Unit 2: Chemistry of Life

Content Area: **Template**
Course(s):
Time Period:
Length:
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Unit 2: Chemistry of Life

Learning Objectives

- How do chemicals combine and break apart inside living things?
- How do organisms use different types of carbon compounds?
- How does structure relate to function in living systems?
- What is the matter in organisms made of?
- Why are the properties of water important to organisms?

Essential Skills

- Analyze and explain how cells carry out a variety of chemical transformations that allow conversion of energy from one form to another, the breakdown of molecules into smaller units, and the building of larger molecules from smaller ones
- Create a model of the four major categories of organic molecules (carbohydrates, fats, proteins, and nucleic acids) using unique characteristics and primary functions
- Demonstrate that the activities of enzymes are affected by the temperature, ionic conditions, and the pH of the surroundings
- Determine why each major category of organic molecule is essential to life
- Explain how molecules are used to assemble larger molecules with biological activity (including proteins, DNA, sugars and fats)
- Identify enzymes as proteins, and determine how they catalyze biochemical reactions
- Identify the six elements most common to biological organisms: carbon, hydrogen, oxygen, nitrogen, phosphorous and sulfur
- Recognize that food molecules are taken into cells and react to provide the chemical constituents needed to synthesize other molecules, and knowing that the breakdown and synthesis are made possible by enzymes

- Recognize that most chemical transformations are made possible by protein catalysts called enzymes

Standards

9-12.HS-LS2-5	Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
9-12.HS-LS1-6	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Instructional Tasks/Activities

- "Toothpickase" Lab Activity: students use their hands to demonstrate the effect of enzymes on a reaction
- 3D models: students create various organic molecules using kits
- Acid/Base Food Lab: students hypothesize then identify pH of everyday foods
- Affect of CO2 (breath) on Bromythymol blue Solution: students hypothesize then observe the effect of CO2 on solution
- Atomic Structure: students determine from periodic table (proton, neutron, electron, energy levels) using candy/ beads/ beans/ coins
- Chapter tests
- Enzyme-simulation with Amlyase
- H2Olympics Lab: students demonstrate and identify properties of water (cohesion, adhesion, capillary action)
- Identify physical vs. chemical change and mixture vs. solution: students identify whether a chemical or physical change had occurred in various stations
- pH Laboratory Experiment (Pasco): students use sensors to identify pH of various solutions then identify if it's an acid or base
- Review game
- Vocabulary Quizzes

Assessment Procedure

- Assemble protons, neutrons, electrons of individual atoms using manipulatives (candy, beads, etc.) as a group & individually
- Assemble structures of molecules in 3 dimensions using kits
- Classroom Total Participation Technique
- Classwork
- DBQ
- Draw structures of atoms using periodic table (individually & using smartboard)
- Drop in the Bucket Demo (compares total amount of water on Earth compared to actual amount of drinkable freshwater)

- Effect of Enzyme – demo (time one at normal speed and one with enzyme)
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Foldables – organization of material (atomic structure, chemical vs. physical changes, properties of water)
- Group discussion
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- POGIL Macromolecules
- PowerPoint presentation of material
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Think, pair, share (read assigned section of text individually, discuss with a partner, present material in pairs to class – use PowerPoint as a reference)
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz

- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load

- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

N/A

Resources

- Resource 1
- Resource 2
- Resource 3
- Resource 4
- Resource 5