



Statewide Framework Document for: 030201

Natural Resources Management and Policy

Standards may be added to this document prior to submission but may not be removed from the framework to meet state credit equivalency requirements. Performance assessments and leadership alignment may be developed at the local level. In order to earn state approval, performance assessments must be submitted within this framework. **This course is eligible for one credit of lab science.** The Washington State Science Standards performance expectations for high school blend core ideas (Disciplinary Core Ideas, or DCIs) with scientific and engineering practices (SEPs) and crosscutting concepts (CCCs) to support students in developing usable knowledge that can be applied across the science disciplines. These courses are to be taught in a <u>three-dimensional manner</u>. The details about each performance expectation can be found at <u>Next Generation Science Standards</u>.

| School District Name | | | |
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| Course Title: Natural Resources Management and Policy | Total Framework Hours: 180 | | |
| CIP Code: 030201 Exploratory Preparatory | Date Last Modified: December 30, 2020 | | |
| Career Cluster: Agriculture, Food and Natural Resources | Cluster Pathway: Natural Resource Systems | | |
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Course Summary:

This course prepares individuals to plan, develop, manage, and evaluate programs to protect and regulate natural habitats and renewable natural resources. The course includes instruction in the principles of wildlife and conservation biology, environmental science, animal population surveying, natural resource economics, management techniques for various habitats, applicable law and policy, administrative and communications skills, and public relations.

As with all agriculture courses, instruction and assessment in the Supervised Agriculture Experience (SAE) is a requirement. The Supervised Agriculture Experience includes placing a student in a position where he or she will learn the practices of entrepreneurship and the fundamentals of research and experimentation in the agricultural field. Participants in the SAE will conduct exploratory projects with the purpose of learning about and improving practices in their surroundings.

| Eligible for Equivalent Credit in: Science Total Number of Units: 9 |
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| Unit 1: Fundamentals of Environmental Scie | nce | Total Learning Hours for Unit: 12 | |
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| Performance Assessments: (Districts to con | nplete for each unit) | 2 | |
| Example assessments for this unit include: | | | |
| • The Internet activity What is your eco | logical footprint? | | |
| • The Tragedy of the Commons lab. | | | |
| The Personal Energy Consumption lab |). | | |
| • The Alternative Energy Solution lab. | | | |
| Leadership Alignment: (Districts to comple | e for each unit) | | |
| Leadership alignment must include a unit spe | cific project/activity that aligns with the 21 st Century Leadership | o Skills. | |
| Example: | | | |
| • Students demonstrate the ability to a | ccess information and apply technology while determining the | eir ecological footprint. | |
| Industry Standards and/or Competencies: | | | |
| NRS.01.01. Performance Indicator: Apply kno | wledge of natural resource components to the management of | of natural resource systems. | |
| Level I: NRS.01.01.01.a. Identify natur | al resources. | | |
| Level II: NRS.01.01.01.b. Differentiate | between renewable and nonrenewable natural resources. | | |
| Level I: NRS.01.01.02.a. Define ecosys | tem and related terms. | | |
| NRS.02.01. Performance Indicator: Develop a | safety plan for work with natural resources. | | |
| Level I: NRS.02.01.01.a. Identify hazar | ds associated with the outdoor environment. | | |
| Level II: NRS.02.01.01.b. Demonstrate safety practices when working in an outdoor environment. | | | |
| Level III: NRS.02.01.01.c. Demonstrate appropriate responses to accidents and injuries that occur in an outdoor environment. | | | |
| Level I: NRS.02.01.02.a. Recognize bio | hazards associated with natural resources. | | |
| Level II: NRS.02.01.02.b. Use appropri | ate techniques and equipment when working with biohazards. | | |
| NRS.02.06. Performance Indicator: Apply ecc | logical concepts and principles to natural resource systems. | | |
| Level I: NRS.02.06.01.a. Identify bioge | ochemical cycles. | | |
| Level II: NRS.02.06.01.b. Diagram biogeochemical cycles and explain the processes. | | | |
| NRS.05.01. Performance Indicator: Communi | cate natural resource information to the public. | | |
| Level I: NRS.05.01.01.a. Identify ways in which a message regarding natural resources may be communicated to the public. | | | |
| Aligned Washington State Academic Stan | dards | | |
| | Washington Science Standards (Next Generation Science | Standards): | |
| | HS-ESS2-2. Analyze geoscience data to make the claim that o | ne change to Earth's surface can create | |
| | feedbacks that cause changes to other Earth systems. | | |
| Science | HS-ESS3-1. Construct an explanation based on evidence for h | ow the availability of natural resources, | |
| | occurrence of natural hazards, and changes in climate hav | e influenced human activity. | |
| | HS-ETS1-1. Analyze a major global challenge to specify qualit | ative and quantitative criteria and constraints | |
| | for solutions that account for societal needs and wants. | | |

| HS-E n HS-E tl p Addi Conc The l of th | HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. Additional Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs): The local level must list one or more projects to be completed in this unit that will cumulatively address all of the following additional SEPs, DCIs, and CCCs. | | |
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| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems Developing and Using Models Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information | ESS3A: Natural Resources LS2C: Ecosystems Dynamics, Functioning and Resilience ESS3A: Natural Resources ESS3A: Natural Resources | Cause and Effect Systems and System Models Cause and Effect Cause and Effect | |

| Unit 2: Soil and Soil Dynamics | Total Learning Hours for Unit: 12 | | |
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| Derformance Accoremente: (Districts to complete for each unit) | | | |
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| Example assessments for this unit include: | | | |
| A field activity in which they conduct a soil analysis on school property. | | | |
| The Soil Sampling and Testing lab. | | | |
| The Rock Cycle and Soil Formation lab. | | | |
| • The Plate Tectonics lab. Students will research volcanic eruptions and earthquakes using the USGS v | vebsite. | | |
| A written report on soil pollution, followed by a group presentation. | | | |
| Leadership Alignment: (Districts to complete for each unit) | | | |
| Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills. | | | |
| Example: | | | |
| • Students think creatively, collaborate with others, and interact effectively with others to complete the | ne soil analysis field activity. | | |
| Students communicate clearly, use and manage information, and produce results to complete a rep | port on soil pollution. | | |
| Industry Standards and/or Competencies: | | | |
| Agriculture, Food, and Natural Resources (AFNR) Standards - Natural Resource Systems (NRS) Pathy | way: | | |
| NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of | of natural resource systems. | | |
| Level I: NRS.01.01.01.a. Identify natural resources. | | | |
| NRS.01.02. Performance Indicator: Classify natural resources. | | | |
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Level I: NRS.01.02.05.a. Demonstrate techniques used to identify rock, mineral and soil types.

Level II: NRS.01.02.05.b. Identify rock, mineral and soil types.

Level III: NRS.01.02.05.c. Conduct a field inventory of rock, mineral and soil types, and record and document findings.

NRS.05.01. Performance Indicator: Communicate natural resource information to the public.

Level II: NRS.05.01.01.b. Design and construct a display that communicates a natural resource topic, and discuss the topic in a public forum

| Aligned Washington State Academic Standards | | | |
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| | Washington Science Standards (Next Generation Sc | ience Standards): | |
| | HS-ESS1-5. Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. | | |
| | HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. | | |
| | HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes | | |
| | HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. | | |
| Science | y qualitative and quantitative criteria and constraints ants. | | |
| | HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. | | |
| | Additional Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting | | |
| | Concepts (CCCs): | | |
| | The local level must list one or more projects to be completed in this unit that will cumulatively address all of the following additional SEPs, DCIs, and CCCs. | | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations Engaging in Argument from Evidence | ESS2A: Earth Materials and Systems LS1D: Information Processing ESS1C: The History of Planet Earth ESS2C: The Role of Water in Earth's Surface Processes | Energy and Matter: Flows, Cycles, and Conservation Energy and Matter: Flows, Cycles, and Conservation Energy and Matter: Flows, Cycles, and Conservation | |

| Unit 3: The Living World | Total Learning Hours for Unit: 24 | |
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| Performance Assessments: (Districts to complete for each unit) | | |
| Example assessments for this unit include: | | |

- A field activity where they study a wetland biome at a local property. Students will identify plants and become familiar with the aspects of the biome.
- The invasive species wanted poster.
- A food web that they design.
- The Schoolyard Car lab, employing the Shannon-Wiener index.
- The *Ecosystem Column* lab.
- A report on the U.S. National Park Service. Students will research one of America's national parks and write a report that explains the challenges that rangers face in maintaining the park, and the features that attract visitors to the park.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills. *Example:*

• Students will work creatively with others, communicate clearly, and collaborate with others as they complete their field activity.

Industry Standards and/or Competencies:

Agriculture, Food, and Natural Resources (AFNR) Standards - Natural Resource Systems (NRS) Pathway:

NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems.

Level I: NRS.01.01.01.a. Identify natural resources.

Level III: NRS.01.01.01.c. Research and debate one or more current issues related to the conservation or preservation of natural resources.

Level I: NRS.01.01.02.a. Define ecosystem and related terms.

Level II: NRS.01.01.02.b. Describe the interdependence of organisms within an ecosystem.

Level III: NRS.01.01.02.c. Conduct a field study of an ecosystem, and record and document observations of species interactions.

NRS.01.02. Performance Indicator: Classify natural resources.

Level I: NRS.01.02.01.a. Describe morphological characteristics used to identify trees and other woody plants.

Level II: NRS.01.02.01.b. Identify trees and other woody plants.

Level III: NRS.01.02.01.c. Conduct a field inventory of trees and other woody plants, and record and document findings.

Level II: NRS.01.02.02.b. Identify herbaceous plants.

Level III: NRS.01.02.02.c. Conduct a field inventory of herbaceous plants, and record and document findings.

Level I: NRS.01.02.03.a. Describe morphological characteristics used to identify wildlife species.

Level II: NRS.01.02.03.b. Identify wildlife species.

Level I: NRS.01.02.04.a. Describe morphological characteristics used to identify aquatic species.

Level II: NRS.01.02.04.b. Identify aquatic species.

NRS.02.04. Performance Indicator: Demonstrate natural resource enhancement techniques.

Level I: NRS.02.04.01.a. Identify the different kinds of streams.

Level II: NRS.02.04.01.b. Identify indicators of the biological health of a stream.

Level I: NRS.02.04.03.a. Identify characteristics of a healthy wildlife habitat.

Level II: NRS.02.04.03.b. Identify methods of wildlife habitat improvement.

Level III: NRS.02.04.03.c. Conduct a survey of a habitat and devise a comprehensive improvement plan.

NRS.03.01. Performance Indicator: Produce, harvest, process and use natural resource products.

Level I: NRS.03.01.03.a. Identify wildlife species that can be sustainably harvested.

Level II: NRS.03.01.03.b. Describe techniques used in the harvesting of wildlife.

Level I: NRS.03.01.04.a. Identify products obtained from wildlife species.

Level I: NRS.03.01.09.a. Identify aquatic species harvested for commercial and recreational purposes.

NRS.05.01. Performance Indicator: Communicate natural resource information to the public.

Level II: NRS.05.01.01.b. Design and construct a display that communicates a natural resource topic and discuss the topic in a public forum

| Aligned Washington State Academic Standards | | | |
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| | Washington Science Standards (Next Generation Science Standards): | | |
| | HS-PS3-1. Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known | | |
| | HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. | | |
| | HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. | | |
| | HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. | | |
| | HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. | | |
| Science | HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. | | |
| | 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. | | |
| | HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. | | |
| | HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. | | |
| | HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. | | |
| | HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. | | |
| | HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations. | | |

| HS HS HS HS The The | HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. Additional Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs): The local level must list one or more projects to be completed in this unit that will cumulatively address all of the following address and the following address all of the following address and the following address all of the following address and the following address all of the following address and the following address all of the following address and the following address and the following address all of the following address all of the following address and the following address all of the following address and the following | | |
|--|--|---|--|
| of the following additional SEPs, DCIs, and CCCs. | | | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Constructing Explanations and Designing Solutions Obtaining, Evaluating, and Communicating Information Obtaining, Evaluating, and Communicating Information Planning and Carrying Out Investigations | LS2B: Cycles of Matter and Energy Transfer in Ecosystems LS1C: Organization for Matter and Energy Flow in Organisms LS2C: Ecosystems Dynamics, Functioning and Resilience ESS3A: Natural Resources LS2A: Interdependent Relationships in Ecosystems | Energy and Matter: Flows, Cycles, and Conservation Energy and Matter: Flows, Cycles, and Conservation Cause and Effect Energy and Matter: Flows, Cycles, and Conservation Structure and Function | |

| Unit 4: Population | Total Learning Hours for Unit: 16 |
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| Performance Assessments: (Districts to complete for each unit) | |
| Example assessments for this unit include: | |
| The Population Dynamics lab. | |
| The Something Fishy lab. | |
| The Owl Pellet Dissection lab. | |
| The Power of the Pyramids lab. | |
| A report on the actions of another nation that have positive or negative impacts on the global environment | ronment. Students should propose solutions |
| that would improve a nation's "report card." | |
| A report on the actions of another nation that have positive or negative impacts on the global environment that would improve a nation's "report card." | ronment. Students should propose solutions |

| A brochure on one of the endangered species. | | | |
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| Leadership Alignment: (Districts to complete for each unit) | | | |
| Leadership alignment must include a unit spe | ecific project/activity that aligns with the 21 st Century Leadership Skills. | | |
| Example: | | | |
| Students access and evaluate inform | ation, think creatively, and use systems thinking to complete the population dynamics lab. | | |
| Students work creatively with others, | collaborate with others, and produce results to create the endangered species brochure. | | |
| Industry Standards and/or Competencies | | | |
| Agriculture, Food, and Natural Resources | (AFNR) Standards - Natural Resource Systems (NRS) Pathway: | | |
| NRS.02.06. Performance Indicator: Apply eco | ological concepts and principles to natural resource systems. | | |
| Level II: NRS.02.06.05.b. Give example | es of primary succession and secondary succession species in a community of organisms. | | |
| Level III: NRS.02.06.05.c. Conduct a fi | eld study to determine the stages of ecological succession in a community of organisms. | | |
| Level I: NRS.02.06.06.a. Explain popu | ation ecology, population density and population dispersion. | | |
| Level II: NRS.02.06.06.b. Discuss facto | ors that influence population density and population dispersion. | | |
| Level I: NRS.02.06.07.a. Define invasiv | /e species. | | |
| Level II: NRS.02.06.07.b. Discuss facto | ors that influence the establishment and spread of invasive species. | | |
| Level III: NRS.02.06.07.c. Develop and | implement a plan to reduce the impact of invasive species on natural resources. | | |
| Aligned Washington State Academic Stan | dards | | |
| | Washington Science Standards (Next Generation Science Standards): | | |
| | HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that | | |
| | affect carrying capacity of ecosystems at different scales. | | |
| | HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about | | |
| | factors affecting biodiversity and populations in ecosystems of different scales. | | |
| | HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems | | |
| | maintain relatively consistent numbers and types of organisms in stable conditions, but changing | | |
| | conditions may result in a new ecosystem. | | |
| Science | HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity | | |
| | HS-I S2-8 Evaluate the evidence for the role of group behavior on individual and species' chances to | | |
| | survive and reproduce. | | |
| | HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of | | |
| | populations. | | |
| | HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: | | |
| (1) increases in the number of individuals of some species, (2) the emergence of new species over tir | | | |
| | and (3) the extinction of other species. | | |

| H H H H H | His Edsor II. Construct an explanation based on evidence for now the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. Additional Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs): The local level must list one or more projects to be completed in this unit that will cumulatively address all of the following additional SEPs. DCIs and CCCs. | | |
|--|--|---|--|
| 01 | of the following additional SEPs, DCIs, and CCCs. | | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems Engaging in Argument from Evidence | LS2D: Social Interactions and Group Behavior ETS1B: Developing Possible Solutions LS4D: Biodiversity and Humans | Cause and Effect Stability and Change Systems and System Models | |

| Unit 5: Land and Water Use | Total Learning Hours for Unit: 22 |
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| Performance Assessments: (Districts to complete for each unit) | |
| Example assessments for this unit include: | |
| An activity on nonrenewable resource depletion. | |
| The Fishing in the Commons lab. | |
| A project on land use planning. | |
| The Radiation of Radish Seeds Lab. | |
| Leadership Alignment: (Districts to complete for each unit) | |

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

• Students manage goals and time, be self-directed learners, and produce results to complete the fishing in the commons and radiation of radish seeds lab.

Industry Standards and/or Competencies:

Agriculture, Food, and Natural Resources (AFNR) Standards - Natural Resource Systems (NRS) Pathway:

NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems.

Level I: NRS.01.01.01.a. Identify natural resources.

Level II: NRS.01.01.01.b. Differentiate between renewable and nonrenewable natural resources. Level III: NRS.01.01.01.c. Research and debate one or more current issues related to the conservation or preservation of natural resources. NRS.01.02. Performance Indicator: Classify natural resources. Level I: NRS.01.02.01.a. Describe morphological characteristics used to identify trees and other woody plants. Level II: NRS.01.02.01.b. Identify trees and other woody plants. Level I: NRS.01.02.02.a. Describe morphological characteristics used to identify herbaceous plants. Level II: NRS.01.02.02.b. Identify herbaceous plants. Level I: NRS.01.02.04.a. Describe morphological characteristics used to identify aquatic species. NRS.02.02. Performance Indicator: Demonstrate cartographic skills to aid in developing, implementing and evaluating natural resource management plans. Level I: NRS.02.02.01.a. Demonstrate how to use maps to identify directions and features, calculate actual distance and determine the elevations of points. Level II: NRS.02.02.01.b. Locate natural resources using a land survey and geographic coordinate system. Level III: NRS.02.02.01.c. Employ Global Positioning System and Geographic Information Systems technologies to inventory features in natural resource management. NRS.02.04. Performance Indicator: Demonstrate natural resource enhancement techniques. Level I: NRS.02.04.01.a. Identify the different kinds of streams. Level II: NRS.02.04.01.b. Identify indicators of the biological health of a stream. Level III: NRS.02.04.01.c. Create and implement a stream enhancement plan. Level I: NRS.02.04.02.a. Identify characteristics of a healthy forest. Level II: NRS.02.04.02.b. Identify ways in which forest stands may be improved. Level I: NRS.02.04.04.a. Identify characteristics of healthy rangeland. Level I: NRS.02.04.05.a. Identify natural resource characteristics desirable for recreational purposes. Level II: NRS.02.04.05.b. Identify natural resource management techniques for improving recreation opportunities NRS.02.06. Performance Indicator: Apply ecological concepts and principles to natural resource systems. Level I: NRS.02.06.02.a. Describe properties of watersheds and identify the boundaries of local watersheds. Level II: NRS.02.06.02.b. Relate the function of watersheds to natural resources. Level III: NRS.02.06.02.c. Analyze ecosystem functions of a watershed. Level I: NRS.02.06.03.a. Compare and contrast groundwater and surface-water flow. Level II: NRS.02.06.03.b. Explain stream hydrology and structure, and determine the different classes of streams. Level I: NRS.02.06.04.a. Define riparian zones and riparian buffers, and explain their functions. Level II: NRS.02.06.04.b. Identify techniques used in the creation, enhancement and management of riparian zones and riparian buffers. NRS.03.01. Performance Indicator: Produce, harvest, process and use natural resource products. Level I: NRS.03.01.01.a. Describe forest harvesting methods. Level II: NRS.03.01.01.b. Determine when to harvest forest products. Level I: NRS.03.01.02.a. Describe uses of tree species.

Level II: NRS.03.01.02.b. Describe processing of forest products.

Level III: NRS.03.01.03.c. Formulate a management plan for protecting wildlife from overexploitation.

Level I: NRS.03.01.09.a. Identify aquatic species harvested for commercial and recreational purposes.

Level II: NRS.03.01.09.b. Describe techniques used to harvest aquatic species.

Level III: NRS.03.01.09.c. Harvest aquatic species according to sustainable management principles.

NRS.04.01. Performance Indicator: Manage fires in natural resource systems.

Level I: NRS.04.01.01.a. Differentiate between desirable and undesirable fires and prepare a report on the role fire plays in a healthy ecosystem.

NRS.04.02. Performance Indicator: Diagnose plant and wildlife diseases and follow protocol to prevent their spread.

Level I: NRS.04.02.01.a. Identify causes of diseases in plants.

Level III: NRS.04.02.01.c. Explain management techniques used to reduce infection and spread of plant diseases in natural resources.

NRS.04.03. Performance Indicator: Manage insect infestations of natural resources.

Level I: NRS.04.03.01.a. Identify harmful and beneficial insects and signs of insect damage to natural resources.

Level III: NRS.04.03.01.c. Describe techniques used to manage pests of natural resources.

| Aligned Washington State Academic Standards | | | |
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| Wa | Washington Science Standards (Next Generation Science Standards): | | |
| HS- | HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials | | |
| and | and surface processes. | | |
| HS- | HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs | | |
| tha | that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible | | |
| Science soc | social, cultural, and environmental impacts. | | |
| | | | |
| Add | litional Science and Engineering Practices (SEPs), I | Disciplinary Core Ideas (DCIs), and Crosscutting | |
| Cor | cepts (CCCs): | | |
| The | local level must list one or more projects to be comp | leted in this unit that will cumulatively address all | |
| of t | ne following additional SEPs, DCls, and CCCs. | | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems | ESS2C: The Role of Water in Earth's Surface | | |
| Constructing Explanations and Designing | Processes | Stability and Change | |
| Solutions | ESS3C: Human Impacts on Earth Systems | Structure and Function | |
| Developing and Using Models | ESS3C: Human Impacts on Earth Systems | Cause and Effect | |
| Planning and Carrying Out Investigations | ESS3C: Human Impacts on Earth Systems | Cause and Effect | |
| Asking Questions and Defining Problems | ETS1B: Developing Possible Solutions | | |

| Unit 6: Energy Resources and Consumption | Total Learning Hours for Unit: 22 |
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Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

- The Half-Life in a Box activity.
- The Capturing the Wind lab.
- The That's the Way the Cookie Crumbles lab.
- The Fossil Fuels lab.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

• Students solve problems, collaborate with others, and produce results as they complete the labs and activities associated with energy resources and consumption.

Industry Standards and/or Competencies:

Agriculture, Food, and Natural Resources (AFNR) Standards - Natural Resource Systems (NRS) Pathway:

NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems.

Level II: NRS.01.01.01.b. Differentiate between renewable and nonrenewable natural resources.

Level III: NRS.01.01.01.c. Research and debate one or more current issues related to the conservation or preservation of natural resources.

NRS.02.06. Performance Indicator: Apply ecological concepts and principles to natural resource systems.

Level III: NRS.02.06.01.c. Determine the human influence on biogeochemical cycles.

NRS.03.01. Performance Indicator: Produce, harvest, process and use natural resource products.

Level I: NRS.03.01.05.a. Describe the value of minerals and ores to the economy.

Level II: NRS.03.01.05.b. Describe economically important minerals and ores that are extracted and processed.

Level I: NRS.03.01.06.a. Describe the value of fossil fuels to the economy.

Level II: NRS.03.01.06.b. Describe sources of fossil fuels and products made from fossil fuels.

Level III: NRS.03.01.06.c. Give examples of methods used to extract and process fossil fuels.

Level I: NRS.03.01.07.a. Describe the benefits of hydroelectric generation.

Level II: NRS.03.01.07.b. Describe characteristics of sites that lend themselves to hydroelectric generation.

Level III: NRS.03.01.07.c. Describe hydroelectric generation techniques and procedures, and prepare a report on the impacts of hydroelectric dams on aquatic systems.

| Aligned Washington State Academic Standards | | |
|---|---|--|
| | Washington Science Standards (Next Generation Science Standards): | |
| Science | HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios. | |
| | HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. | |

| I | HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as | | |
|--|--|---------------------------------------|--|
| | possible social, cultural, and environmental impacts. | | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems | PS3A: Definitions of Energy | Systems and System Models | |
| Constructing Explanations and Designing | PS3A: Definitions of Energy | Cause and Effect | |
| Solutions | PS3C: Relationship Between Energy and Forces | Systems and System Models | |
| Developing and Using Models | ESS3C: Human Impacts on Earth Systems | Systems and System Models | |
| Engaging in Argument from Evidence | ESS3C: Human Impacts on Earth Systems | Cause and Effect | |
| Obtaining, Evaluating, and Communicating | ESS3A: Natural Resources | Energy and Matter: Flows, Cycles, and | |
| Information | PS3B: Conservation of Energy and Energy | Conservation | |
| Planning and Carrying Out Investigations | Transfer | Scale, Proportion, and Quantity | |
| | | | |

| Unit 7: Pollution | Total Learning Hours for Unit: 36 |
|---|-----------------------------------|
| Performance Assessments: (Districts to complete for each unit) | |
| Example assessments for this unit include: | |
| Water testing at a creek nearby or on school property. | |
| The Parts per Million lab. | |
| The Personal Solid Waste Inventory lab. | |
| A lab studying the effects of salinization on seed germination. | |
| The <i>Ecocolumn</i> lab (ongoing for 5-6 weeks). | |
| Leadership Alignment: (Districts to complete for each unit) | |
| Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership | Skills. |
| Example: | |
| Students reason effectively, work creatively with others, and be responsible to others as they comple | ete water-testing projects. |
| Students use systems thinking, solve problems, and communicate clearly their personal solid waste i | nventory. |
| Industry Standards and/or Competencies: | |
| Agriculture, Food, and Natural Resources (AFNR) Standards - Natural Resource Systems (NRS) Pathw | ay: |
| NRS.02.06. Performance Indicator: Apply ecological concepts and principles to natural resource systems. | |
| Level I: NRS.02.06.08.a. Describe sources of pollution and delineate between point and nonpoint sou | rce pollution. |
| Level II: NRS.02.06.08.b. Describe the impact of pollution on natural resources. | |
| Level III: NRS.02.06.08.c. Create and implement a plan to prevent or limit the effects of pollution on r | natural resources. |
| NRS.03.01. Performance Indicator: Produce, harvest, process and use natural resource products. | |
| Level I: NRS.03.01.06.a. Describe the value of fossil fuels to the economy. | |

Level II: NRS.03.01.06.b. Describe sources of fossil fuels and products made from fossil fuels.

| NRS.05.01. Performance Indicator: Communicate natural resource information to the public. | | | | |
|--|---|---|--|--|
| Level II: NRS.05.01.01.b. Design and co | onstru | ct a display that communicates a natural resource to | opic and discuss the topic in a public forum. | |
| Aligned Washington State Academic Stand | dards | | | |
| | HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints including cost safety reliability and aesthetics as well as | | | |
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| | | | | |
| Science | | | | |
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| | | possible social, cultural, and environmental impacts. | | |
| Science and Engineering Practice | | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems Asking Questions and Defining Problems Constructing Explanations and Designing Solutions | | ESS2D: Weather and Climate ESS3C: Human Impacts on Earth Systems ESS3C: Human Impacts on Earth Systems ESS3C: Human Impacts on Earth Systems | Cause and Effect Cause and Effect Cause and Effect | |
| Developing and Using Models | | | | |

| Unit 8: Health Hazards | Total Learning Hours for Unit: 14 |
|---|-----------------------------------|
| Performance Assessments: (Districts to complete for each unit) | |
| Example assessments for this unit include: | |
| A risk-assessment activity in groups. | |
| A study of air quality using test kits. | |
| The Airborne Particulates lab. | |
| The Exhausting Problems lab. | |
| Leadership Alignment: (Districts to complete for each unit) | |
| Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership | Skills. |
| Example: | |
| • Students collaborate with others, interact effectively with others, and produce results to complete the | e group risk-assessment activity. |
| | 11. · · · · |

• Students use systems thinking, solve problems, and access and evaluate information to complete air quality testing.

Industry Standards and/or Competencies:

Agriculture, Food, and Natural Resources (AFNR) Standards - Natural Resource Systems (NRS) Pathway:

NRS.02.05. Performance Indicator: Interpret laws related to natural resource management and protection.

Level I: NRS.02.05.01.a. Identify laws associated with natural resource systems.

Level II: NRS.02.05.01.b. Identify the purposes of laws associated with natural resource systems.

NRS.04.01. Performance Indicator: Manage fires in natural resource systems.

Level I: NRS.04.01.01.a. Differentiate between desirable and undesirable fires and prepare a report on the role fire plays in a healthy ecosystem.

| Aligned Washington State Academic Standards | | | |
|---|---|----------------------|--|
| V | Washington Science Standards (Next Generation Science Standards): | | |
| H | HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. | | |
| H | HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity biodiversity. | | |
| Science | HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resu | | |
| | occurrence of natural hazards, and changes in climate have influenced human activity. Additional Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscuttin Concepts (CCCs): | | |
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| Т | The local level must list one or more projects to be completed in this unit that will cumulatively address all of the following additional SEPs, DCIs, and CCCs. | | |
| o | | | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept | |
| Asking Questions and Defining Problems | ESS3C: Human Impacts on Earth Systems | Cause and Effect | |
| Engaging in Argument from Evidence | ESS3C: Human Impacts on Earth Systems | Cause and Effect | |

| Unit 9: Global Change | Total Learning Hours for Unit: 22 |
|---|--|
| Performance Assessments: (Districts to complete for each unit) | |
| Example assessments for this unit include: | |
| • The How Hot Is It Here on Earth? lab. | |
| The Global Warming and Greenhouse Effects lab. | |
| The APES portfolio. | |
| • Research about global change by reading an article from a credible magazine journal. Students will | write a summary report of what they learn. |
| Leadership Alignment: (Districts to complete for each unit) | |
| Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership | Skills. |
| Example: | |
| • Students manage goals and time, work independently, and produce results to complete the heat or | n earth lab. |

• Students access and evaluate information, collaborate with others, and think creatively to create their global change report and portfolio products

Industry Standards and/or Competencies:

NRS.01.01. Performance Indicator: Apply knowledge of natural resource components to the management of natural resource systems.

Level III: NRS.01.01.01.c. Research and debate one or more current issues related to the conservation or preservation of natural resources.

NRS.02.05. Performance Indicator: Interpret laws related to natural resource management and protection.

Level I: NRS.02.05.01.a. Identify laws associated with natural resource systems.

Level II: NRS.02.05.01.b. Identify the purposes of laws associated with natural resource systems.

NRS.02.06. Performance Indicator: Apply ecological concepts and principles to natural resource systems.

Level I: NRS.02.06.09.a. Describe climatic factors that influence natural resources.

Level II: NRS.02.06.09.b. Describe the impact climate has on natural resources.

NRS.05.01. Performance Indicator: Communicate natural resource information to the public.

Level II: NRS.05.01.01.b. Design and construct a display that communicates a natural resource topic and discuss the topic in a public forum.

| Aligned Washington State Academic Standard | S | |
|---|--|--|
| Aligned Washington State Academic Standard HS-1 HS-1 Science HS-1 HS-1 HS-1 HS-1 HS-1 HS-1 HS-1 HS-1 | Second se | cing the impacts of human activities on the nanges in environmental conditions may result in: ecies, (2) the emergence of new species over time, to mitigate adverse impacts of human activity on for how the availability of natural resources, have influenced human activity. It reduces impacts of human activities on natural te the relationships among Earth systems and |
| | how those relationships are being modified due to human activity. | |
| Science and Engineering Practice | Disciplinary Core Idea | Crosscutting Concept |
| Engaging in Argument from Evidence | LS4D: Biodiversity and Humans | Cause and Effect |