

Concepts of Biology

Guided Reading Notes

Chapter 5

1 Life's Energy Comes from the Sun

- **Photosynthesis** converts the _____ of the sun into that of _____.

2 Living Things Transform Energy

5.1 Energy makes things happen

- Energy is the _____ to do _____.
- The five form of energy are:
 - ✓
 - ✓
 - ✓
 - ✓
 - ✓
- Potential energy is _____ while **kinetic energy** is _____ in _____.
- A _____ is the amount of heat need to raise the temperature of _____ of water by _____ Celsius.

5.2 Two laws apply to energy and its use

- First Law of thermodynamics: _____

- Second Law of thermodynamics: _____

5.3 Cellular work is powered by ATP

- When ATP breaks down to ADP+ P, _____ is released.
(Draw the diagram of this reaction found on p. 91)

- Continual _____ and _____ of ATP is called the **ATP cycle**.
- An **Exergonic Reaction** _____ energy
- An **Endergonic Reaction** requires _____ to occur.

5.4 ATP breakdown is coupled to energy-requiring reactions

- Reactions are coupled when an _____ drives an _____.

3 Enzymes Speed Chemical Reactions

5.5 Enzymes speed reactions by lowering activation barriers

- Enzymes bring reactants together effectively at body temperature because _____

5.6 An enzyme's active site is where the reaction takes place

- The reactants in an _____ are called the **substrate**.
- The active site is a small _____ of the _____ that binds with the _____ forming an **enzyme-substrate complex**.
- According to the **induced fit model**, the _____ of the _____ changes slightly to accommodate the _____.
- _____ sometime actively participate in _____.

5.7 Enzyme speed is affected by local conditions

- Enzyme activity increases as _____ increases until all _____ have been filled.
- As temperature rises, _____ increases until the _____ gets too high. The enzyme is _____, and _____ levels off and declines.
- Each enzyme has an optimal pH and may require _____ or _____ for optimal reaction.
- Vitamins are required for _____ and _____.

5.8 Enzymes can be inhibited noncompetitively and competitively

- **Enzyme inhibition** occurs when _____.
- In **noncompetitive inhibition**, the inhibitor _____.
- In **competitive inhibition**, an inhibitor _____.

5.9 Enzyme inhibitors can spell death

- Examples of enzyme inhibitors are:
 - ✓
 - ✓
 - ✓(used as rat poison).

4 The Plasma Membrane Has Many and Various Functions

5.10 The plasma membrane is a phospholipid bilayer with embedded proteins

- Proteins form a mosaic pattern in the _____ of the plasma membrane.
- Cholesterol is a _____ found in animal _____.
- Phospholipids and proteins with attached _____ are called _____ and _____ respectively.
(Draw the diagram of the Plasma Membrane found on p. 92)

5.11 Proteins in the plasma membrane have numerous functions

- _____ allow passage of molecules and _____.
- **Cell recognition proteins** are _____ that help the body recognize _____.
- **Receptor proteins** bind _____.
- _____ carry out metabolic reactions.
- _____ assist cell-to-cell _____.

5.12 Malfunctioning plasma membrane proteins can cause human diseases

- _____, _____, and _____ are caused by abnormal plasma membrane proteins.

5 The Plasma Membrane Regulates the Passage of Molecules Into and Out of Cells

5.13 Simple diffusion across a membrane requires no energy

- In **simple diffusion**, _____ in a solution move down a _____ until equally distributed.
- A _____ contains a _____ (usually a solid) and a _____ (usually a liquid).

5.14 Facilitated diffusion requires a carrier protein but no energy

- _____ facilitate the diffusion of _____ substances across a _____ membrane (e.g., plasma membrane).
- _____ move down their concentration gradient.

5.15 Osmosis can affect the size and shape of cells

- **Osmosis** is _____ of water across a _____ (e.g., plasma membrane).
- Cells placed in an _____ solution neither gain nor lose _____.
- _____ placed in a **hypotonic** solution lose _____.
- Expansion of a cell due to gain of water in a hypotonic solution is called _____. Shrinking of a cell due to loss of water in a hypotonic solution is called _____.

5.16 Active transport requires a carrier protein and energy

- During active transport, a substance moves _____ its _____ gradient.
- Protein Carriers involved in active transport are called _____. (e.g. sodium-potassium pump).

5.17 Bulk transport involves the use of vesicles

- In **endocytosis** vesicles transport substances _____.
 - ✓ **Phagocytosis**: amoeboid cells _____.
 - ✓ **Pinocytosis**: vesicles form _____.
 - ✓ **Receptor-mediated endocytosis** is selective and _____ than _____.
- In **exocytosis**, vesicles _____ (e.g. digestive enzymes, hormones) _____.

