

Chemistry – Unit 4 Notes

Dalton's Playhouse

In the late 18th century, Joseph Priestly, Antoine Lavoisier and others performed some critical experiments that helped Dalton develop his theories on the atomic model of matter.

The simulation at the website:

http://web.visionlearning.com/dalton_playhouse/ad_loader.html will allow you to replicate some of the key experiments these scientists performed. Answer the questions on the website and keep track of your responses on this notes sheet.

Part 1 – Priestley

| | | | |
|----------------------|------|------|---------|
| Calx | 100g | 200g | 216.59g |
| Mass of each product | | | |
| Volume of gas | | | |

1. What happened to the mass of the material in the flask as it was heated?
2. What did you note about the masses of the gas produced and the mercury metal left in the flask?
3. State the relationship between the volume of gas produced and the mass of the calx that was heated.

Part 2 – Lavoisier

You will need to record the initial and final values for oxygen and phlogiston in each of the trials order to complete the table below.

| | Burn 1/3 | Burn 2/3 | Burn all |
|------------------------|----------|----------|----------|
| Mass oxygen used | | | |
| Mass phlogiston used | | | |
| Mass of product | | | |
| Volume oxygen used | | | |
| Volume phlogiston used | | | |
| Volume of product | | | |

1. With relation to the volumes of the gases, in what specific proportion did oxygen react with phlogiston?

- How did the mass of the gas in all three vessels before burning compare to the total mass after burning?

Part 3 – Diamond and Charcoal

| | | | | |
|----------------|----------------|------------------|-----------------|-------------------|
| 0.20g diamond | Mass of oxygen | Volume of oxygen | Mass of product | Volume of product |
| initial | | | | |
| final | | | | |
| 0.40g diamond | Mass of oxygen | Volume of oxygen | Mass of product | Volume of product |
| initial | | | | |
| final | | | | |
| 0.20g charcoal | Mass of oxygen | Volume of oxygen | Mass of product | Volume of product |
| initial | | | | |
| final | | | | |
| 0.40g charcoal | Mass of oxygen | Volume of oxygen | Mass of product | Volume of product |
| initial | | | | |
| final | | | | |

- How did the mass of gas formed compare if you used the same amount of diamond and charcoal?

Concepts

- Which of the core concepts below most logically follows from the experiments you conducted in Track 1- Priestley?
 - Red calx turns into mercury when it is heated.
 - Some substances are composed of discrete amounts of two or more other substances.
 - All substances can be broken down into simpler materials by heating them.
- Which of the core concepts below most logically follows from the experiments you conducted in Track 2- Lavoisier?
 - The total mass of the products in a chemical reaction is greater than the mass of the reactants.
 - The total mass of the products in a chemical reaction is less than the mass of the reactants.
 - The total mass of the products in a chemical reaction is exactly equal to the mass of the reactants.
- Which of the core concepts below most logically follows from the experiments you conducted in Track 3- Diamond?
 - Elements combine in specific, defined ratios in chemical reactions.
 - Carbon reacts differently depending whether it is in the diamond or charcoal form.
 - Carbon can form carbon dioxide when neither air nor oxygen is present.