

Density: why things float or sink

Grade 6 science (Year 7 · Class 6) · Lab

Name: _____ Date: _____ Class: _____

Is the density of a liquid the same whatever amount you measure? In this lab you weigh different volumes of water and oil, calculate their densities and use the results to predict what floats on what. A wooden block gives a solid to test.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** MS-PS1-2

Aim

To measure the density of water and of cooking oil by finding the mass of different volumes, and to use the results to predict what floats.

Equipment

- 100 mL graduated cylinder
- Balance (0.1 g steps) with a tare button
- Water and sunflower oil in separate beakers
- Dropper
- Small wooden block and a ruler

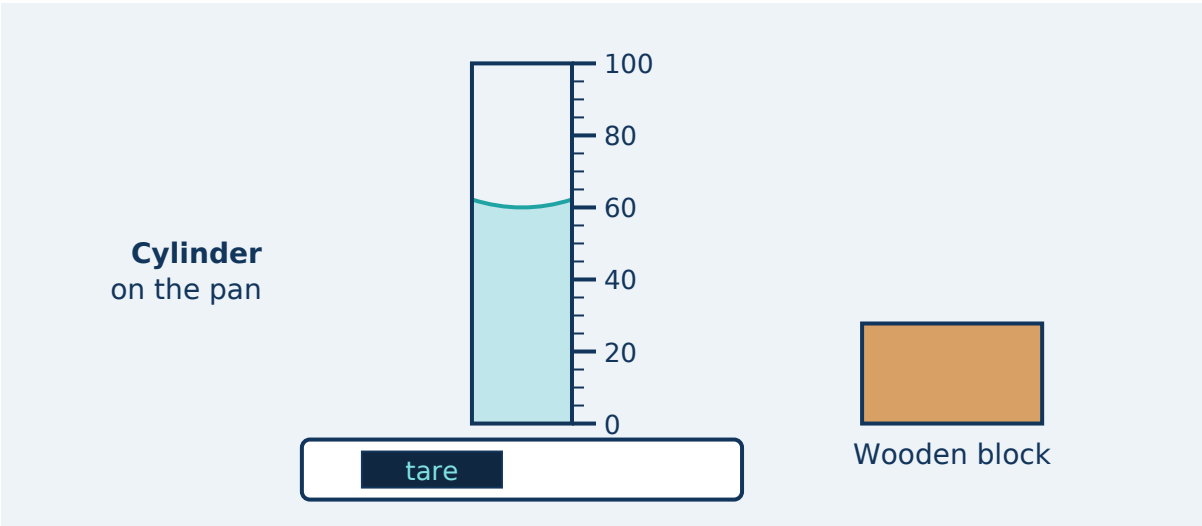
Safety

Safety

Wipe up spilled oil immediately because it makes the floor slippery. Wash your hands after handling oil, and do not taste anything in the lab.

Method

1. Stand the empty, dry cylinder on the balance and press tare so the display shows 0.0 g.
2. Pour in water to the 20 mL mark, using the dropper to set the bottom of the meniscus exactly. Record the mass.
3. Add more water to reach 40, 60 and 80 mL, recording the mass each time.
4. Empty the cylinder, dry it, and repeat the whole procedure with oil.
5. Measure the block with a ruler and find its mass on the balance.



The cylinder stands on the balance; press tare, add liquid, then read the mass and the volume.

Results

Volume (cm³)	Mass of water (g)	Mass of oil (g)	Density of water (g/cm³)	Density of oil (g/cm³)
20	20.1	18.4	to calculate	to calculate
40	39.8	36.6	to calculate	to calculate
60	60.2	55.1	to calculate	to calculate
80	80.1	73.5	to calculate	to calculate

Wooden block: 8.0 cm × 4.0 cm × 2.0 cm, mass 38.4 g.

Analysis questions

Question 1 Density of oil

Calculate the density of the oil for each volume, to three decimal places.

Question 2 Mean density

Calculate the mean density of the oil and give it to two decimal places.

Question 3 Density of water

Calculate the density of the water for each volume and state the mean to two decimal places.

Question 4 Graph gradient

Plot mass of oil (y-axis) against volume (x-axis). Describe the graph and calculate its

gradient using the first and last points.

Question 5 Prediction for oil

Use your results to predict what happens when oil is poured onto water. Explain.

Question 6 Wooden block

Calculate the density of the block, say whether it floats in water, and predict the percentage of its volume under the surface.

Question 7 Sources of error

Describe two possible errors in this lab and how to reduce them.