MICRO MOLE ROCKETS

Hydrogen & Oxygen Mole Ratio

INTRODUCTION

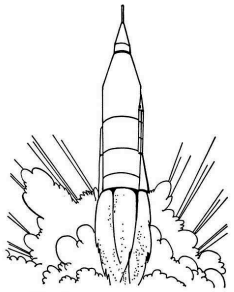
The space shuttle uses rocket fuel made from the combustion reaction of hydrogen and oxygen.

Electric cars also use the reaction of H_2 and O_2 .

YOUR EXPLORATION

Find the most powerful gas mixture of H_2 and O_2 in 7 trials.

Which mixture will make the loudest POP sound as it combusts?



SAFETY: What do you need to be safe handling these items during our lab?

Hydrochloric acid -

Open flame from a match or a BBQ lighter -

MATERIALS: Do you have all these tools and chemicals?

GENERAL MATERIALS

Goggles & hair ties

Matches or BBQ lighter

Test tube rack

6 bulbs marked into 6 equal parts (make 5 lines)

FOR MAKING H_2 –

1 each: graduated cylinder, rubber stopper, Beral-type pipette, test tube

Hydrochloric acid, 2.0 mL (HCl 3M)

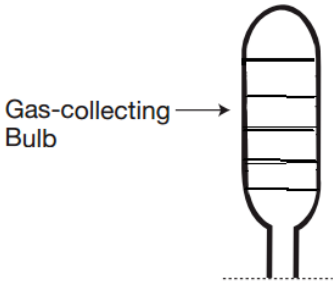
Mossy Zinc, 5g, (Zn 5g)

FOR MAKING O_2 –

1 each: graduated cylinder, rubber stopper, Beral-type pipette, test tube

Hydrogen peroxide, 2.0 mL (H_2O_2 3%)

Yeast



PROCEDURE

1. Make gas harvesting bulbs to capture your rocket fuel.
   a. Snip a plastic pipette at the bulb.
   b. Draw 5 lines to divide the bulb into 6 equal parts.
   c. Make about 5 of these bulbs.

2. Make H_2 –

Fill a bulb with water. Stop it with your finger.

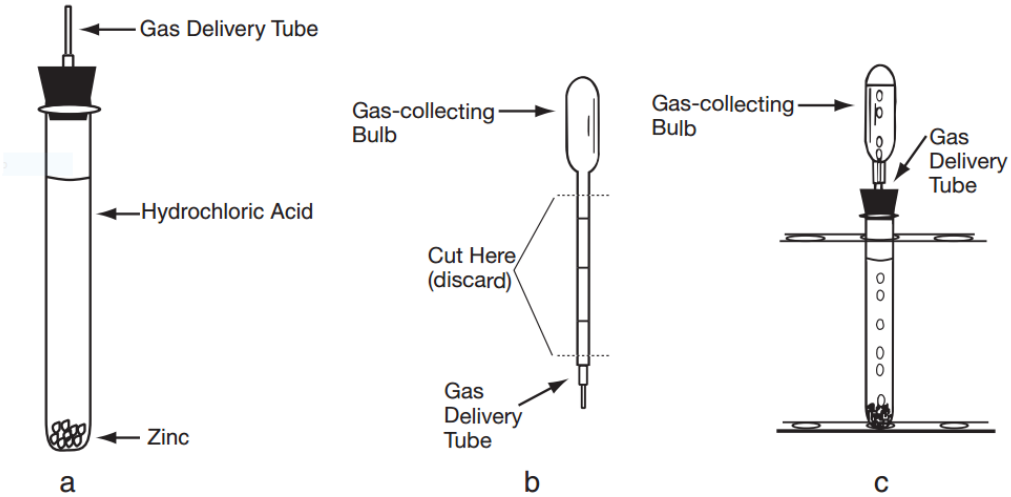
Place Mossy Zinc in bottom of test tube.

CAREFULLY add 2.0 Ml hydrochloric acid

Put on stopper with the pipette.

Slip the bulb over the pipette and capture hydrogen gas up to level of 1 line.

Remove bulb and get ready to slip it over the O_2 test tube (step 2)



3. Make O_2 --
    Place Yeast in bottom of test tube.
    CAREFULLY add 2.0 Ml hydrogen peroxide
    Put on stopper with the pipette.
    Slip the bulb over the pipette and capture oxygen gas up to fill the entire bulb.
    Remove bulb and get ready to light the bulb (step 3)
4. Light the Rocket –
    Hold the bulb securely with the opening sideways; finger over opening to prevent gas escaping.
    Light a flame and hold it under the bulb until the gas inside it combusts.
    Record the size of the combustion "pop".
    If the bulb becomes damaged, prepare another one for the next trial.

REPEAT PROCEDURE, change the ratio of H_2 and O_2 for a total of 7 trials.

Title:

Parts of H_2	**Parts of O_2**	**Loudness of "pop" (rate 1-10)**			**Average Loudness**
		trial 1	**trial 2**	**trial 3**	**add all three trials and divide by 3**
0	6				
1	5				
2	4				
3	3				
4	2				
5	1				
6	0				