ENZYME UNIT

Enduring Understandings

- All living things are the outcome of many chemical reactions happening every second of their lives.
- These chemical reactions occur between and among very stable molecules that don't react easily or quickly.
- All living things depend on enzymes that act as catalysts to speed up these reactions.
- Enzymes are protein molecules whose shape (structure) is critical to their function.
- Various environmental factors can damage the functional shape of enzymes rendering them useless possibly with catastrophic results for living things.

Essential Questions

- Why are enzymes required for life?
- How do enzymes cause stable molecules to react?
- How does the environment affect these enzymes?

Targets

1. **Vocabulary:** energy, metabolism, endothermic, exothermic, chemical reaction, reactant, product, amino acid, protein, enzyme, substrate, active site, rate, hydrogen peroxide, catalase, oxygen, pH, temperature, denature.
2. Know the characteristics of both exergonic and endergonic reactions. Describe the energy level of the reactants compared to the products for both. Know which reaction is energetically favorable. Know which reaction is spontaneous. Know which reaction needs activation energy to begin and which needs a continuous input of energy. Be able to draw and/or label the graphs of these reactions including axes, activation energy, energy given off and energy input where applicable.
3. Define an enzyme and know how it speeds up a reaction. Know the specifics of both the lock and key model and the induced fit model.
4. Know the relationship between activation energy and the speed of the reaction. Know how stability/strength of bonds influences the activation energy.
5. Understand the relationship between enzyme structure and function.
6. Be able to discuss the effects of environmental changes on reaction rate and production of products.
7. Be able to discuss how the presence of enzymes and in all living things and their function provides evidence of the relatedness of living things in the world.