

Standards-Aligned Lessons & Activities for Kindergarten

The Weather Outside is...

Activity Description: Keep track of the number of days that were sunny/rainy during a certain month. Also track relative temperatures (cold enough to need a coat or warm enough to comfortably wear shorts, etc.) and make a simple graph. This gets the students observing the weather outside and noticing patterns and weather.

Standard Addressed: K-ESS2-1
(NGSS)

(Which has to do with... making quantitative & qualitative observations about weather patterns)

What Do You Need?¹

Activity Description: Make a chart/list of the things people need to survive, another to show what animals need, another to show what plants need (have students help come up with ideas and discuss needs vs. wants). Compare the needs of people/plants/animals. Then, talk about how living things fulfill these needs/where they get them.

Standard Addressed: K-ESS3-1
(NGSS)

(Which has to do with... using a model to represent the relationship between plant/animal needs and the place where they live; living things need air, water, and various resources and tend to live in areas that have those resources)

Adapted From: “Beautiful Basics” (Project WILD, p. 58)

Possible Extension: Go over what could be considered “evidence” of various needs (such as a bird eating a worm, or broken pieces of nuts under a tree where a squirrel was eating). Take a tour around the grounds or field trip to other nearby location, and have students look for evidence of various needs... (Adapted from Project WILD, p. 84)

¹The “What Do You Need?” lesson is a nice lead-in to “Reducing Our Impact” below.

Reducing Our Impact

Activity Description: Present simple human actions/activities that are harmful to the environment and other species, and have students brainstorm other ways to meet people’s needs and wants.

Standard Addressed: K-ESS3-3
(NGSS)

(Which has to do with... coming up with solutions to reduce the negative impacts of humans on land, water, air, and other living beings)

Adapted From: “Ethi-Thinking” (Project WILD, p. 303-304)

Possible Extension: Have students think about the ecological/environmental impact of games they play and come up with new games or new way to play that are less detrimental (Adapted from “Playing Lightly on the Earth” – Project WILD, p. 432-433)



Standards-Aligned Lessons & Activities for 1st Grade

Inspired by Nature

Activity Description: As a possible introduction, guide students in learning about products/materials we use that come from plants/trees/nature, from fruit to cosmetics, paper, cork, packaging... Then, have students design a solution based on a helpful adaptation found in nature.

Standard Addressed: 1-LS1-1
(NGSS)

(Which has to do with... using materials to design a solution to a human problem by mimicking how plants and animals use external parts to help them grow, survive, and meet their needs)

Materials Needed: Items to show students, plus clean packaging (plastic, cardboard, etc.) that would otherwise be thrown away

Make it a STE(A)M Activity: Present a problem that is relevant to the students – such as kids getting hurt while riding bikes, and have the students design clothing that is protective (based on plant/animal protective outer covering in this example). Ask students how plants/animals address a similar problem & prompt them to devise a solution based on the answer in nature.

What's the Message?

Activity Description: Prep the students by telling them that you'll be going outside to notice ways that humans and other species utilize light or sound to communicate. Take students outside to observe sounds and try to identify where they're coming from/what's making the noise. Discuss whether the sound is intentional/necessary for communication, such as a bird chirping to another bird, or accessory/not essential for function (such as the noise of an airplane flying, branches creaking).

Standard Addressed: 1-PS4-4
(NGSS)

(Which has to do with... designing & building a device that uses light or sound to communicate over a distance)

Materials Needed: Light bulbs, wire or copper tape, noise-making materials

Adapted From: "Sounds Around" (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 26-30)

Make it a STE(A)M Activity: Present a scenario such as people on hills/mountains on two sides of the Umpqua River need to communicate a message and there is no cell service. Have students design and build a device which uses sound/light for communication. If possible, test it out in the field and make adjustments as needed.

Why is it Like That?

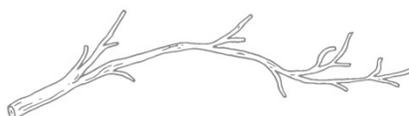
Activity Description: Review shapes – possibly give students a shape reference such as a necklace/bracelet or shape pieces and/or read a book about shapes. Then, head outside and take photos of/find shapes in nature. (It might be helpful to assign particular shapes to groups of students.) You can then make a mural of the photos or have them draw what they saw in nature (this could be done as a nature journal entry on shapes). Discuss connections between shape and function/ability to solve a given problem. Wrap up the activity by having students write a poem/descriptive words in the shape of something in nature the students observed.

Standard Addressed: K-2-ETS1-2
(NGSS)

(Which has to do with... developing a sketch, drawing, or model to illustrate the relationship between an object's shape and function)

Materials Needed: Shape cutouts, nature journals

Adapted From: "The Shape of Things" & "Poet-Tree" (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 17-19 and 31-33)



Standards-Aligned Lessons & Activities for 2nd Grade

Plants & Animals Around the World

Activity Description: Cut out photos of as many different species of plants or animals as possible from magazines, or visit a botanical garden or zoo and observe the vast diversity of different species. Have students sort them into categories and ask why they sorted them the way they did.

Standard Addressed: 2-LS4-1
(NGSS)

(Which has to do with... making observations of plants and animals to compare the diversity of life in different habitats)

Materials Needed: Magazines, scissors, glue (or nature journal and/or items for diorama such as cardboard box, paint, clay)

Adapted From: “Picture This” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 34-36)

Possible Extension: Have each student research/learn about a different type of plant or animal and make a diorama (or do a nature journaling entry) to represent it within its habitat.

States & Motion of Water

Activity Description: First, go over different states of matter and explain that water can be found in different forms – such as the liquid water we drink, ice, and steam/vapor, etc. To help the students understand, you can have them act out the movements of water molecules through the water cycle. Next, have students think about where water is likely to be found, and in what state.

Standard Addressed: 2-ESS2-3
(NGSS)

(Which has to do with... obtaining information to identify where water is found on Earth and understanding this can be solid or liquid)

Adapted From: “Water in Motion”, “Molecules in Motion”, and “Imagine!” (Project WET, p. 450-453, 47-49, and 157-160)

Possible Extension: Set up a mini ecosystem in a jar to visualize the water cycle and see the movement of water as it evaporates and condenses again (Adapted from “Water Models” and “Water Cycle in a Jar” – Project WET, p. 204-205)

Staying Warm &/Or Dry

Activity Description: Blankets and coats can be made of different natural (such as wool, down, cotton, bamboo) and synthetic/human-made materials. Have students look at the tags on blankets and coats they have at home. On a cold or wet day, have students compare the warmth/dryness of various materials.

Standard Addressed: K-2-ETS1-3
(NGSS)

(Which has to do with... comparing the strengths and weaknesses of two objects designed to solve the same problem)

Materials Needed: Coats, blankets

Possible Extension: You could also have students observe what happens when rain falls on different natural materials outside – for example, wood, soil, waxy leaves, etc. and hypothesize why this happens/the benefit.

Make it a STE(A)M Activity: There has been an increasing number of homeless people in the area. Task students with designing rainproof tents, coats or other gear at “low-cost”/that could be easily made from found materials.



Standards-Aligned Lessons & Activities for 3rd Grade

Ideal Growing Conditions

Activity Description: Conduct an experiment to determine the impact of different conditions on seedling growth. (I recommend peas because they're easy to grow.) Keep everything the same except for the factor being tested. You can have students help come up with some of the different variables, but examples include: varying amounts of water, temperature, amount of sunlight, access to a trellis/something for the tendrils to wrap around, etc. (Be sure to clearly label each container with the variable being tested.) Over several weeks, the students should notice differences in growth/appearance, likely related to the different factors.

Standard Addressed: 3-LS3-2
(NGSS)

(Which has to do with... using evidence to support the explanation that traits can be influenced by the environment)

Materials Needed: Thermometer(s), pea (or other fast-growing) seeds, soil, water, plant pots, other materials/variables

Blend In Or Become Lunch²

Activity Description: Prior to the activity, hide/spread out a number of different-colored items (preferably biodegradable if you're doing this outside) which represent "food" that birds eat (see Materials Needed below). Be sure to make a note of the quantities of each item. Prep the students by letting them know that you'll be doing a simulation in which they're pretending to be birds looking for foods to take back to their nest. Bring up any expectations/rules you want them to follow – such as no running, whoever touches the item first gets to pick it up/no fighting, not picking up any living creatures or anything sharp/dangerous, and the signal that you'll give to stop/freeze/stop collecting. Give a limited amount of time for the students to look for the items at first, so they're unlikely to find everything. Then, have the students add up/calculate the total number of items found and compare this with the total number that were hidden. Also have them reflect on the characteristics (such as type, color, size, (or location)) of the items which were collected first and discuss the benefits of camouflage/blending in with one's environment. You could do a second round in which students try to find the remaining items.

Standard Addressed: 3-LS4-2
(NGSS)

(Which has to do with... using evidence to construct an explanation for how variations in characteristics among individuals of the same species may provide advantages)

Materials Needed: Miscellaneous items of various colors, sizes, and shapes to represent different types of "food" consumed by birds – for example: twine and yarn to represent worms, wooden buttons/beads to represent seeds (some should blend in with the area where they'll be dispersed, and others should be more easily visible)

Adapted From: "Birds & Worms" (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 111-112)

Possible Extension: Show pictures of different colored peppered moths on trees with and without lichen and discuss the impact of the industrial revolution or have students research the camouflage of various types of animals that are native to the region.

²This offers a nice lead-in to "Suitable for the Environment" below.

Suitable for the Environment

Activity Description: Research and write about an animal that lives in a certain habitat; one option is to exchange letters with another student – perhaps at a different school or in a different class – who learned about a different animal in the same habitat or an animal from a different habitat. Have students compare the suitability of the various animals in the same habitat, or if their animal would be able to survive in a different habitat. This could be expanded to involve pen paling with a class from a different region.

Standards Addressed: 3-LS4-3 & 3-ESS2-2 (NGSS)	<i>(Which have to do with... some organisms surviving well, others surviving less well, and some not surviving at all in a particular habitat & obtaining and combining information to describe climates in different regions of the world)</i>
Adapted From: “Habitat Pen Pals” and “Environmental Exchange Box” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 37-38 & p. 92-94)	
Possible Extension: Play a variation of tag to simulate certain animals being caught as prey, while others are able to hide in a “thicket” or other area representing cover, and describe the need for cover for some species such as mice (adapted from “Thicket Game” – Project WILD, p. 114-115). A portion of the owl scene from “Once Upon a Forest” could be shown to demonstrate the importance of having cover for prey species.	



Standards-Aligned Lessons & Activities for 4th Grade

Relating Structure to Function

Activity Description: Observe and describe the relationship between structure and function of certain body parts of animals/various species or characteristics of various flowers (such as rafflesia, which smells like rotting flesh to attract pollinators and pitcher plants, which are shaped in such a way that insects slide down and can’t get back out (and are dissolved/used for food)). Additionally, study birds or other animals to discover how their adaptations help them to be successful in various ways. Students could also research ecosystems and figure out what adaptations are suited for those environments (or what characteristics are needed to survive there).	
Standard Addressed: 4-LS1-1 (NGSS) This could also relate to Math standard 4.G.A.3, which has to do with recognizing lines of symmetry	<i>(Which has to do with... understanding that plants and animals have internal and external structures which support growth, survival, behavior, reproduction)</i>
Adapted From: “Grasshopper Gravity”, “Adaptation Artistry”, & “Move Over Rover” (from Project WILD, p. 4-6, 128-129, & 144-151)	

Identification by Sense of Touch/Smell

Activity Description: This activity can be conducted inside the classroom by touching natural items in mystery boxes, or outside using blindfolds. Have students feel and describe the textures of different objects/items such as bark, leaves (of non-poisonous plants), and pinecones. See if they can identify them by feel. You could also have students identify various foods/spices by scent. (Be mindful of allergies and germs – this would probably be a post-COVID activity or have separate boxes/samples for each student.) Discuss the value in being able to identify things by touch, smell, sound, etc.	
Standard Addressed: 4-LS1-2 (NGSS)	<i>(Which has to do with... animals receiving different types of information through their senses, processing information in their brain, and then responding in various ways; “Animals are able to use their perceptions and memories to guide their actions”)</i>
Materials Needed: Various natural items to have students identify by touch, spices and extracts to identify by smell	
Adapted From: “Get In Touch with Trees” & “Peppermint Beetle” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 20-22 & 23-25)	

Rock/Fossil Match-Up³

Activity Description: Look at images of correlating fossils/rock layers, and have students share what they notice. Then, discuss how landscapes change over time, and what could account for missing layers, certain fossils ending up in different places, etc.

Standard Addressed: 4-ESS1-1 (NGSS)

(Which has to do with... identifying evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time)

Materials Needed: Images of fossil/rock layers

Adapted From: If you are able, actually visit a location to see matching rock formations/layers, such as where a road has been cut through a mountain/hill and matching layers are apparent.

³This could connect to the Weathering & Erosion lesson below.

Weathering & Erosion

Activity Description: Research/read about water's role in erosion, sedimentation, and the preservation of fossils (and possibly connect this to the aging/matching of fossils/rock layers). Additionally, you could have students act out or see the impact of vegetation on the speed and movement of water.

Standard Addressed: 4-ESS2-1 (NGSS)

(Which has to do with... the effects of weathering or rate of erosion by water, wind, ice, or vegetation)

Adapted From: "The Great Stony Book" & "Just Passing Through" (Project WET, p. 150-154 & 166-170)

Preparing for a Natural Emergency

Activity Description: Have students design a model of a building or bridge that can remain upright/withstand jostling (representing an earthquake), or a system of monitoring and alerting people about a volcanic eruption or flood.

Standards Addressed: 4-ESS3-2 (NGSS) & 3-5-ETS1-1, 3-5-ETS1-2, 3-5-ETS1-3 if you make it a STE(A)M activity

(Which have to do with... generating and comparing multiple solutions to reduce the impacts of natural Earth processes on humans (only focusing on earthquakes, floods, tsunamis and volcanic eruptions), as well as brainstorming multiple solutions, designing a solution based on a problem/need, and testing the design(s) with certain variables controlled)

Materials Needed: popsicle sticks, cardboard, glue, string, or other materials

Make it a STE(A)M Activity: Have students construct a model based on specified criteria and time/material/cost/environmental impact constraints, then test it out, redesign/make modifications and retest.



Standards-Aligned Lessons & Activities for 5th Grade

Water, Water, Everywhere, & Hardly a Drop to Drink

Activity Description: Calculate the relative amount of water, freshwater, and clean, suitable-for-drinking water, then demonstrate the amount available. (Based on a "Water Availability Table" and activity provided by Project WET, if the amount of salt water on Earth is represented by 970 mL, then the relative amount of water in icecaps and glaciers would be 24 mL, the amount of unavailable freshwater is around 6 mL, and the amount of potable freshwater is only about one drop).

Standard Addressed: 5-ESS2-2 (NGSS)	<i>(Which has to do with... describing and graphing the amounts and percentages of various types of water on Earth – focusing on solid and liquid water in bodies of water, waterways, glaciers, polar ice caps, ground water...)</i>
Materials Needed: Buckets, water, dropper	
Adapted From: “A Drop in the Bucket” (Project WET, p. 238-241)	

What a Waste

Activity Description: Students will collect, sort, weigh, record, and compare values of materials thrown away in a “Garbage Audit”. They will utilize graphs to see and compare the totals in a visual way and understand the magnitude and details of the challenge. Discuss what might be the most effective/meaningful way to tabulate results (for example: by quantity or weight). Ask questions such as: What’s not being recycled that could be? How much food waste that could be composted is being put into the garbage? This can be done at home or in school.	
Standard Addressed: 5-ESS3-1 (NGSS), especially ESS3.C & 3-5-ETS1-1, 3-5-ETS1-2, & 3-5-ETS1-3 if you make it a STE(A)M activity	<i>(Which has to do with... how science ideas can protect the Earth’s resources and environment, & negative impacts of human activities such as agriculture, industry, and everyday life, as well as ways individuals and communities can protect Earth’s resources and environment)</i>
Materials Needed: Scale, garbage, large plastic garbage bags, gloves, labels/masking tape, data collection sheets	
Adapted From: “Mathematics & Garbage” (Teaching Green: The Elementary Years, p. 122-125)	
Possible Extension: Ideally, follow up with a trip to a landfill or recycling plant. While there, ask questions about where garbage/recycling goes/what happens to it, what isn’t recyclable and why, what could be done differently with our “waste”. Another activity that could address this standard would be to research areas that have been protected for wildlife, and think about whether the amount that’s been zoned to be protected (10% prior to possible new changes in 2021) is actually sufficient for all other non-human species. Also dive into questions of what’s needed in terms of genetic diversity, range/area to find food and mates, etc. and whether there are roads bisecting large mammals’ paths, etc. (It’s likely that the answer is yes.) (Adapted from “Protected Areas: Arks of the 21 st Century” – Teaching Green: The Middle Years, p. 56-59.)	
Make this a STE(A)M Activity: Learn about and collect data about types of litter, impacts of litter, why there’s more litter in certain areas, how to reduce litter; in conjunction, do a community service/service learning project through a litter clean up. Or, have students design low- or no-waste packaging for something that’s commonly found in landfills or litter (adapted from “Litter We Know” (Project WILD, p. 434-435).	

Is it Water?

Activity Description: Conduct various tests to determine if a clear liquid is water.	
Standard Addressed: 5-PS1-3 (NGSS)	<i>(Which has to do with... making observations and measurements to identify materials (powders, metals, liquids) based on their properties, such as color, hardness, conductivity, reflectivity)</i>
Materials Needed: Liquids/powders or other substances/materials to test	
Adapted From: “Is there Water on Zork” (Project WET, p. 43-46)	
Possible Extension: You could have students conduct various tests on a white powder to determine its identity; I’ve done this as part of a “crime scene lab” with middle school students.	

A House, A Home

Activity Description: Look at pictures/research different types of animal shelters and human habitations, build a model, and present/explain where it's found/who builds it, and how the structure relates to its function.

Standard Addressed: 3-5-ETS1-1, 3-5-ETS1-2, & 3-5-ETS1-3

(Which has to do with... defining a design problem reflecting a need or want, which includes specific criteria for success & such constraints as time, cost, materials, generating multiple solutions, and testing the designs/solutions)

Materials Needed: Diorama-type materials or other fabrics, coverings, etc. depending on which STE(A)M activity you do

Adapted From: "My Kingdom for a Shelter" (p. 28-29 in Project WILD)

Make it a STE(A)M Activity: Option A) Design a homeless shelter with certain constraints; **Option B)** Considering animals' needs and well-being, design a wildlife reserve or zoo exhibit – perhaps each student is assigned a different animal, or small groups work together for the same animal or ecosystem (adapted from "Polar Bears in Phoenix" (Project WILD, p. 125-127)



Standards-Aligned Lessons & Activities for 6th Grade

Impacts on Seedling Growth

Activity Description: Conduct an experiment in which you test seed growth (seeds of the same type will likely grow at different rates in different conditions, and seeds of different types or from different parents will likely grow at different rates even under the same conditions). Use data as evidence.

Standard Addressed: MS-LS1-5 (NGSS)

(Which has to do with... constructing a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms, with local environmental factors including such variables as the availability of water, light, food, and space)

Materials Needed: Plant pots, water, soil, seeds, other variables

Possible Extension: Take a trip to a local nursery or greenhouse, have students find a plant that interests them, and have them research or ask questions to learn more about the plant's care/needs, find out where it's from/native to, etc (adapted from Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 123-129).

Who Lives in the Old Growth Forests of Southern Oregon/the Pacific Northwest?

Activity Description: Research a species who calls the ancient forests of the Pacific Northwest home, or relies on old growth forests/those over 150 years old.

Standard Addressed: RST.6-8.1 (ELA), WHST.6-8.7 & WHST.6-8.8

(Which has to do with... citing evidence to support analysis of science/technical texts, conducting research projects, draw from several sources when compiling information, and utilizing credible sources)

Adapted From: "Discovering Our Temperate Rainforests" (Teaching Green: The Middle Years, p. 44-49)

Possible Extension: Hold a debate about whether or not to clear-cut a swath of old-growth/mature and complex forest home to certain endangered species (adapted from "Rainforest Debate" in Teaching Green: The Middle Years, p. 47-48).

Where All the Water Goes

Activity Description: Build a watershed model (using cement and other materials) on school grounds, or borrow an existing watershed model if constructing a large, permanent structure is not an option. Observe how water moves through the watershed, as well as the movement of pollution.	
Standard Addressed: MS-ESS2-4 (NGSS)	<i>(Which has to do with... developing a model to show/explain the cycling of water through Earth's systems, driven by energy from the sun and the force of gravity)</i>
Materials Needed: Generic watershed model OR maps of local topography & building materials such as foam boards, framing, sand/gravel/granite, rebar, chicken wire, cement, concrete glue, cement dye, or papier-mâché (depending on which approach you take)	
Adapted From: "Educating the Community: A Watershed Project" (Teaching Green: The Elementary Years, p. 164-168) and "Branching Out" (Project WET, p. 129-132)	
Possible Extension: This model can be utilized by other students/classes to learn about the water cycle, geography, and/or build models of indigenous villages during a Social Studies unit.	

What's the Solution to Water Pollution?

Activity Description: This one has multiple parts and options. 1) Introduce the topic – of water and/or pollution: depending on what you've already covered and the students' background on states of matter, you could have them find images of water in different states of matter, or just review the water cycle. 2) See below for a hands-on/STE(A)M activity. 3) If you have a watershed model, or even a diagram representing one, you could show students how point and non-point source pollution enter the waterway. Another option would be to make a maze of drainage pipes with various contaminants along the path to show how water can become polluted.	
Standard Addressed: MS-ESS3-2 (NGSS)	<i>(Which has to do with... applying scientific principles to design a method for monitoring & minimizing a human impact on the environment, such as land usage, water usage, or pollution)</i>
Materials Needed: Watershed model or diagram, water, various types of items and substances representing "pollution" and other materials which would need to be removed in order to clean the water (such as vegetable oil, food coloring, twigs/plant matter, packing peanuts, stones/soil, cocoa powder, etc.) If you're doing the "No Water Off a Duck's Back" activity, you'd need natural feathers, hard-boiled eggs, liquid detergent, cooking oil, and shallow containers, possibly old toothbrushes, paper towels or washcloths	
Adapted From: Filter activity in Teaching Green: The Middle Years (p. 104-105), "Branching Out" papier-mâché model (Project WET, p. 129-132), "What's the Solution to Water Pollution?" lesson taught in Ryan Kincaid's 6 th grade Science class, "Water Match" (Project WET, p. 50-53), "A-maze-ing Water" (Project WET, p. 219-222), "Sources of Nonpoint Source Pollution & Best Management Practices" (Project WET, p. 268), "No Water Off a Duck's Back" (Project WILD, p. 305-307)	
Make it a STE(A)M Activity: A) "What's the Solution to Water Pollution": Present the students with the scenario that they've been enlisted to help clean a lake that's been severely polluted with various materials, as well as sediments and algae (you could add that the community is hoping to utilize this source of water for drinking and/or agriculture if it can be filtered/cleaned enough). Let them know that each group will be given 50mL samples of "polluted" water and have to use different methods to clean it/see which group can come up with a repeatable procedure for cleaning the water/end up with the most "clean" water at the end. (I recommend letting them see the sample and their tools and develop an initial procedure prior to actually getting to work/filtering.) B) Simulate the impact of an oils spill by having water and oil in a shallow pan. Expose feathers and hard-boiled eggs to the oil, note the difference before and after. Present the students with the real-world scenario of oil spills in the ocean (possibly show photos of birds in the oil so they have that real-world context), and have them devise a method for cleaning the bird feathers and eggs.	
Possible Extensions: Examine additional negative human impacts, such as waste-production, clear-cutting forests... Assess the levels of waste/recycling at school, visit a landfill (see 5 th grade "What a Waste" activity),	



Standards-Aligned Lessons & Activities for 7th Grade

Ecosystem Survey

Activity Description: Conduct a phenological study/periodic surveys of the area near your school. This could be an opportunity to track plant growth and note observations in a field/nature journal. What plants and animals live nearby? How are they adapted for their habitat? How suitable are the school grounds for plant and animal species native to this region?	
Standard Addressed: MS-LS1-6 (NGSS)	<i>(Which has to do with... constructing a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into & out of organisms)</i>
Adapted From: “Teaching with the Seasons” (Teaching Green: The Middle Years, p. 2-6) & “Urban Nature Search” (Project WILD, p. 70-72)	
Possible Extension: Review what’s needed for plants to grow, and analyze what’s needed for the food we eat. Additionally, students could do an experiment to observe photosynthesis in action. (Adapted from “What’s for Dinner” – Project WILD, p. 96-97 and “Air Plants” - Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 120-122)	

What Factors Impact the Size of a Population?

Activity Description: Students do an activity to see the impact of resource availability on individuals and populations. This activity could be: A) looking at and analyzing graphs of predator and prey species (such as lynx and hares, foxes and mice, wolves and deer), B) a game outdoors (or in a wide open area in which tokens of different colors representing various types of food that bears eat); students are “bears” trying to find enough food to survive the winter (there should be enough food for some to “survive” but not enough resources for all), or C) the STE(A)M activity below.	
Standard Addressed: MS-LS2-1 (NGSS)	<i>(Which has to do with... analyzing and interpreting data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem)</i>
Materials Needed: A) Graphs; B) Tokens; C) Jars, native plants, spiders (or don’t use actual spiders)	
Adapted From: “How Many Bears Can Live in this Forest?” (Project WILD, p. 23-27), “Oh Deer!” (Project WILD, p. 36-40)	
Make it a STE(A)M Activity: Take excursions and do research to learn about the flora and fauna of the local ecosystem, then have students design a “biosphere” to sustain a population of spiders for a certain number of years. You might not have them actually build it, but at least have them explain their thinking in terms of what needs to be included, how much water to start out with, etc (adapted from “The Biosphere Challenge” – Teaching Green: The Middle Years, p. 7-12).	

Nature Partners

Activity Description: Research the relationship/interaction between organisms in a given pair and explore different types of symbiosis.	
Standard Addressed: MS-LS2-2 (NGSS)	<i>(Which has to do with... constructing an explanation that predicts patterns of interactions among organisms – relationships between organisms and among organisms and abiotic components of the ecosystem, such as competitive, predatory, & mutually beneficial)</i>
Materials Needed: Pairs of species that interact/display various types of symbiosis	
Adapted From: “Dynamic Duos” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 113-116) & “Good Buddies” (Project WILD, p. 91-95)	
Possible Extension: Read all or parts of Aldo Leopold’s <i>A Sand County Almanac</i> and discuss humans’ relationship with the land. Then, rank and discuss opinions/values regarding various environmental	

issues/topics This could be part of a lesson/discussion in ELA on how the English language includes more separation of people from objects and non-human beings (adapted from “Viewpoints on the Line” - Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 89-91 and Teaching Green: The Middle Years, p. 11).

Breaking it Down

Activity Description: First go over the role of decomposition in an ecosystem and learn about types of decomposers. Learn what makes a bog, and set up an artificial one in an aquarium *or* set up a worm compost bin (and add pill bugs, sow bugs, worms, etc.) to observe decomposition over time.

Standard Addressed: MS-LS2-5 (NGSS)

(Which has to do with... evaluating competing design solutions for maintaining biodiversity and ecosystem services, such as water purification, nutrient recycling, and prevention of soil erosion)

Materials Needed:

Adapted From: “People of the Bog” (Project WET, p. 89-92), “Salt Marsh Players” (Project WET, p. 99-106) & “Nature’s Recyclers” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p.108-110)

Where Did it Come From & Where Does it Go?

Activity Description: Have students bring in an item made of various materials and research the components/how they were made, what they were made of, and additionally how the materials got to where they are now.

Standard Addressed: MS-PS1-3 (NGSS)

(Which has to do with... gathering/making sense of information to show/explain that synthetic materials come from natural resources that have gone through chemical processes, and impact society)

Materials Needed: Various items that students bring from home (you could set parameters – perhaps it has to be a toy, or nothing dangerous/sharp, etc.)

Adapted From: “A Few of My Favorite Things” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 75-76)

Possible Expansion: Explore where items go when we throw them “away”. Perhaps this could lead to an item exchange/swap or repurposing fair in which broken items are fixed or made into something new.

We All Need Water

Activity Description: Discuss values and how they impact water use. Do an activity in which there is a certain amount of water (such as 1L), and divide it up based on needs and wants of a fictional community (for recreation, for drinking, for cleaning, for hygiene, for agriculture, etc.) – the totals should be greater than the amount given so they have to discuss who gets how much and why.

Standard Addressed: Cross-cutting concept: MS-ETS1-1 (NGSS)

(Which has to do with... the influence of Science, Engineering, & Technology on Society & the Natural World: “All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural world”)

Adapted From: “Choices & Preferences, Water Index” (Project WET, p. 367-372), “Perspectives” (Project WET, p. 397-399), “Pass the Jug” (Project WET, p. 392-396), “Ethi-Reasoning” (Project WILD, p. 203-207) & “Whose Problem is It?” (Project WET, p. 429)

Possible Extension: Research local water issues, such as the Winchester Dam and simulate a trial (adapted from “Water Court” – Project WET, p. 413-420 & p. 377-381)



Standards-Aligned Lessons & Activities for 8th Grade

Harnessing Wind Energy

Activity Description: Have students collect wind related data then construct a model of a wind turbine out of various materials.	
Standard Addressed: MS-PS3-1 (NGSS)	<i>(Which has to do with... constructing & interpreting graphical displays of data to describe the relationships of kinetic energy to the mass and speed of an object)</i>
Materials Needed: Used, clean plastic and cardboard containers that would otherwise be thrown away	
Adapted From: “The Wind in the Schoolyard” & wind turbine lesson (Teaching Green: The Middle Years, p. 133-135 & 136-138)	

Oh the Possibilities

Activity Description: Humans typically use more resources than we need, which can then harm other humans, plants, animals, ecosystems, and the environment/planet as a whole; go through an example of a community adjacent to a forest/wooded area that is potentially slated for either development/building and/or logging, have the students take different points of view and discuss the long-term impacts of various uses.	
Standard Addressed: MS-ESS3-4 (NGSS)	<i>(Which has to do with... constructing an argument based on evidence for how increases in human population & per capita consumption of natural resources impact Earth’s systems, and these impacts are typically negative unless the activities and technologies are engineered otherwise)</i>
Materials Needed:	
Adapted From: “Forest Consequences” (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 138-143), “Population, Consumption, & The Environment” (Teaching Green: The Middle Years, p. 92-97)	
Possible Extension: As the human population increases, the number of people visiting national parks has also risen drastically, sometimes causing harm. Brainstorm what can be done to preserve these "islands of habitat" increasingly fragmented/ separated from other similar ecosystems and sometimes the only places certain animals can live (Adapted from/related to "Loving It Too Much" (Project Learning Tree Pre K-8 Environmental Education Activity Guide, p. 147-152). Also discuss ethics; have students think about their own special places/what and where they would want to protect and why.	
Make it a STE(A)M Activity: Simulate/build models of different irrigation systems, and test them out with certain constraints; compare the economic & ecological costs of various students’/groups’ designs (adapted from Project WET, p. 254-259).	

Sensitive Creatures

Activity Description: Research and/or do field trips/surveys to local ponds, streams, or wetlands to learn about the impacts of acidification and other factors have impacted populations of macroinvertebrates, frogs and other aquatic life.	
Standard Addressed: MS-ETS1-1 (NGSS)	<i>(Which has to do with... defining criteria and constraints for a problem and considering impacts on people and the environment)</i>
Adapted From: “Where are the Frogs?” (Project WET, p. 279-286) & “Life in the Fast Lane” (Project WET, p. 79-84)	

