

Listed below is an overview of lesson plans, methods and objectives that The Lands Council offers in regards to Project SUSTAIN's four units, Forests, Water, Wildlife and Sustainability. Please read through the individual lessons and consult with TLC to choose a set of complimenting programs preferred for your classroom. The Lands Council encourages schools to choose a total of 16 in-class lessons and 4 field trips to complete the Project SUSTAIN program.

UNIT 1. FORESTS

| Title of Lesson | Method | Objectives |
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| Forest for the Trees | Students role-play managing a tree farm. | <ul style="list-style-type: none"> - Understand how forest resources are managed to provide products and other benefits. - Understand economic factors that influence management decisions for private forest lands. |
| Native Plants in Our Own Backyards ¹² | Students learn about local ecology, identify common wildflowers, and research and deliver a short presentation on a wildflower of their choice. | <ul style="list-style-type: none"> - Correctly answer questions about local area ecology. - Recognize and identify 10 common wildflower species. - Conduct internet research. |
| Web of Life | By conducting research and simulating a food web, students take a close look at forest ecosystems and the ways in which plants and animals are connected to each other. | <ul style="list-style-type: none"> - Understand that forest ecosystems are composed of interdependent organisms and other components. |
| Forest Consequences | Students learn about the effects of human activities on a forest and explore the trade-offs and compromises involved in solving complex land use issues. | <ul style="list-style-type: none"> - Critically evaluate options for managing or using a piece of forested land. - Make a land use decision and explore consequences of that decision. |
| How Big is Your Tree? ¹ | Students measure trees in different ways, become familiar with a tree's structure, and learn the importance of standard units of measure and measuring techniques. | <ul style="list-style-type: none"> - Measure and compare trees and tree parts. - Discuss how and why people measure things. - Explain the need for consistency in measuring. |
| People of the Forest | By comparing and contrasting different forest peoples (e.g. Mbuti Pygmies of Africa, Yanomami and Kuna of Latin America), both past and present, students learn about ways people have depended on forests throughout history. | <ul style="list-style-type: none"> - Describe lifestyles of several forest-dwelling peoples and ways that they depend on the forest. - Describe effects that forest peoples have had on their environment. - Write a story focusing on a "day in the life" of a member of one group of forest people. |

¹Field lesson

²Also appropriate for high school students

***Ponderosa Pine Matching Project Challenge (semester project, high school students only).** Students will go door-to-door in their respective neighborhoods, distributing educational materials on the benefits of Ponderosa pine and other native trees and shrubs. Residents will be able to place an order for a FREE Ponderosa pine or other local native seedling (oceanspray or mock orange) to plant on their property in the spring. Students will match each tree ordered by planting a Ponderosa pine seedling during a tree planting event in April or May, ideally to take place in one of the neighborhoods. Students will take tree species orders in March and deliver all seedlings in April, "Girl Scout cookie" style! Residents will also have the opportunity to donate to our urban forest restoration efforts if they choose.

UNIT 2. WATER

| Title of Lesson | Method | Objectives |
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| Water Canaries ¹ | Students investigate a stream or pond using sampling techniques. | <ul style="list-style-type: none"> - Identify aquatic macroinvertebrates. - Assess relative environmental quality of a stream or pond using indicators of pH, water temperature, dissolved O₂, and presence of diversity of organisms. |
| Water We Eating? ¹ | Students visit a local supermarket and compile a list of products originating in aquatic habitats. | <ul style="list-style-type: none"> - Identify foods derived from aquatic sources and their geographic origins. - Describe importance of aquatic environments as food sources. |
| What's in the Water? | Students analyze pollutants found in a hypothetical river, graph quantities of pollutants, and make recommendations about possible actions to improve habitat. | <ul style="list-style-type: none"> - Identify major sources of aquatic pollution. - Make inferences about potential effects of aquatic pollutants on wildlife and wildlife habitats. |
| Something's Fishy Here! | Students read and discuss a story about river pollution, inventing their own endings that lead to environmental action in their community. | <ul style="list-style-type: none"> - Identify potential cause-and-effect relationships involving aquatic pollution. - Generate and evaluate alternative solutions to problems of aquatic pollution. - Outline plan to reduce consequences of possible aquatic pollution in the Spokane community. |
| Fishable Waters ² | Students evaluate how healthy fish populations provide multiple benefits for their community, and they play a card game to explore the connection between water quality, habitat, and "fishable, swimmable" waters as stated in the Clean Water Act of 1972. | <ul style="list-style-type: none"> - Identify and describe value of clean water and healthy fish populations. - Infer that populations and species composition are dynamic. - Differentiate between harmful and positive impacts on water quality and fish populations, and understand that human activities can accelerate natural processes such as runoff, sedimentation, and nutrient cycles. - Understand that management of aquatic species and habitats is directly influenced by land-based watershed activities. - Learn that legislation (such as the Clean Water Act and state fishing regulations) is a tool used to manage resources. |
| To Dam or Not to Dam ² | In a group role-play, students portray individuals representing differing perspectives and concerns related to a complex issue. | <ul style="list-style-type: none"> - Evaluate potential positive and negative effects of dam construction on a river. |
| Sum of the Parts | Students demonstrate how everyone contributes to the pollution of a river as it flows through a watershed and recognize that everyone's contribution can be reduced. | <ul style="list-style-type: none"> - Distinguish between point and non-point source pollution. - Recognize that everyone contributes to and is responsible for a river or lake's water quality. - Identify Best Management Practices to reduce pollution. |
| Capture, Store, & Release | Students use a household sponge to simulate how wetlands capture, store, and release water. | <ul style="list-style-type: none"> - Recognize that groundwater, surface water, and precipitation can contribute water to wetlands. - Describe how wetlands capture, store, and release water. |
| Get the Groundwater Picture ² | Students learn about basic groundwater principles by creating their own geologic cross section or "earth window." | <ul style="list-style-type: none"> - Learn about Spokane Valley-Rathdrum Prairie (SVRP) Aquifer. - Compare movement of water through diverse substrates. - Relate different types of land uses to potential groundwater and aquifer contamination. |

UNIT 2. WATER

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| A Grave Mistake ² | Students analyze data to solve a mystery and identify a potential polluter. | <ul style="list-style-type: none"> - Analyze data to trace flow of contaminants in groundwater. - Conclude that past solutions, developed with the best of intentions, may create contemporary problems. |
| There is No Point to This Pollution ² | Students analyze data to solve a mystery, interpret a topographic map, and analyze and compare water quality data to learn about cumulative impacts of nonpoint source pollution. | <ul style="list-style-type: none"> - Identify point and nonpoint source (NPS) pollutants. - Demonstrate cumulative effects of NPS pollution. - Read and interpret contour map while identifying important map clues about watersheds and water quality. - Graph, analyze, and interpret data sets to draw conclusions about a pollution source. - Compare local household and community NPS pollution to water quality standards. - List ways to reduce or eliminate NPS pollution. |
| Enviroscape™ Spokane! | Students learn about point and non-point source pollution in watersheds and aquifer contamination in a hands-on demonstration using the Enviroscape™. | <ul style="list-style-type: none"> - Demonstrate causes of pollution and solutions to limiting its entry into surface and groundwater. |
| Ice Cream Aquifer | Students learn about aquifer composition and groundwater contaminant flow by making (and eating!) an ice cream soda. | <ul style="list-style-type: none"> - Describe the different parts of an aquifer. - Demonstrate aquifer drawdown. - Discuss important characteristics about the SVRP Aquifer. |

¹Field lesson

²Also appropriate for high school students

*TLC is also offering an interactive 10-lesson sub-curriculum for grades 5-9 on the Spokane Valley-Rathdrum Prairie (SVRP) Aquifer, developed by the Spokane Aquifer Joint Board and the West Valley Outdoor Learning Center. Topics include aquifer formation, water quantity and quality, water rights, and water systems. Please let us know if you are interested in incorporating one or more of these lessons into your Project SUSTAIN program.

UNIT 3. WILDLIFE

| Title of Lesson | Method | Objectives |
|----------------------------------|---|---|
| Edible Beaver Dam | Students construct and eat a beaver dam made of pretzel sticks, chow mein noodles, cocoa pebbles, and chocolate frosting. | <ul style="list-style-type: none"> - List 5 facts relating to beaver natural history/ecology. - Identify what beavers need in their habitats. - Understand how beavers construct dams. - Describe three ecological benefits of beaver dams. |
| Dam It! | Students participate in a physically-active role-playing activity to learn about beaver habitat and different tree species. | <ul style="list-style-type: none"> - Identify what beavers need in their habitats. - Understand how beavers construct dams. - List preferred tree types for beaver food and dams. - Explain dangers beavers face in their own habitat. |
| The Best Dam Water Stopper | Students build dams across a tabletop stream simulator using rocks, sand, and "logs." | <ul style="list-style-type: none"> - List materials beavers use to build dams. - Identify successful techniques in damming water. - Understand the challenges beavers face in dam construction. |
| Bearly Born | Students illustrate, compute, and graph differences between people and black bears at various stages of maturity. | <ul style="list-style-type: none"> - Understand ecology and natural history of black bears. - Identify similar survival needs of black bears and human babies. |
| Wildlife Treasure | Students go outside on a "treasure hunt" for wildlife. | -Understand that humans and wildlife share environments. |
| Hunt ¹ | | <ul style="list-style-type: none"> - Demonstrate that humans do not have exclusive use of environments. - Generalize that wildlife can be all around us, even if we don't actually see or hear it. |
| Urban Nature Search ¹ | Students go outside to observe an environment and use a questionnaire to assist in gathering data. | <ul style="list-style-type: none"> - Generalize that each environment has characteristic life forms. - Observe and explore plants, animals, birds, predator/prey relationships, plant disease, food chains, bees, lichens, water, mulches, habitat, etc. |
| Good Buddies | Students research pairs of animals, play a card game, and classify the pairs of animals according to three major forms of symbiotic relationship. | <p>Define symbiosis, commensalism, mutualism, and parasitism.</p> <p>Identify animals that live in each type of symbiotic relationship.</p> <p>Explain that symbiotic relationships are examples of the intricate web of interdependence within which all plants and animals live.</p> |
| Birds of Prey ³ | Students interpret data and generate test hypotheses. | <ul style="list-style-type: none"> - Interpret a graph of an animal population, noting changes over time. - Hypothesize a relationship between temperature, ground squirrel behavior, and falcon populations. - Predict the foraging distribution of falcons following aestivation of ground squirrels. - Generalize that ecosystems are comprised of interdependent parts. |
| Carrying Capacity ² | Students become herds of animals seeking food in a physically-involving activity. | <ul style="list-style-type: none"> - Formulate and test hypotheses related to wildlife populations and carrying capacity. - Describe the significance of carrying capacity. |
| I'm Thirsty ² | Students use data on desert bighorn sheep to perform mathematical calculations and make inferences. | - Make inferences about the importance of adaptations in order for wildlife and other animals to survive. |

UNIT 3. WILDLIFE

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| Deer Crossing ² | Students are given background information on a deer management issue and asked to make recommendations. | <ul style="list-style-type: none"> - Identify various factors involved in a wildlife management issue. - Evaluate alternatives in a complex issue involving wildlife. |
| Cabin Conflict ² | Students participate in a role-playing activity. | <ul style="list-style-type: none"> - Describe possible circumstances in which public and private interests may conflict in land-use issues. - Evaluate points of view which may arise under such circumstances. |
| Deadly Links | Students become “hawks,” “shrews,” and “grasshoppers” in a physical activity. | <ul style="list-style-type: none"> - Give examples of ways in which pesticides enter foods chains. - Describe consequences of pesticides entering food chains. |
| No Water Off a Duck’s Back ² | Students conduct experiments using water, oil, hard-boiled eggs, detergent, and feathers. | <ul style="list-style-type: none"> Identify ways in which oil spills can adversely affect birds. Describe possible negative consequences to wildlife, people, and the environment from human-caused pollutants. |

¹Field lesson

²Also appropriate for high school students

³High school students only

UNIT 4. SUSTAINABILITY

| Title of Lesson | Method | Objectives |
|-------------------------------------|---|---|
| Viewpoints on the Line ³ | Students think critically about controversial environmental issues, form opinions, express their opinions to classmates, and listen to the views of others. | <ul style="list-style-type: none"> - Share views and opinions with others and gain awareness on a range of opinions related to contemporary environmental issues. - Identify need for balanced information when forming opinions. |
| Oh Deer! | Students portray deer and habitat components in a physical activity. | <ul style="list-style-type: none"> - Identify and describe food, water, and shelter as three essential components of habitat. - Describe factors that influence carrying capacity. - Define “limiting factors” and give examples. - Recognize that some fluctuations in wildlife populations are natural as ecological systems undergo constant change. |
| Energy Sleuths | Students learn about different sources of energy, how energy is used in their daily lives, and important energy use issues (e.g. growing scarcity of energy resources, environmental impacts of current energy systems). | <ul style="list-style-type: none"> - Identify different energy sources. - Discuss pros and cons of energy sources from economic, social, and environmental perspectives. - Describe the ways in which people use energy in their daily lives. |
| A Peek at Packaging | Packaging, made from both renewable and non-renewable resources, is necessary to protect an item, keep it fresh, make it tamper-proof, and make it easy to transport and store. Students examine the pros and cons of different packaging strategies. | <ul style="list-style-type: none"> - Describe different purposes for packaging. - Identify pros and cons of different types of packaging. - Explore how packaging affects our decisions as consumers. |

UNIT 4. SUSTAINABILITY

| Title of Lesson | Method | Objectives |
|-------------------|--|--|
| Resource Go-Round | By tracing the life cycle of a pencil, students gain insight into processes by which natural resources are turned into products and recycled into other products. | <ul style="list-style-type: none">- Identify natural resources from which products are derived.- Trace the “cradle to grave” life cycle of a product, from natural resources to raw materials to finished product.- Describe how energy is consumed in the manufacturing and transportation of products and how it might be conserved. |
| Renewable or Not? | Students discover why sustainable use of natural resources is so important through activities involving popcorn and cookies and focusing on global and generational food distribution. | <p>Identify renewable, nonrenewable, perpetual, reusable, and recyclable resources and explain differences among them.</p> <p>Play a game that simulates society’s use of renewable and nonrenewable resources.</p> |

¹Field lesson

²Also appropriate for high school students

³High school students only

ADDITIONAL CURRICULUM FEATURES: “Dig It! The Secrets of Soil”

The “Dig It! The Secrets of Soil” exhibit from the Smithsonian's National Museum of Natural History will be on display in Spokane at the MAC between January and June, 2012. TLC attended a classroom activity development workshop in July and received a comprehensive curriculum on soils which is meant to complement the exhibit. The curriculum is geared towards a variety of grade levels and is arranged into the following categories: arts and culture, chemistry, physical earth, general earth, earth science, web soil survey, and organic matter. Please let us know if you’d like to learn more about this and incorporate soils education into your Project SUSTAIN program!

FIELD TRIP OPTIONS

| Location | Activity | Suggested Time of Year | Suggested Topic(s) |
|--|---|-------------------------------|--|
| Little Spokane River ^o | Canoeing | Early-fall/Late-spring | Riparian ecosystems |
| Deep Creek Canyon (Riverside State Park) | Hiking | Fall | Local field geology |
| Dishman Hills Natural Area | Hiking | Fall or Spring | Assorted: plants, animals, habitat, ecology, geology, etc. |
| Mt. Spokane State Park | Snowshoeing | Winter | Subalpine ecosystems |
| Turnbull NWR | Bicycling | Spring | Fire ecology, channel scablands. |
| Liberty Lake County Park ^o | Hiking | Spring | Beaver ecology, natural history, and restoration |
| Museum of Arts & Culture (MAC) | Museum tour | January-June | "Dig It! The Secrets of Soil" exhibit |
| Upriver Dam | Dam tour | Year-round | Dam operations, SVRP Aquifer |
| Water Resource Center (WRC), Spokane County Regional Water Reclamation Facility (SCRWRF) | Interactive display and virtual facility tour | Spring | SVRP Aquifer and Spokane River, county sewer system and SCRWRF |
| West Valley Outdoor Learning Center (WVOLC) | Site visit | Year-round | Various |
| Various sites | Tree planting | Fall and spring | Tree planting |

^oIncludes option for water quality testing and/or macroinvertebrate sampling.

Thank you again for allowing The Lands Council the opportunity to help enhance current earth science curricula through Project SUSTAIN - for more information or for questions, please contact Kat Hall at (509) 209-2403 or at khall@landscouncil.org