Handout A: All About Mitochondria

Directions: *1. Read and highlight, 2. Circle key words, 3. Answer questions 4. Label and color diagram. Please paste this sheet on the left in your notebook and answer the questions using complete sentences on the right.*

Mitochondria are the *powerhouses* of the cell, because "BURN" or break the chemical bonds of glucose to release energy to do work in a cell. Remember that this energy originally came from the sun and was stored in chemical bonds by plants during photosynthesis. **Glucose** and other **carbohydrates** made by plants during photosynthesis are broken down by the process of **aerobic cellular respiration** (requires oxygen) in the mitochondria of the cell. This releases **energy (ATP)** for the cell. The **more active a cell** (such as a muscle cell), the more mitochondria it will have. The mitochondria are bout the size of a bacterial cell and are often peanut-shaped. Mitochondria have their **own DNA, and ribosomes** and a **double membrane** like the **nucleus and chloroplast**. The **outer membrane** is smooth, while the **inner membrane** is convoluted into folds called **cristae in order to increase the surface area**.

1. Why mitochondria are called the powerhouse of the cell?
2. What cell process occurs in the mitochondria?
3. Why do some cells have MORE mitochondria? Give an example.
4. What simple sugar is broken down in the mitochondria?
5. Where does the energy in glucose come from ORIGINALLY?
6. Where is this energy stored in glucose?
7. Why is cellular respiration an aerobic process?
8. What energy is released when the chemical bonds of glucose are broken?
9. Name two other organelles besides the mitochondria that contain DNA and have a double membrane.
10. Describe the outer membrane of the mitochondria.
11. Why is the inner mitochondrial membrane folded?
12. What are the folds called?

Directions: **Figure 1** follow what it says to do with labeling and color.
Color the **outer membrane** *brown* and ***label***. Color the **inner membrane space**, **(IMS)** *yellow* and ***label.*** Color the **inner membrane** *pink* and ***label.*** Circle the **cristae** with *green, and* then ***label.*** **Cristae** greatly increase the surface area of the membrane so that carbohydrates (simple sugars) can combine with oxygen to produce ATP, *adenosine triphosphate* (the energy molecule of the cell). The electron transport chain, ETC takes place across the membranes of the **cristae** (**crista**, singular). The **cristae** are the inside the folds the **cristae.** The space inside the critae is a space called the **matrix** that contains enzymes needed for the Krebs's Cycle. Color the **matrix** *blue* and ***label.***

FIGURE 1 - MITOCHONDRIA