This course was developed in 2021 by the Pacific Education Institute (PEI) with funding from the Russell Family Foundations and Dawkins Charitable Trust. In 2022, the course was revised with funding by Career Connect Washington and participation from CTE teachers representing Highline School District, North Thurston Public Schools, and Yakima School District. Additional writing support was provided by Peninsula College, the Mountains to Sound Greenway Trust, 10,000 Years Institute, Manulife Investments, and the Department of Natural Resources. This working document will be periodically updated while working with CTE teachers across Washington to provide local resources and relevant materials and opportunities to engage youth in learning about restoration ecology in Washington State.

Introduction to Restoration Ecology

Course Title: Introduction to Restoration Ecology		**Total Framework Hours: 180 hours**
Suggested CIP Code: 030101	**X Exploratory Preparatory**	**Date Last Modified: 1/19/2023**
Career Cluster: Agriculture, Food, and Natural Resources		**Cluster Pathway: Natural Resource Systems**
Course Summary: This course framework applies scientific, restoration ecology, and social studies principles to the restoration of Washington habitats. The course includes units on safety and well-being; land management practices; plant identification and watershed ecology; restoration ecology practices; restoration ecology laws and agencies; and career pathways. The course aligns with and can be used in conjunction with the Advanced Restoration Ecology framework. Students will complete a Supervised Agricultural Experience (SAE) in a local natural area as part of the course.		
Requested Course Equivalency: 1.0 science credit		**Total Number of Units: 7**
Course Resources:		

Unit 1: Safety and Well-Being	**Total Learning Hours for Unit: 10**

Unit Summary: This unit will highlight the skills necessary to work safely and effectively on a restoration work crew.

Competencies:

1. Understand the safe and proper use of tools for manual and chemical restoration practices (including cleaning, maintenance, and storage).
2. Engage in field safe field work procedures (ex: pacing, adequate food, water, sleep, and use of personal protective equipment, road rights-of-way).

3. Work on a crew successfully and safely (includes skills in listening, following directions, keeping other crew members safe).
4. Understand and adhere to community partner safety protocols.
5. Understand basic first aid relevant to restoration ecology.
6. Practice Leave No Trace and low ecological impact practices.
7. Practice basic navigation skills.

Performance Assessments: *These can be locally developed or use the suggested assessments below.*

Assessments will be formal and informal, written, verbal and practical. Students can:

- Perform field work safely and properly (ex: pacing, adequate food, water, sleep, and use of personal protective equipment, road rights-of-way).
- Practice safe crew practices (includes skills in listening, following directions, keeping other crew members safe).
- Practice safe and proper hand tool use for manual and chemical restoration practices.
- Adhere to community partner's safety plans and protocols.
- Practice first aid skills through role play activities.
- Use Leave No Trace and low ecological impact practices in the field.
- Practice first aid skills through role play activities.
- Locate and track locations using a compass, map, and GPS.
- Read a weather report and make safety decisions based on forecast.
- Participate in orienteering course.
- Participate in geocaching activity.

Related to Supervised Agricultural Experience (SAE):

- Describe the importance of safety protocols in workplaces.
- Create a list of supplies and personal protective equipment needed to implement the final project.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed for all students.

Suggested skills include:

- 3.B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member
- 7.A.1 Adapt to varied roles, job responsibilities, schedules and contexts
- 4.B.1 Use information

Industry Standards and Competencies

Agriculture Food and Natural Resources Standards: Natural Resource Science (NRS)

NRS.03. Develop plans to ensure sustainable production and processing of natural resources.

- NRS.03.02. Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.
    - NRS.03.02.01.a. Summarize how to use maps and technologies to identify directions and land features, calculate actual distance and determine the elevations of points.

AFNR Cluster Skills

- CS.03. Examine and summarize the importance of health, safety, and environmental management systems in AFNR workplaces.

Career Ready Practices (CRP) Strand

- CRP.09.03. Demonstrate behaviors that contribute to a positive morale and culture in the workplace and community.

Unit 2: Land Management Practices	**Total Learning Hours for Unit: 40**

Unit Summary: Through field work with partner agencies, students will be exposed to the goals, objectives, and practices used while restoring ecosystems.

Competencies:

1. Understand how land management practices influence restoration ecology.
2. Understand the goals and practices of land managers at local restoration sites.
3. Identify evidence of human impact at local restoration sites.
4. Understand tribal sovereignty and the difference between tribal lands and Usual and Accustomed Areas (U&A).
5. Evaluate the impacts of land management decisions on the physical and emotional well-being of local communities, with consideration of disproportional impacts on marginalized communities.
6. Interpret maps, including land use maps and topographical maps.

Performance Assessments: *These can be locally developed or use the suggested assessments below.*

Assessments will be formal and informal, written, verbal and practical. Students can:

- Engage in restoration work in urban or suburban areas to understand the unique challenges including edge effect and wilderness-to-people interface.
- Engage in restoration work on DNR land, USFS, and tribal land to explore the challenges unique to each agency.
- Discuss the goals and practices of the land managers at restoration sites being studied.
- Learn about local community organizations that participate in land management.
- Use a map to identify the land management agency that manages local restoration sites, and the boundaries of that site.

Related to SAE:

- Use maps, GPS, and other tools to define the boundaries of a local restoration site that will be used in final project.
- List ways the restoration proposal supports land manager's objectives.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed for all students.

- 6.A.1 Use technology as a tool to research, organize, evaluate and communicate information
- 4.B.1 Use information accurately and creatively for the issue or problem at hand

Industry Standards and Competencies

Agriculture Food and Natural Resources (AFNR) Standards: Natural Resource Standards (NRS)

- NRS.02.01. Analyze the interrelationships between natural resources and humans.
- NRS.02.02. Assess the impact of human activities on the availability of natural resources.
- NRS.03.02. Demonstrate cartographic skills, tools and technologies to aid in developing, implementing and evaluating natural resource management plans.

AFNR Cluster Skills

- CS.05 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

Career Ready Practices (CRP) Strand

- CRP.05.01. Assess, identify and synthesize the information and resources needed to make decisions that positively impact the workplace & community.
- CRP.05.02. Make, defend and evaluate decisions at work and in the community using information about the potential environmental, social and economic impacts.
- CRP.08.01. Apply reason and logic to evaluate workplace and community situations from multiple perspectives.

Aligned Washington State Academic Standards

Environment & Sustainability	**Standard 3: Sustainability and Civic Responsibility** -- Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.
Science	HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
Social Studies	C3.9-10.1 Analyze the impact of constitutions, laws, treaties, and international agreements on the maintenance of national and international order.

	C3.9-10.2 Analyze relationships among governments, civil societies, and economic markets. C3.11-12.1 Evaluate the impact of constitutions, laws, treaties, and international agreements on the maintenance of national and international order or disorder. C3.11-12.2 Critique relationships among governments, civil societies, and economic markets. C3.11-12.3 Evaluate the impact of international agreements on contemporary world issues. C3.11-12.4 Evaluate the impact of international organizations on United States foreign policy. G2.11-12.2 Analyze how the United States balances protections of the environment and economic development. G3.11-12.4 Evaluate how changes in the environmental and cultural characteristics of a place or region influence spatial patterns of trade and land use. G2.11-12.3 Evaluate the impact of human settlement activities on the environmental and cultural characteristics of specific places and regions.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
Constructing Explanations and Designing Solutions	For: HS-LS2-7 LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	Stability and Change

Unit 3: Plant Identification and Watershed Ecology	**Total Learning Hours for Unit: 40**

Unit Summary: This unit will explore plant characteristics that are relevant to restoration ecology, with particular emphasis on watersheds. Students will learn how plants utilize their environments to grow, how nonnative plants influence ecosystems, and how ecosystems are impacted when one or more biotic or abiotic factors change.

Competencies:

1. Use appropriate terminology to describe leaf and plant parts and plant life cycles.
2. Understand the difference between *native, non-native, invasive*, and *noxious* plants.
3. Understand basic plant taxonomy (ex: family, genus, species).
4. Describe traditional and contemporary uses of plants at a local restoration site.
5. Understand the importance of environmental factors on plant and watershed health (ex: sunlight, temperatures, water quality, pollutants).
6. Describe the concept of a watershed (including roles of biotic and abiotic factors).
7. Describe elements that comprise a watershed (ex: Hydrology, geology, soil, vegetation, and topography).

Performance Assessments: *These can be locally developed or use the suggested assessments below.*

Assessments will be formal and informal, written, verbal and practical. Students can:

- Describe the basic physiology of a plant at a local restoration site.
- Use plant characteristics and field identification keys (including dichotomous keys) to identify a plant at a local restoration site.
- Identify a common native tree or plant species in different stages of growth at a local restoration site.
- Identify a common nonnative tree or plant species at a local restoration site.
- Describe the physiology of aquatic plants found in local streams.
- Identify a common aquatic plant species at a local restoration site.
- Given specimens, use dichotomous keys to identify local plants in a taxonomic practicum.
- Identify traits that allow plants to adapt and compete for resources (ex: allelopathy, growth rates, seed viability and germination).
- Identify plants and their medicinal and traditional uses.
- Create an herbarium of local flora.
- Participate in traditional land use practices (ex: planting or harvest techniques).
- Identify culturally relevant resources with the help of local elders and tribal representatives.
- Use the 4 Cs (cool, clear, complex, clean) to describe water quality characteristics.

Related to SAE:

- Use terminology and scientific names to accurately describe forests, trees, and vegetation in presentation.
- List biotic and abiotic factors that impact a local restoration site.
- Research how organisms and populations at a local restoration site depend on and may compete for biotic and abiotic resources.
- Select species to include in restoration proposal.
- Describe how species included in restoration proposal will impact watershed ecology at a local restoration site.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed for all students.

- 7.A.1 Adapt to varied roles, job responsibilities, schedules and contexts
- 4.B.1 Use information
- Groups of (5) students will each collect 2 samples for trees (live) or unique tools (pictures will work) and then identify each sample and present to the class their findings on their samples.

Industry Standards and Competencies

Agriculture Food and Natural Resources (AFNR) Standards: Natural Resource Standards (NRS)

- NRS.01.04. Apply ecological concepts and principles to aquatic natural resource systems.
- NRS.01.05. Apply ecological concepts and principles to terrestrial natural resource systems.

- NRS.02.03. Analyze how modern perceptions of natural resource management, protection, enhancement and improvement change and develop over time.
- NRS.04.01. Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.
- NRS.04.03. Prevent or manage the introduction of ecologically harmful species in a particular region.

AFNR Cluster Skills

- CS.04. Demonstrate stewardship of natural resources in AFNR activities.
- CS.05. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

Career Ready Practices (CRP) Strand

- CRP.02.01. Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.
- CRP.04.03. Model active listening strategies when interacting with others in formal and informal settings.
- CRP.09. Model integrity, ethical leadership and effective management.

Aligned Washington State Academic Standards	
Environment & Sustainability	**Standard 1: Ecological, Social, and Economic Systems** -- Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels. **Standard 2: The Natural and Built Environment** -- Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.
Science	HS-LS2-7 Design, evaluate, and refine a solution for reducing the impact 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-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-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
Social Studies	**Geography** G2.9-10.3 Explain that the environment is modified through agriculture, industry, settlement, lifestyles, and other forms of activity. G1.11-12.4 Analyze information from geographic tools, including computer-based mapping systems, to draw conclusions about an issue or event.

	G1.9-10.4 Explain relationships between the locations of places and regions, and their political, cultural, and economic dynamics, using maps, satellite images, photographs, and other representations. G1.9-10.3 Create maps that employ geospatial and related technologies to display and explain the spatial patterns of culture and environment.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
Constructing Explanations and Designing Solutions	For: HS-LS2-7 LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	Stability and Change
Using Mathematical and Computational Thinking	For: HS-LS4-6 LS4.C: Adaptation LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	Cause and Effect
Engaging in Argument from Evidence Scientific Knowledge is Open to Revision in Light of New Evidence	For: HS-LS2-6 LS2.C: Ecosystem Dynamics, Functioning, and Resilience	Stability and Change
Constructing Explanations and Designing Solutions	For: HS-ESS3-4 ESS3.C: Human Impacts on Earth Systems ETS1.B: Developing Possible Solutions	Stability and Change Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World

Unit 4: Restoration Ecology Practices	**Total Learning Hours for Unit: 40**

Unit Summary: This unit will explore the basic practices required to perform restoration work.

Competencies:

- Understand the core principles of restoration ecology.
- Identify human impacts on a local restoration site.
- Understand different strategies used in restoration work (ex: conserving and restoring).
- Understand terms used to describe the methods of controlling invasive species (including manual, mechanical, cultural, biological and chemical).

Performance Assessments: *These can be locally developed or use the suggested assessments below.*

Assessments will be formal and informal, written, verbal and practical. Students can:

- Engage in restoration work.
- Research how human activities impact the basic characteristics of a stream (current, land-water exchange, oxygen).
- Perform stream monitoring and health assessments.
- Observe how large woody material contributes to the stream ecosystem.
- Perform data collection using a transect and plots.
- Evaluate the pros and cons of using chemicals in land and stream-based ecological restoration.
- Use safe safety protocols, mixing ratios, and calibrations in pesticide application.
- Demonstrate proper use of hand tools used in restoration work including a Pulaski and sprayer.
- Use a compass and GPS to create data points and navigate to a location on a map.
- Read and interpret reading maps, including land use maps and topographical maps.
- Perform vegetation monitoring using set plots. Collect data about cover, density, and survivorship of native and nonnative invasive plant species at each site that can be used for determining site success and adaptive management.

Related to SAE:

- Write a proposal for restoring a natural area using knowledge of restoration ecology practices (including plant ID, methods, monitoring, best management practices for invasive control and a planting plan).
- Recommend appropriate management practices based on ecosystem types (ex: prairies, forested, aquatic).
- Create a map or diagram that shows the relative species planting locations in restoration site.
- Describe factors that were considered when selecting invasives management protocol.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed for all students.

- 10.A.2 Prioritizes, plans and manages work to achieve the intended result.

Industry Standards and Competencies

Agriculture Food and Natural Resources (AFNR) Standards: Natural Resource Standards (NRS)

- NRS.02.03. Analyze how modern perceptions of natural resource management, protection, enhancement and improvement change and develop over time.
- NRS.04.01. Demonstrate natural resource protection, maintenance, enhancement and improvement techniques.

AFNR Cluster Skills

- CS.05 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

Career Ready Practices (CRP) Strand

- CRP.02.01. Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.
- CRP.04.03. Model active listening strategies when interacting with others in formal and informal settings.
- CRP.09. Model integrity, ethical leadership and effective management.

Aligned Washington State Academic Standards

Environment & Sustainability	**Standard 1: Ecological, Social, and Economic** Systems -- Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels. **Standard 2: The Natural and Built Environment** -- Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.
Science	**NGSS Standards** HS-LS2-7 Design, evaluate, and refine a solution for reducing the impact 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-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-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
Constructing Explanations and Designing Solutions	For: HS-LS2-7 LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	Stability and Change
Using Mathematical and Computational Thinking	For: HS-LS4-6 LS4.C: Adaptation LS4.D: Biodiversity and Humans ETS1.B: Developing Possible Solutions	Cause and Effect
Engaging in Argument from Evidence	For: HS-LS2-6	Stability and Change

Scientific Knowledge is Open to Revision in Light of New Evidence	LS2.C: Ecosystem Dynamics, Functioning, and Resilience	
Constructing Explanations and Designing Solutions	For: HS-ESS3-4 ESS3.C: Human Impacts on Earth Systems ETS1.B: Developing Possible Solutions	Stability and Change Connections to Engineering, Technology, and Applications of Science Influence of Science, Engineering, and Technology on Society and the Natural World

Unit 5: Restoration Ecology Laws and Agencies	**Total Learning Hours for Unit: 30**

Unit Summary: In this unit, students will learn about rules and laws that are designed to protect natural areas resources while providing ecosystem services and balancing societal needs.

Competencies:

- Understand how laws impact natural area restoration (ex: designation of natural areas, using fertilizers and pesticides, zoning).
- Understand culturally significant resources important to local indigenous populations.
- Understand the protection measures that are required for constructing and maintaining natural areas.
- Understand how restoration can impact water quality and wildlife species.
- Learn how to identify and delineate land types.
- Manage and update student created Excel databases.
- Understand how restoration ecology professionals use proposals.
- Understand the components of a restoration plan (ex: objectives, site inventory, site preparation, planting plan, and budget).

Performance Assessments: *These can be locally developed or use the suggested assessments below.*

Assessments will be formal and informal, written, verbal and practical. Students can:

- Identify ways restoration-related rules and laws have been put into practice at a local natural area.
- Examine key components of a restoration management plan.
- Give examples of culturally significant resources and historic sites and artifacts that might be discovered in a natural area.
- Identify the key components of a State Environmental Policy Act (SEPA) Assessment.
- Identify specific measures used to track ecosystem services provided by natural areas.

Related to SAE:

- Develop and host a student-led town hall or presentation for the city council, tribal council or other decision-making body addressing a current restoration ecology project using evidence from current restoration projects or tribal rules.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed for all students.

- Divide the students into teams, have them set up their team with specific responsibilities for a public presentation.
- FFA tie-in could be Forestry or Natural Resources CDEs.

Industry Standards and Competencies

Agriculture Food and Natural Resources (AFNR) Standards: Natural Resource Standards (NRS)

NRS.02. Analyze the interrelationships between natural resources and humans.

- NRS.02.01. Examine and interpret the purpose, enforcement, impact and effectiveness of laws and agencies related to natural resource management, protection, enhancement and improvement (e.g., water regulations, game laws, historic preservation laws, environmental policy, etc.).
  - NRS.02.01.01.a. Distinguish between the types of laws associated with natural resources systems.
  - NRS.02.01.01.b. Analyze the structure of laws associated with natural resources systems.
  - NRS.02.01.01.c. Evaluate the impact of laws associated with natural resources systems (e.g., mitigation, water regulations, carbon emissions, game limits, invasive species, etc.).
  - NRS.02.01.02.a. Distinguish between the types of agencies associated with natural resources systems.
  - NRS.02.01.02.b. Analyze the specific purpose of agencies associated with natural resources systems.
  - NRS.02.01.02.c. Evaluate the impact and effectiveness of agencies associated with natural resources systems (e.g., regulation of consumption, prevention of damage to natural resources systems, management of ecological interactions, etc.).

Aligned Washington State Academic Standards

Environment & Sustainability	**Standard 1: Ecological, Social, and Economic Systems** - Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels. **Standard 2: The Natural and Built Environment** - Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.
Science	**NGSS Standards** HS-LS2-7 Design, evaluate, and refine a solution for reducing the impact 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-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-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

Science and Engineering Practice	Disciplinary Core Idea	Crosscutting Concept
Constructing Explanations and Designing Solutions Analyzing and Interpreting Data Engaging in Argument from Evidence Using Mathematics and Computational Thinking Asking Questions and Defining Problems	ESS3.A: Natural Resources ESS3.B: Natural Hazards ESS2.A: Earth Materials and Systems ESS2.D: Weather and Climate ETS1.B: Developing Possible Solutions ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change ESS2.D: Weather and Climate LS2.A: Interdependent Relationships in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS4.D: Biodiversity and Humans LS4.C: Adaptation ETS1.A: Defining and Delimiting Engineering Problems ETS1.C: Optimizing the Design Solution	Cause and Effect Stability and Change Systems and System Models Scale, Proportion, and Quantity

Unit 6: Career Pathways	**Total Learning Hours for Unit: 10**

Unit Summary: This unit will expose students to various career pathways in the natural resources profession and provide opportunities for students to develop and enhance their employability skills.

Competencies:

1. Outline the key components to include in applications, cover letters, and resumes.
2. Describe individual skills and experiences that are relevant to natural resource jobs.
3. Navigate the employment sections of natural resource organization websites (both public and private).
4. Learn about natural resource jobs that relate to the student's career goals.
5. Understand soft and hard skills that contribute to career success.
6. Understand the required skills, certifications and degrees required for various restoration ecology jobs.

Performance Assessments: *These can be locally developed or use the suggested assessments below.*
Assessments will be formal and informal, written, verbal and practical. Students will be able to:

- Complete a self-assessment to identify qualifications and reflect on opportunities for future job skill growth.
- Create a list of gained individual skills and experiences that are relevant to natural resource jobs.
- Write a resume and cover letter that integrate the skills learned through the course.
- Complete a practice job application.
- Prepare for, and participate in, a mock job interview for a natural resources position.
- Describe how course learning relates to the students' future academic and career goals.
- Research certifications, training, or postsecondary programs that relate to student's career goals.
- Conduct a job search.

Related to SAE:

- Present SAE project to the public and potential employers.
- List knowledge, skills, and abilities gained in the course.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed for all students.

Suggested skills include:

- 8.C.2 Demonstrates initiative to advance skill levels towards a professional level
- 8.A.2 Balance short-term and long-term goals

Industry Standards and Competencies

AFNR Cluster Skills

- CS.05 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

Career Ready Practices (CRP) Strand

- CRP.01.03. Identify and act upon opportunities for professional and civic service at work and in the community.
- CRP.02.01. Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.
- CRP.04.01. Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
- CRP.04.02. Produce clear, reasoned and coherent written and visual communication in formal and informal settings.
- CRP.10.01. Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

Aligned Washington State Academic Standards

Environment & Sustainability	**Standard 1: Ecological, Social, and Economic Systems** - Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels. **Standard 2: The Natural and Built Environment** -- Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.
Social Studies	**SSS2.9-12.3** Determine the kinds of sources and relevant information that are helpful, taking into consideration multiple points of view represented in the sources, the types of sources available, and the potential uses of the sources.

Unit 7: Supervised Agricultural Experience (SAE) Project	**Total Learning Hours for Unit: 10**

Unit Summary: Students will demonstrate their learning by completing a Supervised Agricultural Experience Project (SAE). Students will work individually and, in a group, to consider their strengths as well as their areas for future learning in performing restoration work.

Competencies:

1. Understand the benefits of the SAE for skill development, leadership and career success.
2. Understand the connection between SAE and FFA.
3. Describe the two types of SAE:
    - Foundational SAE (Career exploration & planning (high school and beyond plan), Personal financial planning and management, Workplace Safety, Employability skills for college and career readiness, agricultural or forestry literacy)
    - Immersion SAE (Entrepreneurship/Ownership, Placement/Internships, Research (Experimental, Analytical, Invention), School Business Enterprises, Service Learning)
4. Select an SAE topic that relates to course topics as well as the student's personal interests, academic goals, and career goals.
5. Develop procurement and funding plans.
6. Understand how presentation and reporting formats influence delivery of content to audiences.
7. Use systems thinking (interconnectedness, emergent properties, causality, feedback loops in an ecosystem) to develop SAE project.
8. Demonstrate flexibility.
9. Demonstrate self-directed learning skills.

Performance Assessments: *These can be locally developed or use the suggested assessments below.*

Assessments will be formal and informal, written, verbal and practical. Students will be able to:

- Select a final project format that effectively delivers content (ex: PowerPoint, YouTube video, report, radio public service announcement, poster, tri-fold display, brochure, map, website or blog, event, phone app, etc.)

- Write a report that investigates a topic covered in the course.
- Use Ag Experience Tracker (AET) System or equivalent utilized to track SAE Project.
- Outline the components to be used in final project:
    - Determine the goals of the SAE project.
    - Identify resources and data to be collected to meet project goals.
    - Select the types of data that will be meaningful.
    - Collect data to be used in the final project.
    - Keep records that pertain to the chosen SAE project.
    - Enter data into an Excel spreadsheet.
    - Create maps that display necessary data.
    - Cite sources that are included in the proposal.
- Prepare and deliver final project deliverables.

Leadership Alignment: Leadership activities should include 21st Century Skills embedded in curriculum and instruction for this unit of instruction. Include leadership skills that are being taught and assessed within the class for all students.
Suggested skills include:

- Students are responsible for entering their own data into the system and the data will be used in the annual Agriculture Education Report
- 8.C.2 Demonstrates initiative to advance skill levels towards a professional level
- 8.A.2 Balance short-term and long-term goals

Resources:
Future Farmers of America (FFA) Supervised Agricultural Experience (SAE) Washington FFA site: www.ffa.org
How to start a new chapter: https://www.washingtonffa.org/starting-a-new-chapter
SAE specific resources: https://saeforall.org/ resources for students and teachers.

Industry Standards and Competencies

Agriculture Food and Natural Resources Standards: Natural Resource Science (NRS)
NRS.03. Develop plans to ensure sustainable production and processing of natural resources.

- NRS.03.01. Sustainably produce, harvest, process and use natural resource products (e.g., forest products, wildlife, minerals, fossil fuels, shale oil, alternative energy, recreation, aquatic species, etc.).
    - NRS.03.02.01.b. Apply cartographic skills and tools and technologies (e.g., land surveys, geographic coordinate systems, etc.) to locate natural resources. Create GIS maps that show different projects in a forest and the ongoing results of those projects.

AFNR Cluster Skills

CS.05. Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.

CS.01.05. Awareness: Desire purposeful understanding related to professional and personal activities

Level 2

CS.01.05.01.b. Analyze the impact of trends and issues on the community.

Level 3

CS.01.05.01.c. Articulate current issues that are important to the local, state, national and global communities.

CS.01.05.02.c. Perform leadership tasks associated with citizenship.

Career Ready Practices (CRP) Strand

- CRP.01.03. Identify and act upon opportunities for professional and civic service at work and in the community.
- CRP.02.01. Use strategic thinking to connect and apply academic learning, knowledge and skills to solve problems in the workplace and community.
- CRP.04.01. Speak using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
- CRP.04.02. Produce clear, reasoned and coherent written and visual communication in formal and informal settings.
- CRP.10.01. Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

SAE

- SAE.01.01 Students will establish and conduct Supervised Agricultural Experience Projects (SAE).
    - SAE.01.01.b. Explain the benefits of SAE projects to skill development, leadership and career success.
    - SAE.01.01.c. Explain the connection between SAE and FFA.
    - SAE.01.01.d. Explain the five types of SAE. (Entrepreneurship, Placement, Research, Exploratory, Improvement)
    - SAE.01.01.e. Explore ideas for SAE projects.
    - SAE.01.01.f. Explain how SAE projects support academic achievement.
    - SAE.01.01.g. Select and establish an SAE project.
    - SAE.01.01.h. Explain and keep records on established SAE projects.
    - SAE.01.01.i. Explain SAE project Supervision, visitation and assessment.
    - SAE.01.01.l. Explain the three-circle concept for SAE, FFA Leadership, Classroom/Laboratory in an Agriculture Education program.

Aligned Washington State Academic Standards

Science	Standards will be based on the SAE selected by the student
Environment & Sustainability	**Standard 1: Ecological, Social, and Economic Systems** - Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels. **Standard 2: The Natural and Built Environment** - Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.

21st Century Skills		
Check those that students will demonstrate in this course:		
LEARNING & INNOVATION **Creativity and Innovation** ☒ Think Creatively ☒ Work Creatively with Others ☐ Implement Innovations **Critical Thinking and Problem Solving** ☒ Reason Effectively ☒ Use Systems Thinking ☒ Make Judgments and Decisions ☒ Solve Problems **Communication and Collaboration** ☒ Communicate Clearly ☒ Collaborate with Others	**INFORMATION, MEDIA & TECHNOLOGY SKILLS** **Information Literacy** ☒ Access and /evaluate Information ☒ Use and Manage Information **Media Literacy** ☒ Analyze Media ☐ Create Media Products **Information, Communications and Technology (ICT Literacy)** ☒ Apply Technology Effectively	**LIFE & CAREER SKILLS** **Flexibility and Adaptability** ☒ Adapt to Change ☒ Be Flexible **Initiative and Self-Direction** ☒ Manage Goals and Time ☒ Work Independently ☒ Be Self-Directed Learners **Social and Cross-Cultural** ☒ Interact Effectively with Others ☒ Work Effectively in Diverse Teams **Productivity and Accountability** ☒ Manage Projects ☒ Produce Results **Leadership and Responsibility** ☒ Guide and Lead Others ☒ Be Responsible to Others