

Pressure In Fluids and Upthrust

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Why does water pressure increase diver goes deeper?

Step 1 · What causes the pressure

The weight of the water above pushes down.

Step 2 · Deeper

There is more water above, so more weight pressing down: bigger pressure.

Answer: More water above → more weight → more pressure

Check: Pressure in a fluid acts in all directions, not just down.

2. Now try one with the steps

A stone weighs 5 N in air and 3 N when hung under water. Find the upthrust.

Step 1 · Upthrust pushes up

Step 2 · Calculate

Answer:

3. Practice

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

1. What is upthrust? [1]

2. Is air pressure higher at sea level or at the top of a mountain? [1]

3. Why does water pressure increase with depth? [1]

4. A newton meter reads 5 N for a stone in air and 3 N in water. What is the upthrust, in newtons? [1]

5. A floating duck weighs 8 N. What is the upthrust on it, in newtons? [1]
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6. An object weighs 10 N. Even when completely under water, the upthrust is only 6 N. Does it float or sink? [1]
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7. A stone reads 12 N in air and 7.5 N in water. What is the upthrust, in newtons? [1]
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8. Why are dams built much thicker at the bottom than at the top? [2]
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9. Three holes are made at different heights in a plastic bottle full of water. Which hole squirts water furthest, and why? [2]
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10. A sealed crisp packet puffs up when taken up a mountain. Explain why. [2]
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11. Explain why a ball of plasticine sinks but the same plasticine shaped into a boat floats. [3]
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12. A 20 N block would get 25 N of upthrust if pushed fully under water. When it is let go and floats, how big is the upthrust, in newtons? [2]
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13. Explain why your ears can hurt when you swim to the bottom of a deep pool. [2]
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14. A ship is loaded with cargo. Explain why it sits lower in the water. [2]
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4. Before you hand it in

"Heavy things sink, light things float."

Compare weight with the upthrust: an object floats if the upthrust can match its weight.

"Pressure in water only pushes down."

Water pushes on every surface — up, down and sideways.

"An object weighs less in water because it loses mass."

The newton meter reads less because upthrust is pushing up on it.