

CELL ENERGY TRADING CARD PROJECT

Objectives: To better understand the structure of the organelles involved in the reactions that make up photosynthesis and respiration. As well as an in-depth look at the reactants and products of both processes. When making these trading cards your focus should be on understanding the flow of energy from sunlight to glucose to ATP formation. Another focus will be on enzymes structure and function in metabolism.

Materials:

- Colored pencils
- Scissors
- Notes for most information on the cards
- Textbook for **diagrams only**.
- Trading card templates (9 total cards)
 - o **7 Reaction Cards:** Glycolysis, Light Reactions, Electron Transport Chain, Krebs Cycle, Calvin Cycle, Lactic Acid Fermentation, Alcohol Fermentation
 - o **1 All-StarT Card:** Enzymes
 - o **1 Dynamite Card:** ATP

Directions: You will be creating a trading card for each of the 7 reactions listed above involved with photosynthesis and respiration as well as one for enzymes and 1 for ATP. You will be drawing and coloring a picture of the organelle showing the location of the reaction. Below is a breakdown of how to fill in each of the information lines on the cards.

- 7 Reactions Cards

- o **Name:** Write the name of the reaction.
- o **Picture Box:** Drawing of entire organelle where the reaction takes place and label the place where the reaction takes place. (ex. thylakoid membranes would be labeled inside a chloroplast) It should also be colored.
- o **Team:** Write which reaction it is a part of; Photosynthesis or Respiration
- o **Bats:** Place reaction happens; plant cell, animal cell, both plant and animal (switch hitter), or bacteria/yeast (pinch hitter)
- o **Position:** Write the location of the reaction, be very specific.
- o **Stats:** Write what molecules are the reactants and products for the reaction.
 - **Hits:** Reactants (include # used & there may be more than 1 molecule)
 - **RBI:** Products (include # made & there may be more than 1 molecule)
- o **Player History:** Brief written description of the reaction.

- Enzyme Card: (All-StarT King)

- o **Picture Box:** Labeled drawing of a typical enzyme reaction. It should also be colored
- o **Team:** Explain how enzymes speed up reactions.
- o **Bats:** Explain what optimum range means in relation to enzymes.
- o **Position:** Explain what the lock key-model of enzymes.
- o **Stats:** Factors that effect enzyme reaction rate.
 - **Walks:** List of factors that effect enzyme reaction rate.
 - **Strikeouts:** Explain what happens when those factors slow or stop enzyme reactions.
- o **Player History:** Brief written description of a typical enzyme reaction.

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- **ATP Card:** (Dynamite Card)
 - **Picture Box:** Labeled drawing of an ATP molecule. Parts include adenosine and phosphate groups. It should also be colored.
 - **Team:** Explain why ATP is important to life.
 - **Bats:** Explain how ATP releases energy.
 - **Position:** What organelle produces the most ATP?
 - **Stats:** The # of ATP molecules made by each reaction of cell respiration.
 - **Hits:** Glycolysis
 - **Walks:** Krebs Cycle
 - **HRs:** Electron Transport Chain
 - **Player History:** Compare and contrast aerobic respiration and lactic acid fermentation.

Grading Rubric

- **Reaction Cards:** 10 pts. each
 - **Name:** Name of reaction written: 1 pt
 - **Picture Box:** Correct picture drawn, labeled, and colored: 1 pt.
 - **Team:** Correctly labeled photosynthesis or cell respiration: 1 pt.
 - **Bats:** Correctly names type of cell(s) that the reaction takes place in: 1 pt.
 - **Position:** Correctly names place of the reaction: 1 pt.
 - **Stats:** 2 total pts
 - **Hits:** Correctly names all reactants with correct number used: 1 pt
 - **RBI:** Correctly names all products with correct number made: 1 pt
 - **Player History:** 3 total pts
 - Correctly names reactants and number used: 1 pt
 - Correctly name products and number made: 1 pt
 - Correctly describes what powers the reaction: 1 pt
- **Enzyme Card:** 10 points
 - **Picture Box:** Correctly drawn, labeled, and colored: 1 pt.
 - **Team:** Correct explanation of how enzymes speed up reactions.: 2 pts
 - **Bats:** Correct explanation of what optimum range means in relation to enzymes. 1 pt
 - **Position:** Explain what the lock key-model of enzymes.: 1 pt
 - **Stats:** 3 points total
 - **Walks:** Correct list of factors that effect enzyme reaction rate.: 1 pt
 - **Strikeouts:** Correct explanation of what happens when those factors slow or stop enzyme reactions. 2 pt.
 - **Player History:** Correct written description of a typical enzyme reaction.: 2pts
- **ATP Card:** 10 points
 - **Picture Box:** Correct drawing of ATP, labeled and colored. 1 pt
 - **Team:** Correct explanation of why ATP is important to life. 1 pt
 - **Bats:** Correct explanation how ATP releases energy. ½ pt
 - **Position:** Named correct organelle that produces the most ATP. ½ pt
 - **Stats:** Correct # of ATP molecules made: 3 pts total
 - **Hits:** Glycolysis: 1pt
 - **Walks:** Krebs Cycle: 1pt
 - **HRs:** Electron Transport Chain: 1 pt
 - **Player History:** Correctly lists 2 similarities and 2 differences between aerobic respiration and lactic acid fermentation: 4 pts
- **Neatness and Grammar:** 10 points
- **Overall project is out of 100 points**