

Name \_\_\_\_\_

### Cellular Respiration Lab Design

**Problem:** How can you measure how much your mitochondria are working?

#### Background Knowledge:

- **Bromothymol Blue (BTB)** is an **indicator** for **acids**. This means that BTB changes from the color blue to either yellow or green when in the presence of an acid. Examples of common acids are orange juice, soda, hydrochloric acid (HCl) and sulfuric acid (H<sub>2</sub>SO<sub>4</sub>).
- Carbon dioxide (CO<sub>2</sub>) is an acid; acid rain is formed when carbon dioxide reacts with water (remember environmental science?)
- Oxygen = O<sub>2</sub>
- Water = H<sub>2</sub>O
- Glucose (sugar) = C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>
- ATP = energy
- The stuff on the **LEFT** of the arrow in a chemical reaction are called **REACTANTS**
- The stuff on the **RIGHT** of the arrow in a chemical reaction are called **PRODUCTS**
- Cellular respiration (mitochondria): C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> + O<sub>2</sub> → CO<sub>2</sub> + H<sub>2</sub>O + ATP (energy)
- Photosynthesis (chloroplasts): sunlight + CO<sub>2</sub> + H<sub>2</sub>O → C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> + O<sub>2</sub>

#### Materials Available:

- BTB
- Beakers (various sizes)
- Graduated cylinders
- Stopwatches
- Straws

#### Experimental Design:

Using the materials listed above, design and type-up an experiment which answers the problem. You must include the following:

- Hypothesis
- Independent variable (what you are changing to see its effect)
- Dependant variable (what you are measuring)
- 3 controlled variables (what should stay constant)
- Procedure
- Data
- Discussion