



This framework was developed in 2024 by the Pacific Education Institute (PEI) with funding from a grant from EPA and USFS through Spokane Conservation District. Writers from East Valley School District (Spokane), West Valley School District, and Spokane Public Schools, Spokane Community College, Spokane Conservation District, The Spokane Tribe of Indians, Washington State University Extension, Washington Department of Natural Resources Urban Forestry staff, Forest Health Watch, OSPI's Office of Native Education, OSPI's Associate Director of Secondary Math collaborated to develop this framework. The framework will be periodically updated with CTE teachers across Washington to provide local resources and relevant materials and opportunities to engage youth in learning about urban and community forestry.

Course Information		
Course: Advanced Urban and Community Forestry		Total Framework Actual Hours: 180
CIP Code: Requesting new code from OSPI.	<input type="checkbox"/> Exploratory <input checked="" type="checkbox"/> Preparatory <i>Preparatory courses are best built with a min. of 140 hours.</i>	Date Last Modified: 7/25/2024
Career Cluster: Agriculture, Food & Natural Resources		Cluster Pathway: Natural Resource Systems
Course Summary: This course builds on the Introduction to Urban and Community Forestry framework to go deeper into the scientific and algebraic principles of urban and community forestry. The course includes units on safety, well-being and leadership; trees and people; plant identification and anatomy, tree health, tree planting and care, remote sensing and data analysis, and career pathways. Students will complete a Supervised Agricultural Experience (SAE) as part of the course. The course is designed to meet requirements for 1.0 credit in science or 1.0 credit for Algebra 1.		

Unit Information	
Unit 1: Safety, Well-Being, and Leadership	Total Learning Hours for Unit: 10
Unit Summary: This unit will highlight the skills necessary to work safely and effectively on a tree planting, maintenance, and removal work crew with emphasis on building leadership skills. Students will practice basic activities to evaluate how to fell a tree safely based on size, breadth and other physical characteristics.	
Competencies:	
<ol style="list-style-type: none"> 1. Understand the safe and proper use of tools for urban and community forestry (UCF) 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. Adhere to community partner safety plans and protocols.
5. Understand basic first aid relevant to working with urban tree planting.
6. Understand the protocol and the math involved in safely cutting down a tree and/or pruning large limbs.
7. Practice Leave No Trace and low ecological impact practices in the field.
8. Demonstrate basic navigation skills.
9. Demonstrate leadership skills while leading a group.

Components and Assessments

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, use of personal protective equipment, road rights-of-way).
- Describe PPE list for a specific UCF project (including study boots, safety glasses, hardhat, reflective vest, gloves).
- Model safe crew practices (includes skills in listening, following directions, keeping other crew members safe).
- Model respectful communication while working as part of a crew.
- Demonstrate respect for others' opinions.
- Demonstrate safe and proper hand tool use.
- Adhere to the community partner's safety plans and protocols.
- Participate in a safety meeting that addresses apparent hazards (ex: cliffs, power lines, poisonous plants).
- Lead or assist in first aid skill role play activities.
- Use Leave No Trace and low ecological impact practices in the field.
- Read a weather report and make safety decisions based on forecast.
- Lead or assist a group discussion to create shared group norms for communication and safety.
- Record and update tool inventory sheets.
- Assist community partner to ensure that tools are cleaned, maintained, and stored properly.
- Facilitate a pre- or post-safety meeting for a particular worksite.
- Develop a safety plan that includes protocols for responding to emergency scenarios and reporting biohazards.
- Role-play a problem-solving scenario (ex: conflict resolution between two individuals in a crew).
- Practice leading a crew to implement a worksite activity.
- Complete an OSHA job hazard assessment form.
- Review and discuss herbicide labels for required PPE, application limits, and public notifications.
- Assist in high school appropriate tree removal practices while following the community partner's safety protocol.
- Evaluate where a tree might fall based on size, breadth and other physical characteristics.

Related to Supervised Agricultural Experience (SAE):

- Create a safety plan that includes protocols to be used for on-site restoration work.
- Include examples of relevant hazard and safety signage that should be used in restoration work, as seen in public areas (ex: planting areas, road signs, snags).

Leadership Alignment:

- Students will **be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work (1.B.2)** as they lead or assist a group discussion to create shared group norms for communication and safety.
- Students will **assume shared responsibility for collaborative work, and value the individual contributions made by each team member (3.B.3)** by adhering to safe crew practices (includes skills in listening, following directions, keeping other crew members safe)
- Students will **use information (4.B.1)** to read a weather report and make safety decisions based on forecasts.
- Students will **develop, implement and communicate new ideas to others effectively (1.B.1)** as they facilitate a pre- or post-safety meeting for onsite restoration crew work.

Industry Standards and/or Competencies

Name of standards: Agriculture, Food, and Natural Resources (AFNR) Standards: Natural Resource Science (NRS), Cluster Skills, Career Ready Practices (CRP)

Website: https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

AFNR Standards: 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.
- NRS.03.02.01.b. Apply cartographic skills and tools and technologies (e.g., land surveys, geographic coordinate systems, etc.) to locate natural resources.

AFNR Cluster Skills

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

CRP Strand

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

Aligned Washington State Learning Standards

Mathematics	
Science	HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity

Unit Information

Unit 2: Trees and People	Total Learning Hours for Unit: 40
<p>Unit Summary: In this unit, students will explore how local governing agencies use data on growth rate, tree care, etc. to decide what kind of tree species to plant and where. Students build on their work in the Intro course to investigate a more diverse set of relationships between trees and people. Finally, students practice the skills necessary to talk about sustainable practices within a diverse community.</p>	
<p>Competencies:</p> <ol style="list-style-type: none"> 1. Evaluate the interdependent relationship between trees and people. 2. Investigate the cultural significance of trees in a UCF setting. 3. Investigate the interdependence between ecological, social, and economic systems relating to trees. 4. Categorize the social and ecosystem benefits of trees in a UCF setting. 5. Compare and contrast individual, tribal, city, state, and commercial sustainability practices. 6. Understand the goals and practices of land managers at local tree planting sites. 7. Understand land management concepts (ex: Tragedy of commons, ecological services, conservation vs. restoration). 8. Understand tribal sovereignty and the differences between tribal lands and Usual and Accustomed Areas (U&A). 9. Describe historical and contemporary traditional ecological knowledge concepts, including fire ecology and ethnobotanical plant harvesting. 10. Examine the overall nature and condition of human and tree health. 11. Respond open-mindedly to different ideas and values. 12. Respect cultural differences and work effectively with people from a range of social and cultural backgrounds. 13. Demonstrate how to use data to make sustainable decisions concerning trees in an urban or community setting. 	
Components and Assessments	
<p>Performance Assessments:</p> <ul style="list-style-type: none"> • Engage in UCF-related activities in urban or suburban areas to understand site specific management challenges (ex: Addressing community needs, regional planting priorities, stakeholder engagement). • Investigate the cultural significance of trees in any UCF setting. Compare and contrast how this significance differs from the student's personal urban and community setting. 	

- Using group discussion, essay, or other reflective format, brainstorm the social benefits that trees provide (ex: Cooler temperatures, lowered stress levels, air quality improvements, absorption of pollutants, slower driving speeds on surrounding streets).
 - Create a proposal that strengthens these benefits in a local community.
 - Research tribal, city, state, and commercial sustainability practices in your community regarding tree planting and maintenance.
- Engage with a local community organization that plants trees or partner with a tree planting initiative.
- Analyze the state of human and tree health in your setting noting your criteria.
- During classroom discussions, practice the following skills:
 - Respond to different ideas and values with an open mind.
 - Respect cultural differences.
 - Work effectively with people from a range of social and cultural backgrounds.
 - Leverage social and cultural differences to create new ideas and increase both innovation and quality of work.
- Analyze your relationship with trees in written or multimodal form.
- Evaluate the impact of increasing the tree canopy in a section of your community.
- Create a piece of media that instills a sense of civic responsibility in citizens for trees in their community.
- Develop predictions for how managing the urban forests of your community will change as the tree canopy increases
- Identify cultivars or varieties bred/chosen for different cultural uses.

Related to SAE:

- In the final project, include a synopsis of completed research one or more social benefits provided by trees. Describe how the recommendations in the final project will impact the listed benefit or benefits.
- Provide tree planting or community-based recommendations for a local organization.

Leadership Alignment:

- Students will **be open and responsive to new and diverse perspectives; incorporate group input and feedback into the work (1.B.2)** by using group discussion, essay, or other reflective format, brainstorm the social benefits that trees provide (ex: cooler temperatures, lowered stress levels, air quality improvements, absorption of pollutants, slower driving speeds on surrounding streets).
- Students will **analyze and evaluate major alternative points of view (2.C.2)** by evaluating the impact of increasing the tree canopy in a section of your community.
- Students will **identify and ask significant questions that clarify various points of view and lead to better solutions (2.D.2)** through classroom discussions.
- Students will **examine how individuals interpret messages differently, how values and points of view are included or excluded, and how media can influence beliefs and behaviors (5.A.2)** by creating a piece of media that instills a sense of civic responsibility in citizens for trees in their community.
- Students will **apply a fundamental understanding of the ethical/legal issues surrounding the access and use of media (5.A.3)** by providing tree planting or community-based recommendations for a local organization.

- Students will **respect cultural differences and work effectively with people from a range of social and cultural backgrounds (9.B.1), respond open-mindedly to different ideas and values (9.B.2), leverage social and cultural differences to create new ideas and increase both innovation and quality of work (9.B.3)** by engaging with a local community organization that plants trees or partner with a tree planting initiative.

Industry Standards and/or Competencies

Name of standards: Agriculture, Food, and Natural Resources (AFNR) Standards: Natural Resource Science (NRS), Cluster Skills, Career Ready Practices (CRP)

Website: https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

- 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.)
- NRS.02.03.01.c. Develop predictions for how the management, protection, enhancement and improvement of natural resources will evolve through social considerations (e.g., establishment of national parks, public opinion, and fishing, reduction of waste and energy consumption, etc.).
- NRS.02.03.02.c. Anticipate and predict how society's views and use of natural resources will continue to change as a result of historical figures and trends in modern society
- NRS.02.04.01.c. Devise a plan to improve the conservation, protection, improvement and enhancement of natural resources based on economic value and practices
- NRS.02.05.03.c. Create a communication plan to influence the behavior of people, call people to action and instill a sense of civil behavior related to the conservation, management, enhancement and improvement of natural resources

Career Ready Practices

- CRP.04.01.01.a. Identify and categorize strategies for ensuring clarity, logic, purpose and professionalism in verbal and non-verbal communication (e.g., vocal tone, organization of thoughts, eye contact, preparation, etc.)
- CRP.09.01.02.a. Reflect upon and summarize situations where ethical and effective leadership characteristics were needed and/or personally demonstrated (e.g., motivation, empathy, etc.).
- CRP.08.02.02.b. Apply decision-making processes to generate possible solutions to solve workplace and community problems.

Aligned Washington State Learning Standards

Mathematics

- N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
- N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.
- N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

	<p>A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.</p> <p>A.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>A.SSE.B.3.a Factor a quadratic expression to reveal the zeros of the function it defines.</p> <p>A.SSE.B.3.b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.</p> <p>A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p>
<p>Science</p>	<p>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.</p> <p>HS-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p> <p>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.</p>

Commented [GU1]: relating to: Develop predictions for how managing the urban forests of your community will change as the tree canopy increases

Unit Information	
Unit 3: Plant Identification and Taxonomy	Total Learning Hours for Unit: 30
<p>Unit Summary: This unit explores the skills to competently identify the trees and other plants common in a local urban forest. A working knowledge of the terms used to describe the various fauna is also covered.</p>	
<p>Competencies:</p> <ol style="list-style-type: none"> 1. Understand the plant classification system (kingdom Plantae) and scientific naming system (Genus, Species), including naming rules for hybrids, varieties, forms, and cultivars. 2. Understand the different plant naming systems (scientific, common, and indigenous naming systems) and what informs local, tribal plant names. 3. Be able to identify 15+ dominant, regional trees or shrubs to common name (10+ of these by scientific name). 4. Use tools like dichotomous keys and plant identification apps. 5. Apply knowledge of plant identification and anatomy (ex: Basic plant parts, plant life cycles, taxonomy, naming systems) in an independent project. 	

6. Analyze how native, non-native, invasive, and noxious plants can impact tree planting and care.
7. Use "right tree, right place" concepts to make recommendations for tree planting decisions.

Components and Assessments

Performance Assessments:

- Describe how plants are classified (including differences between angiosperms and gymnosperm division).
- Guiding questions include:
 - What is the tree built to do efficiently from a human perspective?
 - How does this information impact decision-making as to placement in an urban and community setting?
- Identify dominant plant species to Family or Genus through images and/or collected specimens by applying understanding of identifying physical features.
- Explain difference between native, non-native, invasive, and noxious species and understand the potential plant hazards of these species.
- Identify an unknown plant to the Family level using a tool such as a basic dichotomous key or Plant ID app.
- Explain why specific physical features confirm accuracy and/or confidence in identification.
- Use plant identification terminology resources to support the use of dichotomous keys for species identification.
- Create a plant sign for one native species of choice that integrates scientific, common, and indigenous naming systems.

Related to SAE:

- Create a simple visual educational resource that shows some examples of reproductive structures, growth habit, texture, and color used in tree identification.
- Create a simple visual educational resource that shows various examples of leaf arrangement and leaf shape (+ types of leaf margins, bases, and apices).
- Use terminology and scientific names to accurately describe forests, trees, and vegetation in report or presentation.
- Present results of a site analysis of vegetative cover or tree canopy through oral or written report.
- Present a case study of historical impacts and restoration within a watershed.

Leadership Alignment:

- Students will use **systems thinking (2.B.1)** to perform a watershed site assessment.
- Students will utilize appropriate data collection tools and methodology to collect data related to parameters associated with watershed health (stream percentage coverage, water quality, etc.).
- Based on evaluation, students will make **recommendations to remediation strategies (2.C.4), interpret information and draw conclusions based on the best analysis (2.A.1), and use various types of reasoning as appropriate for the situation. (2.D.2).**

- Student will **use digital technologies (computers, PDAs, media players, GPS, etc.), communication/networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy (6.A.2)** to create simple visual educational resources.

Industry Standards and/or Competencies

Name of standards: Agriculture, Food, and Natural Resources (AFNR) Standards: Natural Resource Science (NRS), Cluster Skills, Career Ready Practices (CRP)

Website: https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

- NRS.01.02.01.c. Evaluate the species of trees present to assess the health of an ecosystem (e.g., presence of native versus invasive species, biodiversity, etc.).

Aligned Washington State Learning Standards

Mathematics

Relating to Present results of a site analysis of vegetative cover or tree canopy through oral or written report, and present a case study of historical impacts and restoration within a watershed:

HS.F.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

HS.F.LE.B.5 Interpret the parameters in a linear or exponential function in terms of a context.

N.Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N.Q.A.2 Define appropriate quantities for the purpose of descriptive modeling.

N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.

A.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A.SSE.B.3.a Factor a quadratic expression to reveal the zeros of the function it defines.

A.SSE.B.3.b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

	<p>A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p> <p>A.REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</p> <p>F.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</p> <p>F.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p>
<p><u>Science</u></p>	<p>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.</p> <p>HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.</p> <p>HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p> <p>HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.</p>

Unit Information	
Unit 4: Tree Biology	Total Learning Hours for Unit: 20
<p>Unit Summary: This unit explores a tree's biological systems such as photosynthesis, respiration, cell growth and the relationship between plant structure and function. Students will also develop skills in recognizing plant defense mechanisms. Finally, students will explore how climate change is affecting local urban forests and how communities are considering climate change as they make decisions about urban forests.</p>	

Competencies:

1. Be able to identify structures of a tree: shoots/buds, leaves, wood/bark, flowers/fruits/cones, and roots.
2. Know the relationship between each plant structure and their basic function (including where photosynthesis and respiration take place).
3. Understand how a tree grows (meristems: zones of cell growth).
4. Discuss basics of photosynthesis and respiration processes (simplified inputs and outputs) and understand factors affecting these processes.
8. Understand tree defense mechanisms.
9. Understand impacts of climate change on tree biology.
10. Make tree planting and management decisions based on relationships between soils and plants.

Components and Assessments**Performance Assessments:**

- Describe basic tree structures and their respective functions.
- Collect and press identifying plant parts of local, dominant species (fall: leaves, buds, and fruits; spring: flowers).
- Identify plant parts using an identification assessment in which parts of collected plants, images of plants, and/or diagrams are used to assess knowledge of local species
- Develop a hypothetical case analysis where a planted tree's survival was impacted by environmental factors that affected photosynthesis and respiration.
- Research and present at least one tree case study that highlights defense mechanism findings.
- Research at least one example of a municipal project or initiative related to planting trees resilient to a future climate.
- Calculate the amount of water a tree can absorb at a stormwater intersection over a specified time
- Calculate the amount of carbon a tree can sequester using an online app
- Use data on stormwater sequestration and/or carbon sequestration to determine which species are best for solving environmental problems.
- Use systems of equations to answer questions such as "How many and what kind of trees should be planted in a stormwater runoff swale to control the water? "

Related to SAE:

- Use terminology scientific names to accurately describe trees in final presentation.
- Recommend tree species based on their ecological impacts and benefits at a local tree planting site.
- Create a maintenance protocol for selected species that includes monitoring, diagnosing, and treating anticipated diseases, pests, and pathogens.

Leadership Alignment:

- **Students will use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation (2.A.1)** to create a maintenance protocol for selected species that includes monitoring, diagnosing, and treating anticipated diseases, pests, and pathogens.
- Students will **analyze how parts of a whole interact with each other to produce overall outcomes in complex systems (2.B.1)** by describing cultural, biological, physical factors that affect tree health

Commented [GU2]: This is an 8th grade standard. Maybe just "systems of equations" without the linear part to get at what is being explored

- Students will **demonstrate knowledge and understanding of the environment and the circumstances and conditions affecting it, particularly as relates to air, climate, land, food, energy, water and ecosystems (12.E.1)** by finding at least one example of a municipal project or initiative related to planting trees resilient to a future climate.
- Students will **investigate and analyze environmental issues and make accurate conclusions about effective solutions (12.E.4)** by using data on stormwater sequestration and/or carbon sequestration to determine which species are best for solving environmental problems

Industry Standards and/or Competencies

Name of standards: AFNR NRS

Website:

https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

AFNR NRS:

- NRS.01.02.01.c. Evaluate the species of trees present to assess the health of an ecosystem (e.g., presence of native versus invasive species, biodiversity, etc.)

Aligned Washington State Learning Standards

Mathematics

HS.DS.1 Formulate multivariable statistical investigative questions and determine how data can be collected and provide an answer, consider causality and prediction when posing the question.

HS.DS.2 Understand the issues of bias and confounding variables when collecting data and their impact on interpretation. Understand practices for collecting and handling data, including sensitive information and concerns for privacy and how that may affect data collection.

HS.DS.3 Create and analyze data sets and data displays, including but not limited to scatter plots, regressions, histograms and boxplots using technology to sort or filter data, summarize, and describe relationships between quantitative variables.

HS.DS.4 Acknowledge the presence of missing data values and understand how missing values may add bias to analysis and interpretation. Examine and discuss competing explanations for data trends observed such as confounding variables. Respond to competing arguments or interpretations of the data of different community groups, paying careful attention to what conclusions the data supports, taking into account correlation versus causation.

A.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Commented [GU3]: relating to: Create a maintenance protocol for selected species that includes monitoring, diagnosing, and treating anticipated diseases, pests, and pathogens. Students will investigate and analyze environmental issues and make accurate conclusions about effective solutions (12.E.4) by using data on stormwater sequestration and/or carbon sequestration to determine which species are best for solving environmental problems

	<p>A.REI.D.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</p> <p>F.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.</p>
<p>Science</p>	<p>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</p> <p>HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*</p> <p>HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.</p> <p>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</p> <p>HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>

Unit Information	
Unit 5: Tree Planting and Care	Total Learning Hours for Unit: 30
Unit Summary: In this unit, students will learn about and analyze the factors and management procedures that promote tree health.	
<p>Competencies:</p> <ol style="list-style-type: none"> 1. Evaluate a site to determine planting densities and varietal selection. 2. Evaluate soil characteristics to meet species needs (ex: pH, texture, moisture levels) and how human activity may impact soil profiles. 3. Understand that all trees require nutrients whether added or already existing in the soil. 4. Recognize signs and symptoms of insect damage at close observation (Frass, boring holes, etc.) and make decisions on how to manage pests. 5. Recognize signs of mechanical and animal damage (ex. Deer antler rub, animal browsing). 6. Understand the importance of random sampling to collect data for pest management. 	

7. Be able to correctly prune a tree with supervision.
8. Evaluate the effectiveness of decisions made about survival rates over time vs. the decisions made for tree health and make recommendations for revision.
9. Use equipment to gather data on tree health.

Components and Assessments

Performance Assessments:

- Identify from a list of trees which would be suitable for a particular site and purpose.
- Use trigonometry to determine how many trees can be planted in an area based on potential height, canopy, etc.
- Demonstrate proper planting techniques.
- Conduct the ribbon test (mason jar test) on various soil types.
- Identify basic components of soil (sand, silt, clay) and percentages of each.
- Evaluate soil profile (pH, texture, etc.) to inform decisions on soil augmentation and how human activity impacts soil profiles.
- Make a proper pruning cut with correct tools.
- Practice pruning and pest management using random sampling and observations.
- Practice basic pruning technique.
- Identify insect or disease damage through sign and symptoms.
- Perform tree health assessment for pest or pathogen damage.
- Use iNaturalist for analysis of various tree care decisions.
- Use random sampling of stand to collect data on presence of pests and percent dieback.
- Calculate soil volume needed to grow mature, healthy trees.
- Measure DBH of a tree over time to monitor tree growth .
- Use clinometers and other equipment to evaluate tree health.

Related to SAE:

- Create a simple landscape map that shows a clear understanding of plant selection/site. Extension: Develop a 5-year management plan with pruning goals.
- Identify the pruning needs of the tree based on species and designated function of the tree.
- Investigate the ownership and management (ex: utilities) at a proposed planting site. Record and present the procedures that would be used to determine considerations that will be taken into account when creating a planting plan.

Leadership Alignment:

- Students will **use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation (2.A.1)** by creating a simple landscape map that shows a clear understanding of plant selection/site.

- Students will **analyze how parts of a whole interact with each other to produce overall outcomes in complex systems (2.B.1)** by measuring DBH of a tree over time to monitor tree growth and using clinometers and other equipment to evaluate tree health.
- Students will **demonstrate ability to work effectively and respectfully with diverse teams (3.B.1)** while working on a pruning team
- Students will **assume shared responsibility for collaborative work, and value the individual contributions made by each team member (3.B.3)** while working on a crew that is evaluating tree health.
- Students will **adapt to varied roles, jobs responsibilities, schedules and contexts (7.A.1)** while working on a crew that is evaluating tree health.
- Students will **work effectively in a climate of ambiguity and changing priorities (7.A.2)** while working with supervisor to determine how to manage pest damage.

Industry Standards and/or Competencies

Name of standards: AFNR NRS, Cluster Skills, CRP

Website:

https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

- NRS.01.05.04.a. Compare and contrast techniques associated with soil management (e.g. soil survey and interpretation, erosion control)
- NRS.01.06.02.c. Evaluate the presence and impact of invasive species on natural resources in a given area and devise a plan to prevent, control or eliminate invasive species from that habitat.
- NRS.04.01.05.b. Assess and apply management techniques for improving outdoor recreation opportunities
- NRS.04.02.01.b. Analyze a plant disease based on its symptoms, identify if the disease needs to be reported to authorities and determine which authorities it should be reported to
- NRS.04.03.01.b. Analyze signs of insect infestation, identify if it needs to be reported to authorities and determine which authorities it should be reported to
- NRS.04.03.02.b. Analyze signs of the spread of invasive species, identify if it needs to be reported to authorities and determine which authorities it should be reported to
- NRS.04.03.03.b. Assess and implement a plan for preventing the spread of harmful species for its effectiveness

Aligned Washington State Learning Standards

Mathematics

HS.DS.1 Formulate multivariable statistical investigative questions and determine how data can be collected and provide an answer, consider causality and prediction when posing the question.

HS.DS.2 Understand the issues of bias and confounding variables when collecting data and their impact on interpretation. Understand practices for collecting and handling data, including sensitive information and concerns for privacy and how that may affect data collection.

<p>HS.DS.3 Create and analyze data sets and data displays, including but not limited to scatter plots, regressions, histograms and boxplots using technology to sort or filter data, summarize, and describe relationships between quantitative variables.</p> <p>HS.DS.4 Acknowledge the presence of missing data values and understand how missing values may add bias to analysis and interpretation. Examine and discuss competing explanations for data trends observed such as confounding variables. Respond to competing arguments or interpretations of the data of different community groups, paying careful attention to what conclusions the data supports, taking into account correlation versus causation.</p> <p>G.SRT.C.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.</p> <p>G.SRT.C.7 Explain and use the relationship between the sine and cosine of complementary angles.</p> <p>G.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</p> <p>G.SRT.D.11 (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).</p> <p>G.MG.A.1 Use geometric shapes, their measures, and their properties to describe objects</p> <p>S.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).</p> <p>S.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</p> <p>S.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p> <p>S.ID.A.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.</p>
--

	<p>S.ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.</p> <p>S.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>S.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p> <p>S.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.</p> <p>S.ID.C.9 Distinguish between correlation and causation.</p> <p>S.IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</p> <p>S.IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.</p> <p>S.IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p> <p>S.IC.B.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.</p> <p>S.IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.</p> <p>S.IC.B.6 Evaluate reports based on data.</p>
<p>Science</p>	<p>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</p> <p>HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.*</p>

Commented [GU4]: these standards align w/ 3rd credit math specifically

	<p>HS-ESS3-3: Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity</p> <p>HS-ESS3-4: Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.</p> <p>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</p> <p>HS-ETS1-4: Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.</p>
--	---

Unit Information

Unit 6: Remote Sensing and Data Analysis

Total Learning Hours for Unit: 40

Unit Summary: This unit will build on the skills of the Introductory framework that focuses on data collection, data analysis, and the use of satellite and mapping tools by giving students practice in using GIS, research skills, and evaluation skills. Students will use linear relationships to make decisions around planting, replacement, and other management decisions and use remote sensing to evaluate tree canopy. **The red addendums in the Competencies below indicate the unit this competency could be taught per the teacher’s discretion.**

Competencies:

1. Understand the role of probability in making decisions about tree planting projects - **Tree Planting and Care**
2. Know how to make inferences and justify conclusions when analyzing urban forestry data and which data sets are pertinent to study – **Trees and People**
3. Know what data is included in a tree inventory and how it is collected – **Trees and People unit**
4. Understand how industry-standard sample methods are used to extrapolate full stand composition – **Trees and People unit**

5. Understand the purpose of a basic planting site analysis (ex. How much water is available and therefore what kind of tree to plant as well as other ecosystem benefits that this tree needs to provide?) - **Tree Planting unit**
6. Be able to use maps, including land use maps and topographical maps for decision making – **Tree Planting and Care**
7. Reflect on how climate change data will impact future decisions regarding the urban and community forests in a community – **Trees and People unit**

Components and Assessments

Performance Assessments:

- Use coordinate points to locate a tree (a legal description and a waypoint in GIS) and make projections for tree planting considerations (ex. Will the tree grow to be too close to the building?).
- Collect tree characteristic data on a datasheet.
- Convert between and use imperial and metric systems.
- Estimate full stand composition using industry-standard sample methods.
- Interpret the composition of tree stands using industry standard imagery software and understand common uses.
- Use Excel to pull basic statistics of overall canopy characteristics including species composition of the stand and tree inventory
- Use GIS data for a given area to devise a management plan for an urban forested area in your community.
- Use age composition data of a stand to make recommendations based on expected changes to the stand over time.
- Establish a sample and/or a transect plot to extrapolate full stand composition in a local urban forest.
- Perform a planting site analysis considering all the different data points required to make an informed decision as to the “right tree, right place”.
- Use a global climate model to show how a local community’s trees may be impacted by changing climate and give an example

Leadership Alignment:

- Students will **use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation (2.A.1)** by interpreting the composition of tree stands using industry standard imagery software and understanding common uses.
- Students will **analyze how parts of a whole interact with each other to produce overall outcomes in complex systems (2.B.1)** by establishing a sample and/or a transect plot to extrapolate full stand composition in a local urban forest.
- Students will **interpret information and draw conclusions based on the best analysis (2.C.4)** by performing a planting site analysis considering all the different data points required to make an informed decision as to the “right tree, right place”

Industry Standards and/or Competencies

Name of standards: Agriculture, Food, and Natural Resources (AFNR) Standards: Natural Resource Science (NRS), Cluster Skills, Career Ready Practices (CRP)

Website: https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

- NRS.03.02.01.c. Evaluate the availability of and threats to natural resources using cartographic skills, tools, and technologies (e.g., spread of invasive species, movement of wildlife populations, changes to biodiversity of edge of habitat versus interior, etc.).

- NRS.03.02.02.c. Use GIS data for a given area to devise a management plan for the management, conservation, improvement, and enhancement of its natural resources.

CRP

- CRP.05.01.03.a. Classify the types of information (e.g., data, research, procedures, regulations, etc.) and resources (e.g., human, financial, technology, time, etc.) that may be used to make workplace and community decision.
- CRP.07.01.01.a. Identify and summarize reliable research processes and methods used to generate data for decision-making.

Aligned Washington State Learning Standards

Mathematics

- HS.DS.1 Formulate multivariable statistical investigative questions and determine how data can be collected and provide an answer, consider causality and prediction when posing the question.
- HS.DS.2 Understand the issues of bias and confounding variables when collecting data and their impact on interpretation. Understand practices for collecting and handling data, including sensitive information and concerns for privacy and how that may affect data collection.
- HS.DS.3 Create and analyze data sets and data displays, including but not limited to scatter plots, regressions, histograms and boxplots using technology to sort or filter data, summarize, and describe relationships between quantitative variables.
- HS.DS.4 Acknowledge the presence of missing data values and understand how missing values may add bias to analysis and interpretation. Examine and discuss competing explanations for data trends observed such as confounding variables. Respond to competing arguments or interpretations of the data of different community groups, paying careful attention to what conclusions the data supports, taking into account correlation versus causation.
- S.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- S.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
- S.ID.A.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is

	<p>not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.</p> <p>S.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>S.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p> <p>S.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.</p> <p>S.ID.C.9 Distinguish between correlation and causation.</p> <p>S.IC.A.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</p> <p>S.IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.</p> <p>S.IC.B.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p> <p>S.IC.B.4 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.</p> <p>S.IC.B.5 Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.</p> <p>S.IC.B.6 Evaluate reports based on data.</p>
<p><u>Science</u></p>	<p>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.</p> <p>HS-ESS3-5. Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.</p>

Commented [GU5]: these standards align w/ 3rd credit math specifically

Unit Information	
Unit 7: 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: <ol style="list-style-type: none"> 1. Understand 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. Understand components of a professional introductory email. 4. Compare employment sections of natural resource organization websites (both public and private). 5. Learn about natural resource jobs that relate to the student's career goals. 6. Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts. 7. Know about job shadowing and internship opportunities. 8. Understand aspects of verbal and non-verbal communication in professional settings. 9. Recognize the importance and impact of one's digital presence on future employment opportunities. 	
Components and Assessments	
Performance Assessments: <ul style="list-style-type: none"> • 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. • Update resume and cover letter to integrate course learning and recent career-related experiences. • Write a professional introductory email. • Create Indeed or Linked In profile. • Prepare and participate in a mock interview for a natural resources position. • Contact a natural resources organization to request an informational interview. • Demonstrate professional introduction of self to stakeholders. • Conduct a job search. 	
Related to SAE: <ul style="list-style-type: none"> • Present SAE project to the public and potential employers. • List knowledge, skills, and abilities gained through the course. 	

Leadership Alignment:

- Students will **reflect critically on past experiences in order to inform future progress (8.C.4)** in order to complete a self-assessment to identify qualifications and reflect on opportunities for future job skill growth.
- Students will **balance short-term and long-term goals (8.A.2)** to create a list of gained individual skills and experiences that are relevant to natural resource jobs.
- Students will **articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts (3.A.1)** in a mock interview for a natural resources position.
- Students will **demonstrate initiative to advance skill levels towards a professional level (8.C.2)** by contacting a natural resources organization to request an informational interview.

Industry Standards and/or Competencies

Name of standards: Agriculture, Food, and Natural Resources (AFNR) Standards

Website:

https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0__FINAL.pdf

FNR Cluster Skills

- CS.05 Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food & Natural Resources career pathways.
- CRP.10.01. Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.

CRP Strand (Career Ready Practices)

- 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.

Aligned Washington State Learning Standards**Environment & Sustainability**

[HS-ESS3-2](#): Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.*

[HS-ESS3-3](#): Create a computational simulation to illustrate the relationships among the management of natural resources, the sustainability of human populations, and biodiversity.

[HS-ESS3-4](#): Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.*

Mathematics	
Science	

Unit Information	
Unit 9: Supervised Agricultural Experience (SAE) Project	Total Learning Hours for Unit: 10
<p>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 and areas for future learning in performing restoration work.</p>	
<p>Competencies:</p> <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> o 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) o 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. 	
Components and Assessments	
<p>Performance Assessments:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> o Determine the goals of the SAE project. o 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:

- Students **demonstrate initiative to advance skill levels towards a professional level (8.C.2) and monitor, define, prioritize and complete tasks without direct oversight (8.B.1)** by taking responsibility for entering their own data into the system and the data will be used in the annual Agriculture Education Report

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/or Competencies

Name of standards: Agriculture Food and Natural Resources Standards

Website:

https://www.nj.gov/agriculture/ag_ed/classroom/AFNR_Standards_v2_0_FINAL.pdf

AFNR Standards: 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.

CRP Strand (Career Ready Practices)

- 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 Learning Standards

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.

Environment & Sustainability

<u>Mathematics</u>	
<u>Science</u>	Standards will be based on SAE selected.