SNC1D CHEMISTRY

ATOMS, ELEMENTS, & COMPOUNDS

- Chemical Tests (P.144-145)

Chemical Tests

Not only can chemical changes be used to make new substances, they can also be used to identify unknown substances. For example, a geologist can add an acid to an unknown sample of rock. If bubbles of carbon dioxide gas are formed, the rock is probably limestone. It is this property of limestone that has lead to some major problems.

Chemical Tests

*Suppose that you did an experiment in which an odourless, colourless gas was produced. How would you know what the gas was? Oxygen, hydrogen, carbon dioxide, and water vapour are all odourless, colourless gases. However, they differ in the ways they interact with other chemicals. Chemists use **chemical tests**, or distinctive reactions, to identify unknown gases or other substances.*

CHEMICAL TEST

- distinctive reaction used to identify unknown gases or other substances

Activity: Identifying Gases (B3/P.144)

INSTRUCTIONS

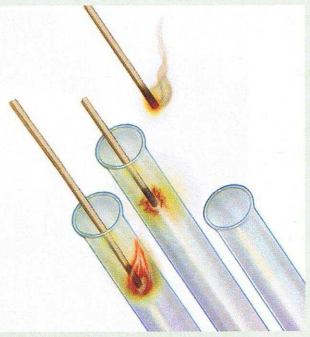
A. Read the activity "B3: Identifying Gases".
B. Follow the instructions given (i.e. procedure 1 to 16).
C. Answer the questions given (i.e. analysis 17 to 21).
D. Submit the answers only – a formal lab report is not required.

NOTE!

- In Part 1, omit "2. Add two drops of dish soap."
- In Part 1 and 2, put your thumb over the test tube and shake gently to promote the generation of a gas.
- If there is time, add "Limewater" as a test for carbon dioxide.
- Check your spelling and grammar by proofing your answers.

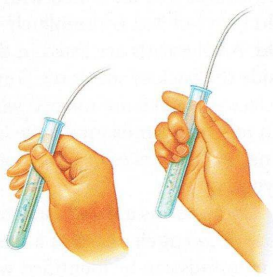
Identifying Gases – Oxygen

Oxygen gas is indicated if a glowing splint bursts into flame when placed in the gas. The more concentrated oxygen in test tube makes the combustion of the splint go faster.



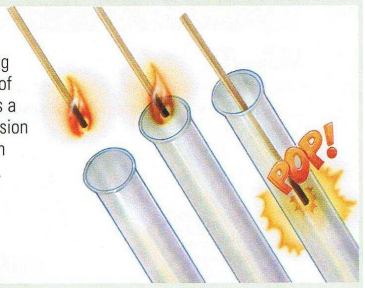
Identifying Gases – Carbon Dioxide

Carbon dioxide gas is indicated if limewater solution turns milky when the gas is bubbled into it. The limewater undergoes a chemical change to form an insoluble white precipitate. A flaming splint, held at the mouth of the tube, is extinguished.



Identifying Gases – Hydrogen

Hydrogen gas is indicated if a flaming splint at the mouth of the test tube causes a "pop"or small explosion in the gas. Hydrogen is highly flammable.



Identifying Gases

Gas Tested For	Gas Test	Positive Result
Oxygen	glowing splint	splint bursts into flames
Carbon Dioxide	flaming splint	flame goes out
	limewater	solution turns milky
Hydrogen	flaming splint	"pop" and flame goes out

✔ Check Your Learning

1. Explain why these three tests can be used to distinguish among oxygen, hydrogen, and carbon dioxide gas but not to determine whether an unknown gas is one of the three.

   because another more dangerous gas could display similar results

✔ Check Your Learning

2. How would you test for the gas produced in each of the following, and what observations would you expect to make?
   (a) A can of pop fizzes.
   (b) A nail added to a strong acid produces a combustible gas.
   (c) When potassium chlorate is heated, a gas that supports burning is produced.

   (a) carbon dioxide – flaming splint/limewater – goes out/turns milky
   (b) hydrogen – flaming splint – "pop" & goes out
   (c) oxygen – glowing splint – reignites

✔ Check Your Learning

3. (a) If you placed a glowing splint in a test tube full of a clear, colourless gas, and the glowing stopped, which of the gases discussed here is most likely present in the test?
   (b) How could you confirm the identity of this gas?

   (a) carbon dioxide
   (b) bubble the gas through limewater – if it goes milky it is most likely carbon dioxide

✔ Check Your Learning

4. Hydrogen's low density make it useful for weather balloons. Why is hydrogen not used in blimps that carry people?

   it is extremely flammable and explosive