

# Mass changes in chemical reactions

## Topic

The nature of chemical reactions, scientific investigation.

## Timing

10 min.

## Description

In this experiment students measure the mass of various reactant solutions before and after reaction to see whether there has been any change in mass.

## Apparatus (per group)

- One student worksheet
- Part of a well-plate (the three-well plate is cut from the standard 24-well plate using a hacksaw. A class set can be cut from a single well-plate).
- Access to a balance that reads to 0.01g.

## Chemicals (per group)

Solutions contained in plastic pipettes, see 'Element solutions' and the 'Apparatus and techniques for microscale chemistry' handouts.

- Sodium carbonate  $0.5 \text{ mol dm}^{-3}$
- Calcium nitrate  $0.5 \text{ mol dm}^{-3}$
- Hydrochloric acid  $1 \text{ mol dm}^{-3}$
- Magnesium ribbon
- Marble chips (small).

## Observations

Students should find that there is a negligible difference in mass before and after mixing the sodium carbonate/calcium nitrate solution but there is some difference in mass in the magnesium or marble chip reaction with hydrochloric acid.

The success of this experiment depends on careful working by students and on the reliability of the balance and its proper use. Other combinations of substances could be examined and the experiment could be used as an investigation.

As an outcome of this experiment students should appreciate that matter is neither created nor destroyed in chemical reactions and that this is a very fundamental aspect of chemistry. It should also help them in balancing chemical equations!

## Note

You will need a balance that reads to 0.01 g.



## Health & Safety

Sodium carbonate,  $0.5 \text{ mol dm}^{-3} \text{ Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$  is of low hazard at this concentration.

Calcium nitrate,  $0.5 \text{ mol dm}^{-3} \text{ Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  and Hydrochloric acid,  $1 \text{ mol dm}^{-3} \text{ HCl (aq)}$ , are of low hazard.

## Credits

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*Health & safety checked May 2018*

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