Scope and Sequence – Biology: 1st Quarter

**From ADE:**

## Purpose of the Arizona Science Standards

The Arizona Science Standards present a vision of what it means to be scientifically literate, and college and career ready. These standards outline what all students need to know, understand, and be able to do by the end of high school and reflect the following shifts for science education:

* Organize standards around thirteen core ideas and develop learning progressions to coherently and logically build scientific literacy from kindergarten through high school.
* Connect **core ideas**, **crosscutting concepts**, and **science and engineering practices**, to make sense of the natural world and understand how science and engineering are practiced and experienced.
* Focus on fewer, broader standards that allow for greater depth, more connections, deeper understanding, and more applications of content.

**Subject:** Environmental Science **Content:** Science **Unit**: Introduction to Biology

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| **Time** | **AZ Standard** | **Vocabulary** | **Learning Goal** | **Essential Questions** | **Assessments/Notes** |
| 2 weeks |  | Biosphere  Biodiversity  Species  Biology  Organism  Cell  Metabolism  DNA  System  Ecosystem  Homeostasis  Evolution  Adaptation  Observation  Data  Hypothesis  Experiment  Independent variable  Dependent variable  Constant  Theory  Microscope  Gene  Genomics  Molecular genetics | Students will be introduced to the study of life, which is biology and unify themes that connects concepts to the field of biology. They will also analyze how science is a way of thinking, questioning, and gathering evidence. Later they will investigate changes in the way biologists work and prove that by understanding biology it can lead to making informed decisions. | How are species related to the concept of biodiversity?  How do the characteristics of living things contribute to an organism’s survival?  What is a biological system?  How is an organism’s structure related to its function?  How is homeostasis essential for all living things?  What is the relationship between adaptation and natural selection?  What role does hypotheses play in scientific inquiry?  What is the difference between independent and dependent variables?  How do light microscopes differ from electron microscope?  Why is computer modeling used in biological studies  How does molecular genetics add to our understanding of genetics? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques |
| 2 weeks |  | Atom  Element  Compound  Ion  Ionic Bond  Covalent bond  Molecule  Hydrogen bond  Cohesion  Adhesion  Solution  Solvent  Solute  Acid  Base  pH  Monomer  Polymer  Carbohydrate  Lipid  Fatty acid  Protein  Amino Acid  Nucleic Acid  Chemical Reaction  Reactant  Product  Bond Energy  Equilibrium  Activation Energy  Exothermic  Endothermic  Catalyst  Enzyme  Substrate | Students will describe how all living things are made up of atoms and analyze how atoms interact. They will also prove the unique properties of water which allowed for life to exist on Earth. Also investigate that all life forms on earth are made up carbon based molecules. Finally summarize the dependence that life has on chemical reaction and connect that idea to the chemical reactions of enzymes which are catalysts in all living things. | How is one element different from another?  Describe the formation of an ionic compound.  What is the difference between ab ionic bond and covalent bond?  How do polar molecules form hydrogen bonds?  What determines if a compound can dissolve in water?  How do polar molecules differ from non-polar molecules?  How does this difference affect their interactions?  What is the relationship between a polymer and monomer?  How are nucleic acids and proteins polymers?  How are carbohydrates and lipid similar and different?  Hydrogen peroxide breaks down into oxygen and water, how is it a chemical reaction and what are its products and reactants?  How do endothermic and exothermic reactions differ?  How does a catalyst affect the activation energy of a chemical reaction?  How does the interaction between an enzyme and its substrate change a chemical reaction? |  |

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| 2 weeks | **Essential HS.L1U1.20 Ask questions and/or make predictions** based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis. | Cell theory  Cytoplasm  Organelle  Prokaryotic Cell  Eukaryotic Cell  Cytoskeleton  Nucleus  Endoplasmic Reticulum  Ribosome  Golgi Apparatus  Vesicle  Mitochondria  Vacuole  Lysosome  Centriole  Cell Wall  Chloroplast  Cell membrane  Phospholipid  Fluid Mosaic Model  Selective Permeability  Receptor  Passive Transport  Diffusion  Concentration gradient  Osmosis  Isotonic  Hypertonic  Hypotonic  Facilitated diffusion  Active transport  Endocytosis  Phagocytosis  Exocytosis | Students will be able to prove that cell are the basic unit of life. They will also connect all eukaryotic cells by showing that they have similar organelles that have the same function. They will identify homeostasis, formulate factors that could affect homeostasis, and finally conclude by summarizing how organelle function contributes to homeostasis. | According to cell theory, what is required for an object to be considered alive?  What role do membranes play in prokaryotic and eukaryotic cells?  How do the cytoskeleton and cytoplasm contribute to the cell’s shape?  Where are proteins made, modified, and packaged in the cell?  Explain what mitochondria do in the cell?  How would you determine if a cell was a plant or animal cell?  How is the lipid bilayer related to the watery environment around them and the watery cytosplasm inside them?  How are cells able to respond to signal molecules to diffuse across the membrane?  How do transport proteins make it easier to for certain molecules to diffuse across a membrane?  Under what conditions would a molecule need to be to actively transported across a membrane?  Can endo and exocytosis occur in the same cell and why? |  |
| **Unit Test** | | | | | |

Scope and Sequence Environmental Science-2nd Quarter

Subject: Environmental Science Content: Science Unit: Ecology

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| **Time** | **AZ Stnadard** | **Vocabulary** | **Learning Goal** | **Essential Questions** | **Assessments/Notes** |
| 4 days |  | * Ecosystem * Biotic Factor * Abiotic Factor * Organism * Species * Population * Community * Habitat | Students will be introduced to the different components that makeup an ecosystem and how populations and communities are structured into ecosystems. | 1. What are the biotic and abiotic factors in a given figure? 2. Give an example of a population 3. What factors are not apart of an ecosystem? 4. Explain the difference between a population and community? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge |
| **Unit Test** | | | | | |

Scope and Sequence- Environmental Science-3rd Quarter

Arizona HS Science standards from Strand 1 (Inquiry Process), Strand 2 (History and Nature of Science) and Strand 3 (Science in Personal and Social Perspective) as well as the AZ Common Core Science Literacy Standards will be taught throughout the year through reading informational texts, through laboratory activities including designing labs and writing lab reports and through direct instruction. They are not mentioned in the below scope and sequence unless that standard is at the main focus of the lesson taught.

NGSS Coming Soon…

Subject: Environmental Science Content: Science Unit: Populations and Water, Air, and Land

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| **Time** | **AZ Stnadard** | **Vocabulary** | **Learning Goal** | **Essential Questions** | **Assessments/Notes** |
| 4 days |  | * Population * Density * Dispersion * Growth Rate * Reproductive potential * Exponential growth * Carrying capacity | Students will be introduced to the general characteristics of populations, explore how populations can grow at different rates and explain why there are natural limits to population growth. | 1. Compare two populations in terms of size, density, and dispersion. 2. What is exponential population growth? 3. How does reproductive behavior of individuals affect the growth rate of a population 4. How are population sizes regulated in nature? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques |
| **Unit Test** | | | | | |

Scope and Sequence- Environmental Science-4th Quarter

Arizona HS Science standards from Strand 1 (Inquiry Process), Strand 2 (History and Nature of Science) and Strand 3 (Science in Personal and Social Perspective) as well as the AZ Common Core Science Literacy Standards will be taught throughout the year through reading informational texts, through laboratory activities including designing labs and writing lab reports and through direct instruction. They are not mentioned in the below scope and sequence unless that standard is at the main focus of the lesson taught.

NGSS Coming Soon…

Subject: Environmental Science Content: Science Unit: Evolution and Diversity (Fourth Quarter)

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| **Time** | **AZ Stnadard** | **Vocabulary** | **Learning Goal** | **Essential Questions** | **Assessments/Notes** |
| 4 days |  | * Climate * Latitude * El Nino * La Nina | Students will explain the difference between weather and climate then explore the factors influencing weather. | 1. Explain the difference between weather and climate 2. What are 4 factors that influence weather? 3. Why does different part of the Earth have different climates 4. What causes the seasons? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques |
| **Unit Test** | | | | | |