THE ROYAL SOCIETY OF CHEMISTRY

28. Which gas is which?

Time

1 h.

Curriculum links

Reactions and properties of carbon dioxide, hydrogen, oxygen, chlorine and dinitrogen oxide.

Group size

2– 4.

Materials and equipment

- lime water
- litmus paper
- spills.

Materials per group

Five test-tubes of each of the gases:

- carbon dioxide
- hydrogen
- oxygen
- chlorine
- dinitrogen oxide.

The test-tubes must be inverted and the tops must be under the level of the water.

Equipment per group

- beaker filled with water
- Bunsen burner
- heat resistant mats
- safety glasses.

Safety

Eye protection must be worn if practical work is undertaken.

Risk assessment

A risk assessment must be carried out for this activity if practical work is undertaken.

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Commentary

During trialling this was set as both a practical and a theoretical problem. Students looked up the reactions and properties of gases that they were unfamiliar with in order to solve the problem.

Swirling the test-tubes should cause one water level to rise (N_2O). Close examination should yield the yellow colour of chlorine, or a piece of litmus paper held near the bottom of the test-tube should turn red then turn colourless due to bleaching. Removal of the test-tube containing the carbon dioxide and its immersion in a beaker of lime water should give a cloudy solution. By keeping the remaining test-tubes inverted after removing them from the water there should be enough time to carry out the tests for hydrogen and oxygen.

Extension

The experiment can be modified by varying the gases in the test-tubes – *eg* by using nitrogen monoxide and nitrogen dioxide.

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28. Which gas is which?

In the beaker are test-tubes containing different gases. The gases are carbon dioxide, dinitrogen oxide, oxygen, chlorine and hydrogen.

You may remove a test-tube only once and when you do so you must identify the gas immediately.

▼ Which tube contains which gas?