Right Plant! Right Place!

Training Manual for Naturalist Staff

Sponsored by the
King County Noxious Weed Control Program

Written by Ginny Ballard, Julie Nelson, and Clay Heilman Nature Vision, Inc.
Revised August 2013
Originally written by NV April 2011

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Grade: 3-5
Time: 60 minutes

Overview of Activity: Through games and group activities, students will become aware of the impact of invasive plants on native plants in ecosystems. Students will learn how to identify invasive plants, how these plants spread, and how to control and remove them in their own backyards and the community.

Objectives:

1) Students become aware of the problem and want to do something about it
2) Students remove invasives, or at least do not plant them in their own neighborhoods
    - Students become peer educators to spread the word
    - Give hope
3) Students volunteer in stewardship activities in the community
    - Create more eyes in the field to alert KC staff to problem areas

Overall KCNWCP wants:

- To reduce invasives and increase people working on them
- To create weed activists
- People to become advocates for issues in their political community

Key messages:

- Fighting invasive plants can help the environment
- Invasive plants can take habitat away over time
- Invasives interfere with farmer's crops and have other detriments to the environment
- Native Plants are our heritage
- Early detection/rapid response
- An invasive plant is a plant that has a way of spreading rapidly that out-competes natives

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- Invasive plants create deserts
- The right plant in the right place
- Plant's natural defenses don't make them invasive
- Weeds are about human perception and invasives are about ecosystems

Vocabulary:

- Native Plant
- Non-native plant
- Invasive Species
- Noxious Weeds
- Ecosystem
- Adaptation
- Out-compete
- Allelopathic
- Best Management Practices
- Biological Control
- Integrated Pest Management
- Stewardship

Science Learning Standards Correlation: See Appendix A for Next Generation Science Standards, Essential Academic Learning Requirements, and WA State Science Learning Standards Correlations.

PROGRAM PRESENTATION STARTS HERE.

Introduction: ***5 minutes***

Introduce self, agency, and concepts. Say something like: "*Good morning (or afternoon)! We are so glad to be here with you. This program is a gift to you from the King County Noxious Weed Control Program. They are the adults in our community (a government agency) that are responsible to make sure our environment is the healthiest it can be by not having as many invasives and encouraging native vegetation. The King County Noxious Weed Control Program knows that when all of our citizens understand how our NW ecosystem works, then our community does a better job of taking care of it."*

Cover briefly the definition of "Invasive" and "Native" with students.
An invasive species is a non-native, introduced species that thrives and reproduces successfully in its new location, spreads and establishes beyond where it was originally introduced, out-competes or harms the native species in its new location, and disrupts local ecosystems. Native plants are those that naturally occur in its ecosystem; was growing there before humans introduced other plants from distant places.

Power Point Slide Show: ***15 minutes***

Slide 1: Title Slide

Show during introduction

Slide 2: Definition of Native plant

A plant that grew, lived, or evolved in a particular place over time.

or...

A plant that was growing here before humans introduced other plants from distant places.

Slide 3: Why are Native Plants good for the ecosystem?

- They use less water and save energy.
- They need less gardening time to maintain.
- They are resistant to disease and don't need pesticides to survive.
- They help control erosion and maintain good soil conditions for ground micro-organisms.
- They reduce flooding and clean our water and air.
- They provide proper food and shelter for wildlife.

- They belong to the Northwest ecosystem and help to keep the natural balance of life going.

Slide 4: Definition of "Weed"

- A plant growing where it wants to, not where it was planted (like a dandelion)
- A plant that takes water, food, or habitat from desired plants
- Sometimes weeds can be useful in one place and harmful in another like blackberry brambles

Slide 5: Definition of Invasive weeds

A plant introduced here from somewhere else in the world that escapes into our natural areas and disrupts the ecosystems
Non-native plants that are able to out-grow, out-spread and out-compete native plants
Cause much more harm than "regular" nuisance weeds (again like dandelions)

Slide 6: Where do Invasive plants come from?

All over the world! People bring plants from their old place to their new homes – memories of the place they left – sentimental value. However, these plants adapted quickly to the new habitat, there are no predators, and they spread outside the intended gardens. Plants came here from other places in cargo holds of boats, inside feed sacks, or stuck to clothing to name just a few ways.

Some plants get a special designation or legal term called noxious.

Slide 7: What is a Noxious weed?

Noxious weeds are invasive plants here in Washington that the government is working to stop from spreading. Some noxious weeds can't be sold because they are so invasive or harmful, and some others have to be removed whenever they spread to new areas to keep them from causing harm to the environment or farms.

- Non-native invasive plant that completely takes over the ecosystem.
- They are plant bullies – grabbing resources before native plants get a chance at food, water, space and sunlight.
- Once established are difficult to control and get rid of.
- Some are poisonous to people and animals by having defenses such as, thorns, poisons, nasty smells and flavors. And some plants such as garlic mustard release a chemical into the soil that prevents other plants from growing nearby, this is called allelopathy.
- Opportunistic – quick to grow into new openings and disturbed places, thus destroying native plant communities.

Slide 8: How are invasive plants damaging to ecosystems and wildlife?
As the invasive plant takes over it reduces habitat and food choices for native wildlife. Invasive plants are the second most important impact after habitat loss. For example, the Oregon Silver spot Butterfly is no longer found in Washington partly because invasive plant like Scotch Broom crowed out the butterfly's native food source.

a. Attracts and lures pollinators away from natives.
b. Crowds out native plants.
c. Decreases biodiversity – not as many animals or plants in the area.
d. Clogs waterways and streams. Making it difficult for boats to navigate, animals and people to swim..

Here's an example of how it happens.

Slide 9: How invasive change the ecosystem

Slide 10: How do plants spread?

Weeds spread by.... .

- Wind - Seed heads with thousands of wind borne seeds in each pod.
- Water – seeds and stems are washed downstream to new places
- Animals – seeds with barbs hook into animal's fur and travel to new locations.
- People activities – seeds are carried on cars, boats, socks, etc

Slide 11: Plant takes over and the ecosystem is out of balance.

Slide 12: Are invasives dangerous to livestock and farmers?
When invasive plants compete with crops, they decrease the amount of food a farmer can grow. Some weeds are toxic to people and animals. For example tansy ragwort, which causes fatal liver damage in horses.

We have discussed different weed categories and here's a review of the differences.

Slide 13: A Quick review of Weed categories and definitions
Nuisance weeds: any plant out of place, unwanted where it is growing, difficult to get rid of, with an ability to spread, e.g. dandelions, blackberry bushes.
Invasive weeds: Non-native plants that invade natural areas and grow and reproduce quickly, crowding out native plants and harming natural ecosystems
Noxious weeds: Nonnative, harmful plants that the government is trying to stop from spreading in order to protect farms, natural resources, ecosystems, and people.

Slide 14: How can we prevent, control and remove invasive plants?
Get to know the plants on Washington's list of harmful noxious weeds. The plants are divided into categories based on how widespread and harmful they are.
Prevent a problem by watching for new weeds and removing them right away before they spread.

Use Best Management Practices to either control or remove the noxious weed.
This means using methods or techniques that are most effective for that location without creating additional problems.

Biological Controls – using living organisms to control weeds.
For example it could be beetles, moth larvae, goats, fungus etc. These organisms also called biocontrols reduce plant growth or seed production. It takes about 4-5 years or any visible signs of weed control using this method.

Slide15: What you can do
- Learn what plants cause problems
- Don't plant noxious weeds in your yard
- Check your clothing, bike, boat, and car for noxious weed "hitchhikers"
- Never dump your aquarium pets (live or dead) and their or plants into a lake or stream. . Brazilian elodea most likely got into Lake Sammamish and Lake Washington through aquarium dumping. When it is introduced into freshwater, it forms dense beds that reduce water quality and interfere with recreational activities like swimming and boating.

Invasive Spotting Activity ***10 minutes***
- Have students look at and touch 6-10 invasive plant samples outdoors or on tables (real or plastic), and write down what they think each one is.
- Help students identify the species correctly, and have short talk on how to identify each one.

Don't Out-compete Me Simulation Game ***10-15 Minutes***
Materials:
1. Blue, red and white poker chips (Blue represents water, red represents nutrients, white represents light)
2. Native plant and Invasive Plant cards

This game is best played outside, in an open field or on pavement.

Directions:

- Spread out the poker chips in a set area, large enough for students to spread out standing with arms out.
- Tell students that they are going to be native plants or invasive plants in this game that have to get what they need to survive.
- Ask what plants need to survive.
- Possible responses: CO_2, water, nutrients, light, space.
- Give the students a role card, native plant or invasive plant. There should be more invasive plants than native plants, 10-15 Native plants and 15-20 invasive plants, depending on class size

Round 1

- Tell the students representing native plants to spread out in the space, far enough so that when their arms are out, they cannot touch the fingertips of another student. There should be about a foot of space between outstretched arms. You don't want students to bump heads or accidentally hit each other.
- The poker chips represent water, nutrients, and light. You have space and are getting your CO_2 for free.
- On your signal, carefully reach out with your arms and one leg and get as many chips as you can in 20 seconds. You have to keep the other leg in place at all times; this is your taproot keeping you stable.
- The plant that gathers the most chips out-competes the rest. Plants with the most resources can grow the largest and stay healthier. Plants in a forest compete for resources, and often young plants are outcompeted by older plants and cannot get the resources they need.

Round 2

- Ask the native plants to spread their chips back out, and have the invasive plants join the game.
- The space the students are in does not change to accommodate more players, so the students will be closer together this time
- This time, let both native plants and invasive plants reach out for resources using one arm and one leg for 20 seconds,
- Students will notice there are fewer resources available for them this time with the addition of invasive plants.

Round 3

- Ask students to hand you all the chips. Remove some.
- Decrease the size of the space-development by humans decreases available space and resources

- Students will have to stand closer to each other, so will have to be extra careful
- Ask the Native plants to place themselves. Now spread out the chips so that it is harder for the natives to reach them.
- Ask the invasive plants to pick strategic places to grow where they will get the most resources and place themselves (invasive plants are opportunistic)
- Native plants can now only use one foot to carefully gather resources
- Invasive plants can use both hands and one foot to gather, and get a 5 second start on the native plants.

Discuss why the invasive plants out-competed the Native plants.

Race for Survival! Game ***15 minutes***

(Adapted from the Great Race for Survival from Alien Invasion: Plants on the Move (http://weedinvasion.org/weed_page.php?page=facts&level=elementary)

This game can be used for older students instead of or in addition to the "Don't Out-compete Me" game. Best played outside, in an open field or on pavement.

Materials:

1) Use the same Invasive plant and Native plant cards with seed graphics

Directions: Use the game instructions for The Great Race for Survival

THE GREAT RACE FOR SURVIVAL

(Hand out one card to each student)

Each of you has been given a playing card representing a particular plant. Please take a minute to read it to yourself. PAUSE. OK, all done? Good. Now you know which plant you will be for the GREAT RACE FOR SURVIVAL. Please listen very carefully to my directions so you know how and when to move.

1. Each one of you has been magically transformed into a tiny plant seed. You are many different kinds of seeds from many different kinds of plants. Through the actions of wind, water, animals, and people, each one of you is now lying along the same stretch of this trail here in this park. You have been lying dormant in the soil all winter. People and animals using the trail have stirred up the soil

and created a disturbance, causing all of you seeds to germinate and start to grow. The events I will describe represent one year in your life. Some of you will keep on growing and moving forward, others will move backward and won't survive the year (I'm sorry to say!). When I tell you to step forward or backward, take normal walking steps.

2. It is early spring. Rain, snowmelt, warm temperatures, and long days result in rapid growth. Perennials send up new shoots from the soil and seed that have lain dormant all winter start to sprout. Everyone step forward five steps.

3. The soil along this trail contains many more seeds from some types of plants than others. Garlic mustard, milk thistle, and any knapweeds step forward two steps. Tansy ragwort, poison-hemlock and purple loosestrife step forward eight steps.

4. The growing season continues to be favorable. All plants step forward 10 steps.

5. A few species are capable of producing chemicals that they release in the soil. These chemicals inhibit the growth of nearby plants. All knapweeds and garlic mustard raise your hands. Any plant within five steps of these plants, step backward three steps.

6. Some plants complete their life cycle earlier in the growing season, making seeds long before the other species. Garlic mustard and woodland violets step forward five steps.

7. All the new growth on plants attracts insects and animals that rely on eating plants for their survival. Many more insects and animals are attracted to the native plants they evolved with, mostly leaving alone the strange invasive plants from other parts of the world. Also, many weed species have natural defenses that help them be successful

weeds by making them taste bitter or otherwise resist damage by insects and animals. The insect damage and grazing by animals slows down the growth of the native plants but not the non-native weeds. All non-native weeds step forward five steps, native plants step backward one step.

8. Summer storms and slightly cooler temperatures improve growing conditions during the normally hot summer months. All plants take six steps forward.

9. As the growing season continues, drought hits this area, and plant growth slows. Deep rooted plants do best. Yellow and Dalmatian toadflax, yarrow, all thistles, sword fern, Oregon grape, and knotweeds step forward four steps.

10. Invasive vines send out long, creeping stems that form a dense mat of vegetation, choking out all other species within a four foot radius. English ivy raise your hand. All plants within two steps of ivy, step backward three steps.

11. Plants continue to grow in the early fall months, but shorter days slows growth. All plants step forward four steps.

12. Some plants are easily hurt by disturbance to their roots. Unfortunately being this close to the trail means that hikers, runners, dogs and trail maintenance crews regularly disturb the soil and stress the roots of the plants. Invasive weeds and some native plants have adapted to disturbed areas and are better able to survive this by having extensive roots, growing back quickly, or just being tough. Red osier dogwood, yarrow, sword fern, spirea, and snowberry step forward two steps. All other native plants, step backward two steps. Also, all non-native weeds step forward three steps.

13. Much plant energy is now devoted to food storage and seed production. All plants step forward two steps.

14. Plants that are able to send their seeds long distances help ensure their success by finding new areas in which to grow. Diffuse knapweed breaks off at the base and tumbles in the wind and attaches itself to vehicles driving by. Tansy ragwort seeds have fluffy structures that get caught on animals, people and vehicles. English ivy seeds are carried in berries that birds eat and deposit below trees they rest in. Burdock seeds have hooks on them that easily get tangled in shoe laces, clothing, and animal fur. Puncture vine seed spines are so sharp they puncture soles of shoes and tires on bicycles, ATV's and cars. Being able to attach themselves to animals, people or vehicles, these seeds are able to travel the furthest. Diffuse knapweed, tansy ragwort, English ivy, burdock, and puncture vine take four steps forward.

15. Several windy days have occurred over the last week, followed by heavy rains. Plants that have seeds that are attached to a plume or pappus of fine hairs (like a dandelion), are quickly moved across the park and even new areas miles away. All thistles, tansy ragwort, and poison-hemlock, take three steps forward.

16. Plants that are near the water's edge release their seeds and root fragments to the rising waters and are dispersed all over the waterway and down into the rest of the watershed and even out to Puget Sound. Purple loosestrife, spiraea, and knotweeds take five steps forward.

17. It is winter now. All plants adapted to our type of climate have ways to survive cold weather. Seeds are hard and can stay dormant but alive through the winter and even over many years. Perennials die back above ground but have sturdy roots and underground stems called rhizomes that keep them alive through the winter. Some

plants have low-growing forms that can persist through cold weather, slowing growing but mostly lying in wait for rapid growth in the spring. Even shrubs and trees slow down their growth and can resist cold weather. All plants are done growing for the year so you can stay where you are.

Summary

So the year is over. Your position relative to the others represents the growth of your plant species this year. If you are way behind the other plants, your survival is questionable. If there were only a few of your in the area to start with, your species may disappear in the near future, out-competed by those plants farther ahead. If you are ahead of the other plants, then your species has out-competed the rest and has a good chance of spreading and taking over this area.

Let's find out how the native plants fared against the non-native invasive plants. Raise your hand if your plant is native. Let's count the hands. Now, raise your hand if your plant is a non-native weed (if you don't know, ask me). Let's count the hands. Which group did better in the race for survival? If the non-natives weren't here, would the race look any different?

Conclusion and Review: *5 minutes*

Review what an invasive plant is, and ways they outcompete native plants. Discuss stewardship, and what students are willing to do to help control and remove weeds. Ask students to please tell their families and peers what they learned today. Give students handouts, thank them, and depart.

Appendix A: Science Standards Met by Grade Level

Next Generation Science Standards Correlation

3rd Grade

3-LS4 Biological Evolution: Unity and Diversity

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

Disciplinary Core Ideas

LS4.C: Adaptation
For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)
LS4.D: Biodiversity and Humans
Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)

Crosscutting Concepts

Cause and Effect
Cause and effect relationships are routinely identified and used to explain change. (3-LS4- 2), (3-LS4-3)

4th Grade

4-LS1 From Molecules to Organisms: Structures and Processes

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Disciplinary Core Ideas

LS1.A: Structure and Function

Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

5th Grade

5-LS1 From Molecules to Organisms: Structures and Processes

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms
Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

5-ESS3 Earth and Human Activity

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems
Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

WA State Science Learning Standards

Grades 2-3

EALR 1: Systems

2-3 SYSA A system is a group of interacting parts that form a whole.

2-3 SYSE Similar parts may play different roles in different objects, plants, or animals.

EALR 2: Inquiry

2-3 INQA (Question) Scientific investigations are designed to gain knowledge about the natural world.

2-3 INQB (Investigate) A scientific investigation may include making and following a plan to accurately observe and describe objects, events, and organisms; make and record measurements, and predict outcomes.
2-3 INQC (Infer) Inferences are based on observations.

2-3 INQE (Model) Models are useful for understanding systems that are too big, too small, or too dangerous to study directly.

2-3 INQF (Explain) Scientists develop explanations, using observations (evidence) and what they already know about the world. Explanations should be based on evidence from investigations.

EALR 3: Application

2-3 APPA Simple problems can be solved through a technological design process that includes: defining the problem, gathering information, exploring ideas, making a plan, testing possible solutions to see which is best, and communicating the results.

2-3 APPB Scientific ideas and discoveries can be applied to solving problems.

2-3 APPC People in all cultures around the world have always had problems and invented tools and techniques (ways of doing something) to solve problems.

2-3 APPE Successful solutions to problems often depend on selection of the best tools and materials and on previous experience.

EALR 4: Life Science

Big Idea: Structures and Functions of Living Organisms (LS1)

2-3 LS1A Plants have life cycles that include sprouting, growing to full size, forming fruits and flowers, shedding seeds (which begins a new cycle), and eventually dying. The details of the life cycle are different for different plants.

EALR 4: Life Science

Big Idea: Ecosystems (LS2)

2-3 LS2A Ecosystems support all life on the planet, including human life, by providing food, fresh water, and breathable air.

2-3 LS2B All ecosystems change over time as a result of natural causes (e.g., storms, floods, volcanic eruptions, fire). Some of these changes are beneficial for the plants and animals, some are harmful, and some have no effect.

2-3 LS2C Some changes in ecosystems occur slowly and others occur rapidly. Changes can affect life forms, including humans.

2-3 LS2D Humans impact ecosystems in both positive and negative ways. Humans can help improve the health of ecosystems so that they provide habitats for plants and animals and resources for humans over the long term. For example, if people use fewer resources and recycle waste, there will be fewer negative impacts on natural systems.

EALR 4: Life Science

Big Idea: Biological Evolution (LS3)

2-3 LS3C Sometimes differences in characteristics give individual plants or animals an advantage in surviving and reproducing.

Grades 4-5

EALR 1: Systems

4-5 SYSA Systems contain subsystems.

4-5 SYSB A system can do things that none of its subsystems can do by themselves.

EALR 2: Inquiry

4-5 INQA (Question) Scientific investigations involve asking and answering questions and comparing the answers with evidence from the real world.

4-5 INQB (Investigate) Scientists plan and conduct different kinds of investigations, depending on the questions they are trying to answer. Types of investigations include systematic observations and descriptions, field studies, models, and open-ended explorations as well as controlled experiments.

4-5 INQF (Models) A scientific model is a simplified representation of an object, event, system, or process created to understand some aspect of the natural world. When learning from a model, it is important to realize that the model is not exactly the same as the thing being modeled.

EALR 3: Application

4-5 APPF Solutions to problems must be communicated, if the problem is to be solved.

4-5 APPH People of all ages, interests, and abilities engage in a variety of scientific and technological work.

EALR 4: Life Science
Big Idea: Structures and Functions of Living Organisms (LS1)

4-5 LS1A Plants and animals can be sorted according to their structures and behaviors.

4-5 LS1B Plants and animals have different structures and behaviors that serve different functions.

4-5 LS1C Certain structures and behaviors enable plants and animals to respond to changes in their environment.

4-5 LS1D Plants and animals have structures and behaviors that respond to internal needs.

EALR 4: Life Science

Big Idea: Ecosystems (LS2)

4-5 LS2A An ecosystem includes all of the populations of living organisms and nonliving physical factors in a given area. Living organisms depend on one another and the nonliving physical factors in their ecosystem to help them survive.

4-5 LS2D Ecosystems can change slowly or rapidly. Big changes over a short period of time can have a major impact on the ecosystem and the populations of plants and animals living there.

4-5 LS2E All plants and animals change the ecosystem where they live. If this change reduces another organism's access to resources, that organism may move to another location or die.

4-5 LS2F People affect ecosystems both positively and negatively.

EALR 4: Life Science

Big Idea: Biological Evolution (LS3)

4-5 LS3A In any ecosystem, some populations of organisms thrive and grow, some decline, and others do not survive at all.

4-5 LS3B Plants and animals inherit many characteristics from their parents. Some inherited characteristics allow organisms to better survive and reproduce in a given ecosystem.

Grades 2-3

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.

EALR 1: Systems (CCA)
Role of Each Part in a System (CC)
See how parts of objects, plants, and animals are connected and work together.
SYSA, SYSE

EALR 4: Life Science (D)
Ecosystems (BI)
Changes in Ecosystems (CC)
Changes in ecosystems affect living populations and the non-living elements of a defined area.
LS2A, LS2B, LS2C, LS2D

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.

EALR 2: Inquiry (CCA)
Conducting Investigations (CC)
Carry out investigations by using instruments, observing, recording, and drawing evidence-based conclusions.
INQA, INQB, INQC, INQE, INQF

EALR 4: Life Science (D)
Ecosystems (BI)
Changes in Ecosystems (CC)
Changes in ecosystems affect living populations and the non-living elements of a defined area.
LS2A, LS2B

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.

EALR 3: Application (CCA)
Solving Problems (BI)

Develop a solution to a problem by using a simplified technological design process. Investigate the use of tools.
APPA, APPB, APPC, APPE

Grades 4-5

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.

EALR 4: Life Science (D)
Ecosystems (BI)
Food Webs (CC)
Changes in ecosystems affect the populations that can be supported in a food web.
LS2A, LS2D, LS2E

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.

EALR 2: Inquiry (CCA)
Planning Investigations (CC)
Plan different kinds of investigations, including field studies, systematic observations, models, and controlled experiments.
INQA, INQB, INQF

EALR 4: Life Science (D)
Ecosystems (BI)
Food Webs (CC)
Changes in ecosystems affect the populations that can be supported in a food web.
LS2A, LS2D, LS2E

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.

EALR 3: Application (CCA)
Different Technologies (CC)
Define technologies and the technological design process to understand the use of technology in different cultures and career fields.
APPF, APPH