused by particles hitting each other."

Pressure comes from particles colliding with the container's walls.

"There is air between the particles."

Between gas particles there is empty space.