**Problem**: How is energy transferred and transformed in living systems?

**Background:**  Living organisms display the property of **metabolism**, which is a general term to describe the processes carried out to acquire and use energy. We know that people need to eat, and in our foods are various kinds of nutrients that our cells use. One large group of nutrients in our foods is carbohydrates, which supply our cells with glucose (C6H12O6). So the question is: How does the food we chew and swallow fuel our cells?. [**NGSS**: HS-LS1-7]

***Directions:*** Use *Model 1* – *Glycolysis* to answer the following questions.

 1. What is represented by the hexagon? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. How many carbon atoms (C) are in one molecule of glucose? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What is represented by the triangles? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What is this

 compound also known as (hint: what did we call it in class?) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. How many carbon atoms (C) are in one molecule of pyruvic acid ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. In the process of glycolysis, what happens to glucose after it crosses the cell membrane into the

 cytoplasm of the cell? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Read This Aloud!**

Glycolysis occurs in the cytoplasm of cells and does not require the presence of oxygen. Therefore, the process is **anaerobic**. It is the first step used by cells to extract energy from glucose in the form of ATP. ATP can be directly used by cells.

6. Thinking about the number of carbon atoms in glucose and in pyruvic acid, explain why there is one molecule of glucose on the left side of the arrow and two molecules of pyruvic acid on the right

 side of the arrow. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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7. How many ATP molecules are produced during glycolysis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Hydrogen-carrying molecules are also produced during glycolysis. What is the symbol of these

 hydrogen-carrying molecules? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Does glycolysis occur inside or outside the mitochondria?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Putting it all together**

10. With your partner, choose an appropriate graphic organizer to visualize the process of glycolysis.