

Modeling Cellular Respiration: How Can Cells Extract the Energy Stored in Glucose?

This activity is designed to help you understand:

1. The roles these play in Cellular Respiration: glycolysis, fermentation, electron transport chain, and the Krebs cycle.
2. The net products and reactants of cellular respiration.
3. The vocabulary of chapter 9

Using your textbook, lecture notes, and the materials available in class, model cellular respiration as it occurs in a cell.

Your model should be a dynamic (working or active) representation of the events that occur in the various phases of cellular respiration.

Building the Model

- Use chalk on a tabletop or a marker on a large sheet of paper to draw the mitochondrion.
- Use Playdough, beads, or anything else to represent the molecules, ions, and membrane molecules.
- Use the pieces you assembled to model the processes involved in cellular respiration. Develop a dynamic (moveable) model that allows you to manipulate or move glucose and its breakdown products through the various steps of the process.
- When your group has developed a good working model, demonstrate and explain it to another student group and/or to your instructor.

Your model of cellular respiration should include what occurs during glycolysis, fermentation and in the reactions of cellular respiration (Krebs cycle and electron transport chain). Be sure your model includes and explains the roles of the following:

NAD ⁺	ATP	oxygen	electrons
NADH	water	glucose	pyruvic acid

Also indicate where in the cell each item is required or produced (outside mitochondrion, inside mitochondrion)

Use your model and the information in your text to answer the questions below.

1.

a. Where does glycolysis occur?	
b. Where does the Krebs cycle occur?	
c. Where does the Electron transport chain occur ?	

2.

a. How many ATP (net) are produced by glycolysis?	b. How many ATP are produced by the electron transport chain (ETC)?	c. How many ATP are produced by the Krebs cycle?

3.

Are the compounds listed here “ <i>used</i> ”, “ <i>produced</i> ”, or “ <i>not present</i> ” in:	Glycolysis	Krebs cycle	Electron Transport Chain
Glucose			
O ₂			
CO ₂			
H ₂ O			
ATP			
Pyruvic acid			
NADH			
NAD ⁺			