

Some reactions of carbon dioxide– student sheet

Apparatus

- Student information sheet and worksheet
- Clear plastic sheet (eg ohp sheet)
- Plastic petri dish (base + lid), 9 cm
- Plastic pipette
- Scissors

Chemicals

- Solutions contained in plastic pipettes, see standard health and safety guidance here <https://rsc.li/3LNbkfo>
- Hydrochloric acid 1 mol dm⁻³
- Barium nitrate solution 0.2 mol dm⁻³
- Sodium hydroxide 0.5 mol dm⁻³
- Small marble chips

Procedure

- You must wear eye protection.
- Cover the worksheet with a clear plastic sheet.
- Place the base of the petri dish directly over the circle below. Place the reaction vessel in the centre.
- At the corners of the triangle add drops of the test solutions as indicated below (Care: barium nitrate is toxic).
- Put a small marble chip in the reaction vessel and add three drops of hydrochloric acid. Quickly replace the lid on the petri dish.
- Record all your observations over the next 15 min.
- The action of hydrochloric acid on marble chips generates carbon dioxide: $\text{CaCO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{s}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$

Question

What explanations can you give for your observations?

Health, safety and technical notes

- Students must wear suitable eye protection (Splash resistant goggles to BS EN166 3).
- Hydrochloric acid, HCl(aq), 1 mol dm⁻³, is of low hazard (see CLEAPSS HazCard [HC047a](#)).
- Sodium hydroxide, NaOH, 0.5 mol dm⁻³ is corrosive (see CLEAPSS HazCard [HC091a](#)). Reducing the concentration to 0.4 mol dm⁻³ means it is an irritant with less of a requirement for goggles.
- Barium nitrate, Ba(NO₃)₂, 0.2 mol dm⁻³ (s) is a skin/eye irritant (see CLEAPSS HazCard [HC011](#)).

