2-7: I can describe how cellular respiration occurs in plants and animals to provide them with energy.

Table 2: Bromothymol Blue Color Change Over Time for Pinto Bean Trial			
Time	Pre-Soaked Pinto Beans	Dry Pinto Beans	No Pinto Beans
0 min	blue	Blue	Blue
30 min	Slightly green	Blue	Blue
60 min	Light green	Blue	Blue
90 min	Light green	Blue	Blue
120 min	Light green	Blue	Blue
150 min	Light green	Blue	Blue
180 min	Light green	Blue	Blue
24 hours	Light green	Bluish green	Blue

Table 3: Bromothymol Blue Color Change Over Time for Kidney Bean Trial			
Time	Pre-Soaked Kidney Beans	Dry Kidney Beans	No Kidney Beans
0 min	Blue	Blue	Blue
30 min	Slightly green	Blue	Blue
60 min	Green	Blue	Blue
90 min	Green	Blue	Blue
120 min	Green	Blue	Blue
150 min	Green	Blue	Blue
180 min	Green	Blue	Blue
24 hours	Green	Bluish Green	Blue

Lab Questions

1.How did the color of the bromothymol blue solution in each beaker change over time in each condition (Use Table 2 and Table 3)?

Blue to green for both

2.What is the mechanism driving the bromothymol blue solution color change?

Bromothymol blue solution is an indicator that changes color in the presence of a weak acid or base. So release of carbon dioxide into water which turns into a weak acid. Therefore the cellular respiration is the driving the color change.

3.What can be inferred from the color change of the bromothymol blue solution?

CO2 gas is released

4.What evidence do you have to prove that cellular respiration occurred in the beans? Explain your answer.

Cellular respiration had to occur in the beans because the bromothymol changed color. This proves that the beans had to release either CO2, which would make a weak acidic compound or blue when it is in a basic solution.

5.What are the controls in this experiment, and what is the variable?

The control in this experiment is the beaker of Bromothymol by itself.

The different types of seeds is the variable

6. If this experiment were conducted at 0 °C, what difference would you see in the rate of respiration? Why?

The rate would be much slower at 0C because cold temperatures inhibits both the release of gas and cellular respiration. This means that the color change and release of CO2 would be much slower than at room temperature.

7.Would you expect to find CO2 in your breath? Why?

Carbon Dioxide is the results of cellular respiration and is carried to the lungs to be exchanged with oxygen, there for it is expelled during respiration and is found when you exhale.

8. Which type of bean conducted the most cellular respiration? What is your evidence?

The pre-soaked pinto beans (after 24 hours) produced the most carbon dioxide, so cellular respiration occurred the most under these conditions. The evidence is the light green color the BTB solution turned.

Key

Part II Modeling Cellular Respiration

Both plant and animal cells contain organelles called mitochondria that are the principle site for cellular respiration. In cellular respiration 1 glucose molecule combines with 6 oxygen molecules to produce 6 water molecules, 6 carbon dioxide molecules, and energy stored in ATP molecules.

1. Place Diagram 2 (animal/plant cell with mitochondria) in front of you on the desktop.
   a. The organelle that is the principal site of cellular respiration is magnified.

      What is the name of this organelle? Mitochondria

   b. What types of organisms have cells with this organelle?

      Plant + animal cells

2. Place the glucose molecule and 6 oxygen molecules that you made during Part I on the diagram of the mitochondria. Without the raw materials (reactants) for cellular respiration, plants and animals cells could not convert the energy stored in food molecules into energy of ATP and they would die. What reactants are required for cellular respiration?

   Glucose + Oxygen

3. Complete Column 1 of Table 2 by counting the number of atom models for the reactants in cellular respiration.

Table 2

	Column 1	Column 2
Atoms	**Number of Atoms in the Reactants**	**Number of Atoms in the Products**
Black carbon atoms	6	6
White hydrogen atoms	12	12
Red oxygen atoms	18	18

4. In cellular respiration, food molecules like glucose are converted through a series of chemical reactions into carbon dioxide, water, and chemical energy that is stored in ATP. **"Break"** the bonds in the glucose molecule and the 6 oxygen molecules. Using only these atoms, reassemble the atoms to make carbon dioxide and water molecules. Glue the products to one side of the mitochondria. Glue the energy pieces and ATP where they belong on the diagram as well.

Name Key
Date _____ Per ___

1. Explain how the model you made illustrates cellular respiration. Be specific! Use the amount of atoms needed to assist you.

In cellular respiration 1 glucose molecule combines w/ 6 molecules to produce 6 water molecules, 6 carbon dioxide molecules, and energy stored in ATP molecules.

2. Does the number of carbon, hydrogen, and oxygen atoms in this diagram remain constant. Explain how this is possible.

The number of atoms for each element are the same and stay constant; however, the molecules are different.

Name Key
Date _____ Per ___