▶ Video explanation (YouTube Short)

Why Does Ice Float?

Most solids sink in their own liquid: solid iron sinks in liquid iron, and solid wax sinks in liquid wax. Water is unusual, because its solid form floats.

1. The rule

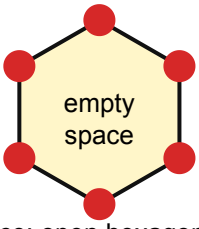
A solid floats if it is **less dense** than the liquid, and sinks if it is denser. Density = mass ÷ volume.

2. Why ice is less dense

1. When water freezes, hydrogen bonds lock its molecules into an **open hexagon pattern**.
2. This leaves empty space between the molecules.
3. The mass stays the same, but the volume grows by about **9%**.
4. Density falls from about 1.00 to about 0.92 g/cm³, so ice floats.



water: close, moving



ice: open hexagon

3. Why it matters

- Lakes freeze from the top, so water stays liquid below and fish survive.
- A floating object sits with a fraction under the liquid equal to its density ÷ the liquid's density. For ice in water that is about 92%, which is why most of an iceberg is hidden.
- Water expanding as it freezes can burst pipes and crack rocks.

Substance	Density near room temperature (g/cm³)
Ethanol	0.79
Paraffin wax	0.90
Ice (0 °C)	0.92
Water	1.00
Glycerol	1.26
Iron	7.87
Mercury	13.5
Gold	19.3

Solved example

Q. A block of ice floats in water. What fraction of it is under water?
A. Fraction = density of ice ÷ density of water = 0.92 ÷ 1.00 = 0.92, so about 92% is under water.

Practice questions

1. (MCQ) Ice in ethanol will: (a) float (b) sink (c) dissolve at once (d) stay exactly halfway
2. (Very short) What pattern do water molecules form in ice?
3. (Very short) By about what percentage does water's volume grow on freezing?
4. (Short) Why does a lake freeze from the top?
5. (Short) Will iron float on mercury? Why?
6. (Short) Wax of density 0.90 g/cm³ floats in water. What fraction is under water?

Answer key

1. (b): ice is denser than ethanol.
2. An open hexagon pattern.
3. About 9%.
4. Ice is less dense than water, so it stays on top and water remains liquid below.
5. Yes: iron (7.87) is less dense than mercury (13.5).
6. 0.90 ÷ 1.00 = 0.90, so 90%.

▶ Watch the video explanation