

Study Guide: Unit 3 Test

HONORS BIOLOGY: CELL ENERGY

Directions: The list below identifies topics, terms, and concepts that will be addressed on your Unit 2 Test. This list should help you focus your review. This is not a homework assignment you will turn into me.

Energy

- What is energy?
- Forms of energy
 - Kinetic energy
 - Potential energy
 - Chemical potential energy
 - Where is energy stored in molecules?
 - Gravitational potential energy
- Law of Conservation of Energy (examples of conversions of energy)

Chemical Energy and ATP

- What is ATP used for?
- Where is energy stored in ATP?
- How is energy released from ATP?
- Most important energy sources (types of organic compounds)
- Structure of ATP
 - 3 parts
 - Importance of Phosphate groups
- What is ADP
- Describe cycle: $ATP \rightarrow ADP \rightarrow ATP$
 - What provides the energy to put add phosphate back onto ADP producing ATP
- Energy available from different organic compounds
 - What is a calorie?
 - What is a Calorie?
- Autotrophs/producers
- Heterotrophs/consumers
- Chemosynthesis
 - Where is it found?
 - Molecules involved (reactants and products)

Photosynthesis

- Definition of photosynthesis
- Overall equation for photosynthesis
- Electromagnetic spectrum
 - Colors of white (visible) light (ROYGBIV)
- Chloroplasts
 - Chlorophyll (a and b)
 - Accessory pigments
 - Colors absorbed by chlorophyll and reflected
 - Grana
 - Thylakoids
 - Stroma
 - Importance of membranes (What reactions take place here?)
- Stages of Photosynthesis
 - **Light Dependent Reaction**
 - What powers LD reaction
 - Photosystem I and II
 - Light absorbing molecules
 - Electron transport chain

- Importance of H⁺ ions, electrons and Oxygen (from breakdown of H₂O)
 - Where does it occur
 - Energy molecules produced (ATP and NADPH)
 - ATP Synthase (what does it produce and what powers it?)
 - Reactants and Products
 - Energy molecules (Importance to Light Independent Reaction)
 - H₂O → O₂
- **Light Independent Reaction**
 - What powers LI reaction (name energy molecules and where they were produced?)
 - Where does it occur?
 - Reactants and products
 - CO₂ → C₆H₁₂O₆
 - Energy molecules converted (ADP and NADP⁺)
- Functions of photosynthesis
 - Base of food chain (sugars and polysaccharides)
 - Regulation of Earth's atmosphere (carbon and oxygen cycles)

Leaf structure and function

- Epidermis and cuticle (function and location)
- Guard cells and stoma (function and location)
- Palisade and Spongy Mesophyll (function and location)
- Veins (function and location)

Cellular Respiration

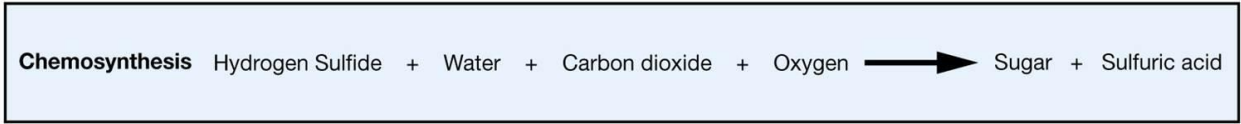
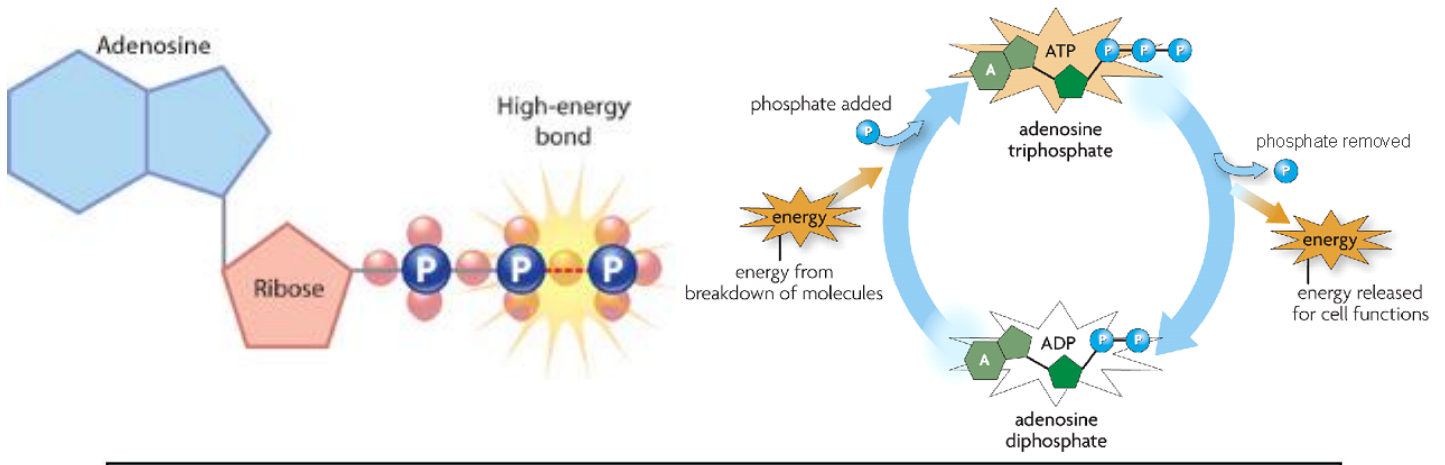
- Mitochondria
- Overall equation (reactants and products) and total 36 ATP produced
- **Glycolysis** (reactants and products)
 - Anaerobic
 - Net ATP production
 - Uses 2 ATP → produces 4 ATP = 2 net ATP produced
 - Location of glycolysis
- **Krebs cycle**
 - Location
 - Starting molecule C₆H₁₂O₆ first transformed into pyruvate in glycolysis
 - Pyruvate → CO₂
 - Energy molecules produced (NADH, ATP, FADH₂)
 - 2 molecules ATP produced
- **Electron Transport Chain**
 - Source of energy
 - Location it takes place
 - O₂ → H₂O (what is the importance of oxygen)
 - 32 molecules of ATP produced

Fermentation

- Allows glycolysis to continue (recycle NAD⁺ to NADH)
- Purpose of fermentation (when does it occur and why)
 - 0 ATP produced by fermentation
 - 2 ATP produced by glycolysis
- 2 types
 - Lactic Acid fermentation (reactants and products)
 - Where and when is it utilized
 - Alcoholic fermentation (reactants and products)
 - Where and when is it utilized

Energy and Exercise

- Quick energy (source and amount)
- Long term energy (source and amount)



PHOTOSYNTHESIS

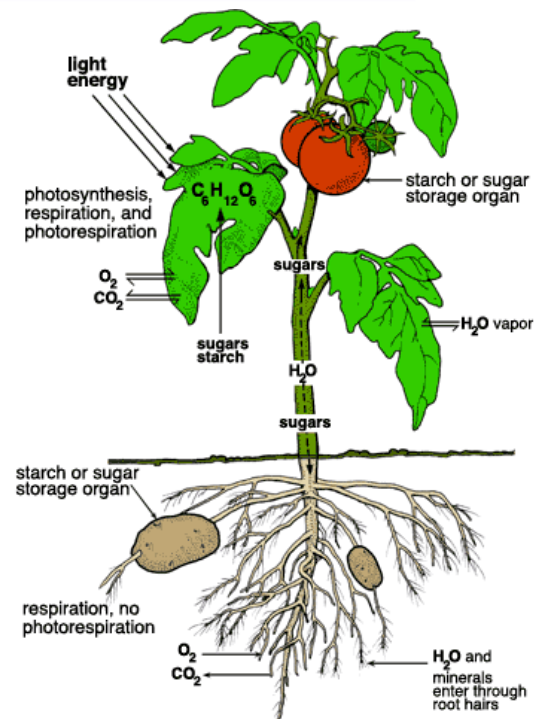
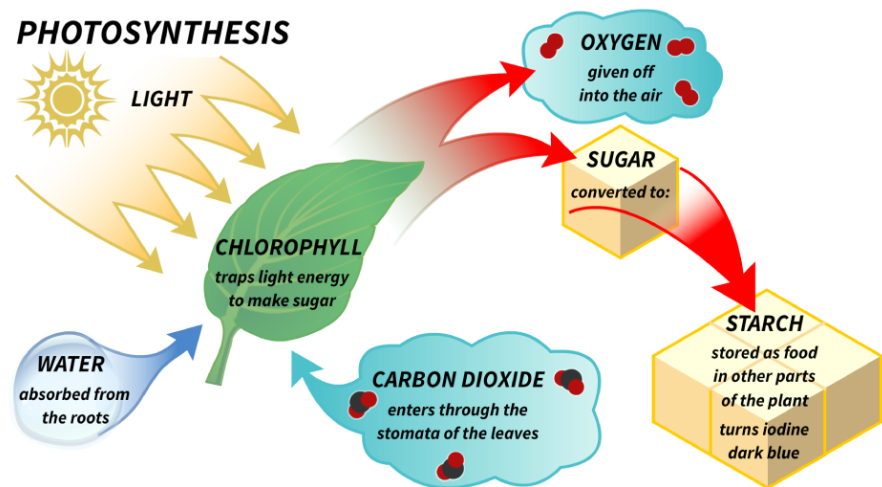


Figure 24. Photosynthesis, respiration, leaf water exchange, and translocation of sugar (photosynthate) in a plant.

