Scope and Sequence – Environmental Science: 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 Environmental Science

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| **Time** | **AZ Stnadard** | **Vocabulary** | **Learning Goal** | **Essential Questions** | **Assessments/Notes** |
| 4 days | **Essential HS.L2U3.18**  It is part of a huge standard, some of this material is a perquisite for what is being taught. | * Environmental Science * Ecology * Agriculture * Natural Resource * Pollution * Biodiversity | Students will be able to describe the fields that contribute to environmental science and explore the history of humans in the environment and discuss the major problems threatening today’s environment. | 1. What are two types of interactions that environmental scientists study? 2. How many major fields of study contribute to environmental science? 3. Why is environmental science interdisciplinary? 4. What is the difference between environmental science and ecology? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter1 |
| 4 days | **Essential HS.L2U3.18**  It is part of a huge standard, some of this material is a perquisite for what is being taught. | * Law of supply and demand * Ecological foot print * Sustainability | Students will explore the relationship between economic and the environment and discuss the role of critical thinking in science. | 1. What’s the difference between a developed and under developed nation? 2. Why is critical thinking important in science? 3. What is the law of supply and demand? How does it relate to the environment? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter1 |
| 3 days | **Essential HS.L2U3.18**  It is part of a huge standard, some of this material is a perquisite for what is being taught. | * Metric System * Meter * Millimeter * Centimeter * Kilometer | Student will practice measuring, collecting data, communicating results, and making predictions. They will also make observations draw conclusions and communicate results. | 1. What is the description of the area you surveyed? 2. What is metric system and what are the units 3. Are there differences between the areas you and your other classmates surveyed? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter1 Lab |
| 4 days | Not specific standard but it is a prerequisite for future material. | * Observation * Hypothesis * Prediction * Experiment * Variable * Experimental Group * Control Group * Data * Correlation | Students will focus on the scientific method and explain the value of the correlation method for use when experiments are impossible or unethical. Students will learn about scientific habits of mind, including curiosity, skepticism, intellectual dishonesty, and imagination. | 1. What are the steps of the scientific method? 2. Name and explain the importance of the 3 scientific habits of mind. 3. Why is a hypothesis not a guess? 4. How do scientists try to answer questions that cannot be tested with experiments? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 2 |
| 4 days |  | * Statistics * Mean * Distribution * Probability * Sample * Risk * Model * Conceptual Map * Mathematical Model | Students will learn statistics and how scientists apply statistics to data. Also the importance of physical, geographical, conceptual, and mathematical models in science. | 1. Why is sample size important in determining probability? 2. What does “the mean number of weeds in three plots of land” mean? 3. What are 3 type sof models used by scientists? | * Five question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 2 |
| 3.5 days |  | * Value * Decision making model | Students will be introduced to the idea that environmental decisions involve different values that are often competing. Difficult decisions can be managed systematically by using a decision making model | 1. Why are the 4 steps in the decision making model important? 2. What are 3 possible values to consider when making environmental decisions | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 2 |
| 2 days |  | * Predict * Experiment * Measure * Data * Classify * Analyze * Communicate | Students will learn to make observations, ask questions, test a hypothesis, analyze results, draw conclusions, and communicate results. | 1. What are the conditions in the experiment? 2. What are the independent and dependent variables? 3. How does the data support your hypothesis? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 2 Lab |
| 3 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).  **Essential HS.E1U1.13**  **[Evaluate explanations](https://www.nap.edu/read/13165/chapter/7" \l "67)** and theories about the role of energy and matter in geologic changes over time. | * Geosphere * Crust * Mantle * Core * Lithosphere * Asthenosphere * Tectonic plate * Erosion | Students will describe the layers of the earth that are divided up by composition and physical properties and also discuss plate tectonics and their effects while ending by discussing erosions and the alteration of the surface by wind and water. | 1. What are the names of the different layers of the Earth and what determines the different layers? 2. How are earthquakes and caused and what are their effects? 3. How would a large-scale volcanic eruption impact global climate? 4. How does wind and water alter the Earth? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 3 |
| 3 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). | * Atmosphere * Troposphere * Stratosphere * Ozone * Radiation * Conduction * Convection * Greenhouse Effect | Students will explore the composition and the layers of the atmosphere and also discuss the energy in the atmosphere and the greenhouse effect. | 1. Name and describe the different layers of the atmosphere 2. What are the 3 mechanisms of heat transfer in Earth’s atmosphere? 3. What is the role of greenhouse gases in the atmosphere? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 3 |
| 3 days |  | * Water Cycle * Evaporation * Condensation * Precipitation * Salinity * Freshwater * Biosphere. | Student will be exposed to the hydrosphere and biosphere | 1. What are the 3 major processes in the water cycle? 2. What are the properties of water? 3. What are the two types of ocean currents? 4. What are two factors that confine living things to the biosphere. | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 3 |
| 3 days |  | * Predict * Experiment * Measure * Data * Classify * Analyze * Communicate | Students will model the forces generated by wave action build, shape, and beach erosion and hypothesize ways in which beaches can be preserved from the erosive forces of wave activity. | 1. What happened to the beach when you first poured the water into the container? 2. Did the break water help to protect the beach from washing away? 3. What happened to the shapes of the waves along the beach? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust Learning goals for Depth of Knowledge * Chapter 2 Lab |
| **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 | **Essential HS.L2U3.18**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. | * 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 * Chapter 4 |
| 4 days | **Essential HS.L4U1.28**  [**Gather, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74) multiple lines of empirical evidence to explain the mechanisms of biological evolution.  **Essential HS.L4U1.27**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity. | * Natural Selection * Evolution * Adaptation * Artificial Selection * Resistance | Students will learn how organisms become adapted to their environments through the process of evolution by natural selection. | 1. What is an adaptation and give 3 examples/ 2. What does evolution by natural selection mean? 3. How does artificial selection benefit humans? 4. How would a population of insects become resistant? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 4 |
| 4 days |  | * Archaebacteria * Eubacteria * Fungus * Protist * Gymnosperm * Angiosperm * Invertebrate * Vertebrate | Student will describe the diversity of living organisms and the way scientists classify organisms. | 1. How do animals and angiosperms depend on each other? 2. Why are protist important to the ocean? 3. What are the 6 kingdoms of life and their characteristics? 4. Why are bacteria and fungi important to the environment? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 4 |
| 4.5 | **Essential HS.L2U1.19**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. | * Photosynthesis * Producer * Consumer * Decomposer * Cellular Respiration * Food Chain * Food Web * Trophic Level | Students will discuss the principle that sunlight is the ultimate energy source for nearly all living organisms. They will also describe the energy transfer in ecosystems and learn about the roles of producers, consumers, decomposers, in food chains and food webs | 1. How is energy transferred from one organism to another? 2. What role do producers play in an ecosystem 3. What is the difference between a herbivore and an omnivore? 4. How would you compare energy transfer in a food chain and food web? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 5 |
| 4 | **Essential HS.L2U1.19**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. | * Carbon Cycle * Nitrogen Fixing Bacteria * Nitrogen Cycle * Phosphorus Cycle | Student will describe the carbon, nitrogen, and phosphorus cycles and how human activities affect these cycles. | 1. What are the two processes of the carbon cycle? 2. How does burning fossil fuels affect the carbon cycle? 3. How does the excessive use of fertilizer affect the nitrogen and phosphorus cycle? 4. Why does the phosphorus cycle occur more slowly that both the carbon and nitrogen cycles? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 5 |
| 4 | **Essential HS.L2U1.19**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. | * Ecological Successsion * Primary Succession * Secondary Succession * Pioneer Species * Climax Community | Students will be introduced to the concept of ecological succession. They will distinguish between secondary and primary succession and explain the importance of pioneer species. | 1. Compare and Contrast primary and secondary succession 2. What role does pioneer species play during the process of ecological succession? 3. Why could putting out a forest fire be damaging in the long run? 4. What’s the role of lichen in primary succession? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 5 |
| 4 |  | * Biome * Climate * Latitude * Altitude | Students will be introduced to biomes and explain how climate and biomes vary by latitude and altitude. | 1. How do plant determine the name of a biome? 2. How does temperature affect which plants grow in an area? 3. How does precipitation affect which plants grow in an area? 4. How are altitude and latitude different? How do they affect the organisms that live in that biome? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 6 |
| 4 |  | * Tropical Rain Forest * Emergent Layer * Canopy * Epiphyte * Understory * Temperate Rain Forest * Temperate Deciduous Forest * Taiga | Students will describe the tropical rain forest, temperate rain forest, temperate deciduous forest, and the taiga. | 1. What are 3 characteristics of a tropical rain forest? 2. What are the main layers of the tropical rain forest? 3. How are the tropical rain forests being threatened? 4. How does a plant survive the changes of seasons in a temperate deciduous forest? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 6 |
| 3 days |  | * Savanna * Temperate Grassland * Chaparral * Desert * Tundra * Permafrost | Students will be introduced to the characteristics of the savanna, grassland, desert, chaparral, and tundra biomes, They will also learn how the adaptations of plants and animals in each animal help them to survive. | 1. What are some adaptations for 2 animals and plants that help them to survive? 2. How do tropical grasslands differ from temperate grasslands? 3. How are plants that live in deserts different from those that live in the tundra? 4. What is one threat to the tundra? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 6 |
| 4 days | **Essential HS.L2U1.19**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. | * Wetland * Plankton * Nekton * Benthos * Littoral Zone * Benthic Zone * Eutrophication | Students will discuss the characteristics of freshwater ecosystems and learn about how wetlands are an important kind of freshwater ecosystem. | 1. What are two factors that determine where an organism lives in an aquatic ecosystem? 2. Compare and contrast the littoral zone of a lake with the benthic zone of a lake. 3. What are two environmental functions that wetlands provide? 4. What is one threat to river ecosystems? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 7 |
| 3.5 days | **Essential HS.L2U1.19**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. | * Estuary * Salt Marsh * Mangrove Swamp * Barrier Island * Coral reef | Students will describe marine ecosystems such as estuaries, coral reels, and open oceans. They will also learn about threats to these ecosystems. | 1. Why are estuaries very productive ecosystems? 2. Compare and contrast a salt marsh and mangrove swamp 3. What are two factors that can damage coral reefs? 4. What are two ways that threaten animals of the ocean? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 7 |
| 2 days | **Essential HS.L2U1.19**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment. | * Artificial Eutrophication | Student will observe the effects of nitrates and phosphates on an aquatic ecosystem. | 1. After 3 weeks which jar shows the most abundant growth of algae? 2. Did you observe any effects on organism other than algae in the jar that had the most abundant algae growth? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 7 Lab |
| **Unit Test** | | | | | |

Scope and Sequence- Environmental Science-3rd Quarter

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 | **Essential HS.L2U3.18**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. | * 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 * Adjust learning goal for depths of knowledge * Chapter 8 |
| 3 days | **Essential HS.L2U3.18**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. | * Niche * Competition * Predation * Parasitism * Mutualism * Commensalism * Symbiosis | Student will explore the many ways in which species interact with each other and with their habitat | 1. What are part of a niche of an organisms that you know of? 2. Give examples of species that have the same habitat but not the same niche that a lion has. 3. What are the 5 types of species interactions? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 8 |
| 3 days |  | * Saccharomyces | Students will observe, record, and graph the growth and decline of a population of yeast cells in an experimental environment. | 1. Why were several counts taken and then averaged for each time period? 2. Describe the populations changes you observed in the yeast cultures 3. Did the yeast cell populations appear to reach a certain carrying capacity? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 8 Lab |
| 2 days | **Essential HS.L2U3.18**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. | * Biodiversity * Gene * Keystone Species * Ecotourism | Students will describe scientists current knowledge of biodiversity and the benefits of biodiversity including healthy ecosystems, medicines, and foods. | 1. What are the 3 levels of biodiversity 2. What is the most commonly meant level of biodiversity/ 3. How is biodiversity important to ecosystems. 4. How is biodiversity important to humans? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 10 |
| 4 days | **Essential HS.L2U3.18**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. | * Endangered Species * Threatened Species * Exotic Species * Poaching * Endemic Species | Students will learn about the various causes of species extinctions, where most species are being threatened, and which factors are causing the most extinctions. | 1. What are 4 ways that animals are being threatened globally 2. What are some examples of endangered and threatened species? 3. Where are the areas of the world that have high biodiversity? 4. How is the biodiversity of the US different to the rest of the world? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 10 |
| 3 days | **Essential HS.L2U3.18**  [**Obtain, evaluate, and communicate**](https://www.nap.edu/read/13165/chapter/7#74)about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem. | * Germ Plasm * Endangered Species Act * Habitat Conservation plan * Biodiveristy Treaty | Students will discuss the techniques being used around the world to protect species and ecosystems. | 1. What are the 4 types of efforts to save individual species? 2. What is the advantage of protecting entire ecosystems rather than individual species? 3. What is the main provisions of the Endangered Species Act? 4. Give examples of worldwide cooperative efforts to prevent extinction. | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 10 |
| 3 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). | * Surface Water * River system * Watershed * Groundwater * Aquifer * Porosity * Permeability * Recharge Zone | Students will review the water cycle and then explore the distribution of fresh water on Earth’s Surface and underground. | 1. How is earth’s water distributed on Earth? Where is most of the fresh water located? 2. Why is fresh water considered a limited resource? 3. Why does pollution in a water shed pose a potential threat to the river system that flow through it? 4. How does water travel through rock? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 11 |
| 4 days |  | * Potable * Pathogen * Dam * Reservoir * Desalination | Student will describe global and domestic patterns of water use, then discuss water management projects and conclude with discussion of water conservation. | 1. What are the patterns of global water use for the world? 2. What is the drinking water treatment process? 3. What are the benefits and cost of dams and water diversion projects? 4. Name 3 things you can do to help conserve the world’s water supply. | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 11 |
| 4 days | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Water Pollution * Point-Source Pollution * Non-point Source Pollution * Waster Water * Artificial Eutrophication * Thermal Pollution * Biomagnification | Students will explore the effects of water pollution and discuss the major laws designed to improve water quality in the United States | 1. Why is point source pollution easier to control than nonpoint source pollution? 2. What are some major water pollutants and how can you reduce the level of each pollutant in a water supply? 3. What are the unique problems of cleaning up ground water pollution? 4. What is the source of most ocean pollution? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 11 |
| 2 days |  | * Glucose | Students will construct a model of earth’s natural ground water filtering system. | 1. Can you see the glucose? 2. Was the soil removed from the water by the filtering? 3. How do you know? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 11 Lab |
| 3.5 Days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).  **Essential HS.E1U1.11**  [**Analyze and interpret data**](https://www.nap.edu/read/13165/chapter/7#61) to determine how energy from the Sun affects weather patterns and climate. | * Air Pollution * Primary Pollutant * Secondary Pollution * Smog * Temperature Inversion | Students will define primary air pollutants and list their sources, Pollution from automobiles and industry will be discussed along with smog ad temperature. | 1. What are 5 primary air pollutants and their sources? 2. What are 2 sources of air pollution in urban areas? 3. How does smog form? 4. What is temperature inversion and how does it trap pollutants? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 12 |
| 3 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). | * Acid Precipitation * pH * Acid Shock | Students will explore the causes and effects of acid precipitation and international efforts to control acid precipitation. | 1. How does acid precipitation form? 2. What are the harmful effect of acid precipitation on plants, soils, and aquatic ecosystems? 3. How can acid precipitation affect humans? 4. How are countries working together to solve the problem? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 12 |
| 2 days |  | * Sulfur Dioxide | Students will perform a chemical reaction that produces sulfur dioxide, a component of acid precipitation. | 1. What does this experiment suggest about the effect of acid precipitation? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 12 Lab |
| **Unit Test** | | | | | |

Scope and Sequence- Environmental Science-4th Quarter

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 | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).  **Essential HS.E1U1.11**  **[Analyze and interpret data](https://www.nap.edu/read/13165/chapter/7" \l "61)** to determine how energy from the Sun affects weather patterns and climate. | * 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 * Adjust learning goal for depths of knowledge * Chapter 13 |
| 3 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). | * Ozone Layer * Chlorofluorocarbons * Ozone Hole * Polar Stratospheric Clouds | Students will describe how the ozone layer serves as a protection shield against ultraviolet radiation and explains how the ozone layer may be damaged by CFCs | 1. What is the process which chlorofluorocarbons destroy ozone molecules in the stratosphere? 2. How does the ozone hole form over antartica? 3. List 5 harmful effect UV radiation could have on plants and animas. 4. Why would it take years for the ozone layer to recover? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 123 |
| 4 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).  **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Greenhouse gases * Global warming * Kyoto Protocol | Students will describe how trace amounts of gases in the atmosphere trap heat similar to the way a green house does and how increasing levels of gases, especially carbon dioxide, appear to be causing the Earth to warm. | 1. Why is Earth’s atmosphere like the glass in a green house? 2. Why is carbon dioxide in the atmosphere increasing? 3. Why is earth’s climate becoming warmer? 4. What are the consequences to a warmer Earth? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 13 |
| 3 | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Famine * Malnutrition * Diet * Yield | Students will learn about the nutritional needs of humans, methods used to feed the world’s population and reasons why providing food for all of the world’s people is difficult. | 1. What are the major causes of nutrition? 2. Compare the environmental costs of producing different types of food. 3. What is the importance of and effects of the green revolution? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 15 |
| 4 days | **Essential HS.E1U1.12**  [**Develop and use models**](https://www.nap.edu/read/13165/chapter/7#56)of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere). | * Arable land * Topsoil * Erosion * Desertification * Compost * Salinization * Pesticide * Biological Pest Control * Genetic Engineering | Students will focus on soil and it role in agriculture. Farming methods that degrade soil and those that preserve or restore soil will be contrasted. | 1. What are the differences between traditional and modern farming methods? 2. Describe the structure and composition of fertile soil 3. Why does the prescience of plant help preserve soil? 4. Why is soil conservation an important agricultural practice? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 15 |
| 3 days | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Domesticated * Overharvesting * Aquaculture * Livestock * Ruminant | Students will be introduced to the ways in which we manage and use animals for food, and methods of raisin fish, livestock, and poultry. | 1. Why is the percentage of seafood produced by aquaculture increasing? 2. How does overharvesting affect the supply of salmon? 3. Importance of livestock to cultures that do not consume meat? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 15 |
| 2 days | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Compost * Soil * Hot Plate | Students will hypothesize how to reduce the amount of water a garden needs | 1. Which of the additional materials improved the soils ability to hold water? 2. What could you recommend to improve the amount of water the soil can hold. | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 15 lab |
| 5 days | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Fossil Fuels * Electric Generator * Petroleum * Oil Reserves | Students will discuss energy use in our society and the important role of fossil fuels in providing energy. Students will learn how electricity is produced from fossil fuels as well as how fossil fuels are formed, their effects on the environment, and the potential for continued use in the future | 1. What are five factors that influence the value of a fuel? 2. How are fossil fuels used to produce electricity and explain how an electric generator works? 3. How are coal, oil, and natural gases formed? 4. How are they uses and how does each fuel effect the environment? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 17 |
| 3 days | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Nuclear Energy * Nuclear Fission * Nuclear Fusion | Students will examine the advantages and disadvantages of nuclear energy and how nuclear fusion is a future energy source. | 1. Compare a power plant that burns fossil fuels with a nuclear power plant 2. What are two advantage and two disadvantages of nuclear power plants? 3. What is the difference between nuclear fission and nuclear fusion? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 17 |
| 5 days | **Essential HS.E1U3.14**  [**Engage in argument from evidence**](https://www.nap.edu/read/13165/chapter/7#71)about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other. | * Renewable energy * Passive Solar heating * Active solar heating * Biomass fuel * Hydroelectric energy * Geothermal Energy | Students will describe renewable energy sources including solar wind power, biomass fuels, and hydroelectricity, and geothermal energy. | 1. What are the forms of renewable energy? 2. What are their advantages and disadvantages? 3. What are the differences between active solar heating, passive solar heating, and photovoltaic energy? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 18 |
| 3 days |  | * Alternative Energy * Ocean Thermal Energy Conservation * Fuel Cell * Energy efficiency * Energy Conservation | Students will describe the three forms of alternative energy and discuss energy efficiency and energy conservation. | 1. What are 3 alternative energy technologies? 2. How could hydrogen be used as a fuel source? 3. How many ways can individuals in the community conserve energy? 4. What is the difference between energy conservation and energy efficiency? | * 5 question assessment at the end of the week * Don’t Forget to incorporate Total Participation techniques * Adjust learning goal for depths of knowledge * Chapter 18 |
| 3 days |  | * Windmill | Student will design and build a functional windmill that lifts a specific weight as quickly as possible. | How did you improve your windmill?  Which design worked the best and why? |  |
| **Unit Test** | | | | | |