

Student experiment  
(5th - 10th grade)

## Determining the density of solids

🕒 Time: max. 15 min.

### Safety:

Independent of the chosen liquids.

Needle tips should be blunted to avoid the danger of accidental injury.

safety glasses

### Instruments:

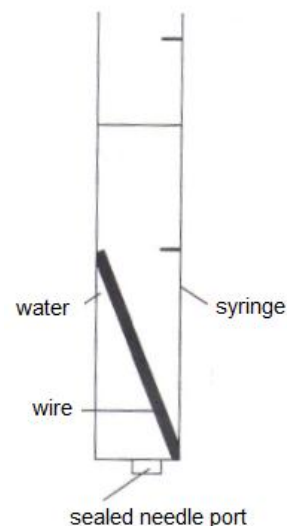
- a scale
- 1ml disposable syringes (scaled in 0,1ml steps),
- another syringe with blunted needle
- Pieces of wire or other solids, whose density is unknown (e.g. aluminum, copper, etc.)
- a nail
- pliers

### Chemicals:

- low-cost methylated spirits burner
- distilled water

### Experiment:

- Heat the nail using the burner. Seal the end of the 1ml disposable syringe with the hot nail.
- Cut the wire pieces so that they are slightly shorter than half the length of the disposable syringe tube.
- Use the needle and syringe to fill the sealed syringe exactly to the 0,5ml mark with colored water.
- A prepared wire piece is carefully sunk in the colored water and the new volume reading recorded.
- The volume of the piece of wire is then calculated.



### Results:

The density of a liquid can be calculated with the help of the following formula:

$$\rho = m / V$$

where m is the mass in gram of the substance and v is the volume in cubic centimeters of displaced water.

### Disposal:

The water can be poured down the drain and the pieces of wire saved for other experiments.