

Biology:

- Intro to Biology
- Chemistry of Life



“Biology will relate every human gene to the genes of other animals and bacteria, to this great chain of being” -Walter Gilbert

Essential Understanding:

Intro to Life

- Design and conduct different types of biological investigations
- Explain through analysis and correctness of scientific investigations
- Communicate and defend my investigations using evidence and connections
- Use laboratory equipment to conduct and improve scientific investigations?
- Use the SI system and graphs to communicate data
- Describe the criteria that are used to consider an organism as living
- Define and provide examples of levels of biological organization

Chemistry of Life

- Identify and describe how subatomic particles are arranged in atoms
- Describe the difference in ions and atoms and their importance in biological processes
- Compare the types of bonding between atoms to form molecules
- Explain the fundamental principles of the pH scale and the consequences of having the different concentrations of H⁺ and OH⁻
- Explain the unique properties of water that are essential to living organisms?
- Show how chemical reactions can be represented by chemical formulas
- Explain the difference between organic and inorganic compounds
- Describe the general structure and function of major groups of organic compounds
- Describe the function of enzymes, including how enzyme-substrate specificity works, in biochemical reactions

Overview

The unit reviews the scientific method and problem solving. We will address biochemistry, covering topics that include polarity of water, macromolecules, and enzymes.

Guiding question 1: How will I use the scientific method to complete laboratory activities and identify the differences between living and non-living?

Lessons

- _____ Week 1: Welcome to Biology (08/31)
- _____ Week 2: The Science of Biology (09/07)
- _____ Week 3: Elements and atoms (09/14)
- _____ Week 4: Electron shells and orbitals (09/18)
- _____ Week 5: Chemical Bonds and reactions (09/25)

Individual Work

_____ Read the overview with your color group and mark it up with questions or comments. (08/31)

Read Khan Academy:

_____ Week 1: Welcome to Biology (08/31)

- Preparing to study biology
- What is life

_____ Week 2: The Science of Biology (09/07)

- The scientific method
- Controlled experiments

_____ Week 3: Elements and atoms (09/14)

- Matter, element, and atoms
- Atomic number, atomic mass, and isotopes

_____ Week 4: Electron shells and orbitals (09/21)

- The periodic table, electron shells, and orbitals

_____ Week 5: Chemical Bonds and reactions (09/28)

- Chemical bonds
- Chemical reactions

_____ Make Mind Map for Guiding Question - weekly

_____ Make vocabulary cards for the vocabulary in your Vocabulary List. – (10/05)

_____ Reflect on the answer to Guiding Question 1. Update your mind map with the group presentation. (10/05)

Group work/Lab work

- ___ Lab1: Scientific method lab using bubble gum (09/07)
- ___ Lab 2: The chemistry of life (10/02)

Labs will be done in groups of 4 or 5.

Lab Handouts: There will be a pre-lab for students to complete before the lab experiment, during the lab the students will gather the necessary data to complete the lab and answer the questions associated with the topic. After the necessary data is collected students will work on completing their lab notebook.

Lab Notebook: Every student is required to keep a lab notebook. The lab notebook will be each student's personal "copy". You will receive specific instructions on the lab notebook requirements.

This notebook will be graded on proper usage and completeness. *The lab notebook will be checked once a unit on the day of the assessment.*

Formal Laboratory Report: Each quarter students will put together a formally written laboratory report. This laboratory report is done individually (plagiarisms is not allowed). The report must be typed and include; Title, Purpose, Procedure, Materials, Observations, Data, Results, Conclusion and Citations.

Assessment

- ___ Group Assessment (09/28)
- ___ Individual assessment (10/05)

Extension/Honors

- Create a 3D model of an element (10/02)

Vocabulary List

Intro to Biology: analyzing, data, control, independent variable, dependent variables, hypothesis, inferring, theory, law, observation, modeling, research bias, inquiry, accuracy, light microscope and parts, transmission and Scanning electron microscope, metrics, biology, homeostasis, metabolism, reproduction, stimulus.

Chemistry of Life: elements, compounds, cells, tissue, organ, organ system, organism, atoms, protons, electrons, neutrons, proteins, amino acids, pH, lipids, carbon, carbohydrates, acids, bases, peptide bonds, covalent bonds, ionic bonds, mixtures, solutions, monosaccharide, disaccharide, polysaccharide, glucose, fructose, sucrose, starch, nucleic acids, monomer, polymer, activation meeting.