



Schoolyard Habitats and Outdoor Classrooms – Connections to the Next Generation Science Standards



Observe



Collect Data



Experiment



Research



Explore

Grade	NGSS	Students who demonstrate understanding can:	Schoolyard Habitats and Outdoor Classroom Lesson Ideas*
K	K-LS1-1 From Molecules to Organisms: Structures and Processes	<i>Use observations to describe patterns of what plants and animals (including humans) need to survive.</i>	Read about and observe the food, water, shelter, and space needs of wildlife in your outdoor habitat/classroom.
K	K-ESS2-1 Earth's Systems	<i>Use and share observations of local weather conditions to describe patterns over time.</i>	Set up a weather station in your outdoor classroom and record temperature, wind direction/speed, and precipitation throughout the school year.
K	K-ESS2-2 Earth's Systems	<i>Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.</i>	In the fall, observe, write, and draw pictures of animals preparing for winter (ie squirrels hiding acorns).
K	K-ESS3-1 Earth and Human Activity	<i>Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.</i>	Draw or create a story about the plants and animals that can be found in your outdoor classroom, making sure to identify the food, water, and shelter needs of the animals.
1	1-LS1-1 From Molecules to Organisms: Structures and Processes	<i>Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.</i>	Explore how animals use their fur, feathers, and scales to protect themselves from different weather conditions. What kinds of materials are similar to human clothing or equipment? Borrow a fur kit from NH Fish and Game: https://www.wildlife.nh.gov/education/curriculum-resources/curriculum-kits



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1	1-LS1-2 From Molecules to Organisms: Structures and Processes	<i>Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.</i>	Explore the NH Fish and Game Website for wildlife information: www.wildnh.com
1	1-LS3-1 Heredity: Inheritance and Variation of Traits	<i>Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.</i>	In the spring, observe, write, and draw pictures of young plants and young animals (spiders, grasshoppers, caterpillars/butterflies) that are in your outdoor classroom.
1	1-ESS1-2 Earth's Place in the Universe	<i>Make observations at different times of year to relate the amount of daylight to the time of year.</i>	Make a sundial in your outdoor classroom. Observe where the sun is and where shadows are throughout the year.
2	2-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	<i>Plan and conduct an investigation to determine if plants need sunlight and water to grow.</i>	Do a planting experiment (inside or outside). When plants are healthy and big enough, plant them in your outdoor classroom.
2	2-LS2-2 Ecosystems: Interactions, Energy, and Dynamics	<i>Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</i>	Use your outdoor classroom to observe and get ideas on how plants disperse their seeds or observe animals pollinating plants. Use these ideas to construct a similar dispersal technique using paper, cardboard, and other classroom supplies.
2	2-LS4-1 Biological Evolution: Unity and Diversity	<i>Make observations of plants and animals to compare the diversity of life in different habitats.</i>	Conduct an inventory of the plants and animals found in your outdoor classroom or schoolyard habitat. Compare to an inventory of a different location (ie. ballfield, woods).
2	2-ESS2-1 Earth's Systems	<i>Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</i>	Compare windbreaks before and after planting new shrubs or trees in your outdoor classroom. Compare wind in ballfield versus in woods. Why is it less windy in the woods?
2	2-ESS2-2 Earth's Systems	<i>Develop a model to represent the shapes and kinds of land and bodies of water in an area.</i>	Make a map of your outdoor classroom or habitat area or neighborhood.



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2	2-ESS2-3 Earth's Systems	<i>Obtain information to identify where water is found on Earth and that it can be solid or liquid.</i>	If you have a water feature in your outdoor classroom space or habitat area, explore when and why water is in liquid or solid ice form.
3	3-LS1-1 From Molecules to Organisms: Structures and Processes	<i>Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.</i>	Research and write life history reports for animals and plants that can be found in your outdoor classroom. https://www.wildlife.nh.gov/wildlife-and-habitat/species-occurring-nh
3	3-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	<i>Construct an argument that some animals form groups that help members survive.</i>	Have students research, observe, and report out about wildlife in your outdoor classroom that form groups (ie. birds, squirrels, snakes, aphids, caterpillars). When do they form groups during their life and why?
3	3-LS3-1 Heredity: Inheritance and Variation of Traits	<i>Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.</i>	Collect data on the physical traits of plants (of one species) growing in your outdoor classroom. Are they all the same? What traits have been passed on from parents. What variations occurred?
3	3-LS3-2 Heredity: Inheritance and Variation of Traits	<i>Use evidence to support the explanation that traits can be influenced by the environment.</i>	Conduct an experiment giving plants too much sun or too little sun, water or other environmental variable. Or observe plants that are growing in different environmental conditions outside (all shade, all sun, etc). What happens to plants growing in different environmental conditions?
3	3-LS4-2 Biological Evolution: Unity and Diversity	<i>Use evidence to construct an explanation for how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</i>	https://www.wildlife.nh.gov/wildlife-and-habitat/species-occurring-nh
3	3-LS4-3 Biological Evolution: Unity and Diversity	<i>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.</i>	Draw or construct a story about the plants and animals that can be found in your outdoor classroom, making sure to identify the food, water, and shelter needs of the animals.



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3	3-LS4-4 Biological Evolution: Unity and Diversity	<i>Make a claim about the merit of a solution to a problem caused when the environment changes and types of plants and animals that live there may change.</i>	Explore Wildlife and Climate Change webpages: https://www.wildlife.nh.gov/wildlife-and-habitat/climate-change-and-wildlife
3	3-ESS2-1 Earth's Systems	<i>Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</i>	Graph data collected from your outdoor classroom weather station.
3-5	3-5-ETS1-1 Engineering Design	<i>Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</i>	Design an outdoor classroom, trails, bridges, or habitat area.
4	4-LS1-1 From Molecules to Organisms: Structures and Processes	<i>Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</i>	Explore the parts of plants growing in your outdoor classroom and the parts of animals that live in your habitat area.
4	4-LS1-2 From Molecules to Organisms: Structures and Processes	<i>Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</i>	Observe and explore animals found in your outdoor classroom to create this model.
4	4-ESS2-2 Earth's Systems	<i>Analyze and interpret data from maps to describe patterns of Earth's features.</i>	Explore Wildlife Action Plan Maps: https://www.wildlife.nh.gov/wildlife-and-habitat/nh-wildlife-action-plan/wap-habitat-maps Create a detailed map of your outdoor classroom, neighborhood, or town that identifies natural features.
5	5-PS3-1 Earth	<i>Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun.</i>	Observe organisms in your outdoor classroom and model their food web identifying how energy passes through the systems.



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5	5-LS1-1 From Molecules to Organisms: Structures and Processes	<i>Support an argument that plants get the materials they need for growth chiefly from air and water.</i>	Use observations from your outdoor classroom to back an argument about the needs of plants.
5	5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	<i>Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</i>	Observe organisms in your outdoor classroom and model their food web and carbon cycle.
5	5-ESS1-2 Earth's Place in the Universe	<i>Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.</i>	Create a sundial in your outdoor classroom, collect data, and graph the data over time.
5	5-ESS3-1 Earth and Human Activity	<i>Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.</i>	Invite guest speakers or research local conservation organizations in your area. How are they helping natural resources and what ways can you get involved?
6-8	MS-LS1-4 From Molecules to Organisms: Structures and Processes	<i>Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.</i>	Create an outdoor "lab" in your outdoor classroom space to propose hypotheses and conduct experiments that test how wildlife behaviors and plant structures affect successful reproduction.
6-8	MS-LS1-5 From Molecules to Organisms: Structures and Processes	<i>Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</i>	Explore evidence in your outdoor classroom or schoolyard habitat areas that show how environmental and genetic factors influence the growth of organisms.
6-8	MS-LS1-6 From Molecules to Organisms: Structures and Processes	<i>Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.</i>	Use observations and evidence collected in your outdoor classroom to draw a pictorial representation and to explain how energy and nutrient cycles.



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6-8	MS-LS1-7 From Molecules to Organisms: Structures and Processes	<i>Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</i>	Observe organisms in your outdoor classroom and model the chemical reactions within their food web, carbon cycle, or nutrient cycle.
6-8	MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	<i>Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</i>	Inventory the natural resources in your outdoor classroom space. Explore what organisms can find all their needs and what organisms must expand their range to find all their needs.
6-8	MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics	<i>Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.</i>	Create food webs and explore relationships (predator-prey, symbiosis, parasitism, etc) for organisms within your outdoor habitat area, neighborhood, and beyond.
6-8	MS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics	<i>Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.</i>	Observe organisms in your outdoor classroom and model the food web, carbon cycle, or nutrient cycle.
6-8	MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics	<i>Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.</i>	Use your outdoor classroom to experiment how changes in an ecosystem affect populations. Explore Wildlife and Climate Change webpages: https://www.wildlife.nh.gov/wildlife-and-habitat/climate-change-and-wildlife
6-8	MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics	<i>Evaluate competing design solutions for maintaining biodiversity and ecosystem services.</i>	Explore the ecosystem services (biodiversity, pollination, clean water, recreation, etc) in your outdoor classroom or habitat area. In groups, have students propose ideas to improve different ecosystem services.
6-8	MS-LS4-6 Biological Evolution: Unity and Diversity	<i>Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</i>	Create an outdoor “lab” in your outdoor classroom space to observe, hypothesize, and collect data on natural selection and traits in populations over time. Start a long-term data collection project so students can see past data.



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9-12	HS-LS1-5 From Molecules to Organisms: Structures and Processes	<i>Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.</i>	Observe organisms in your outdoor classroom and model how photosynthesis transforms light energy into stored chemical energy.
9-12	HS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	<i>Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.</i>	Create an outdoor “lab” in your outdoor classroom space to observe, hypothesize, and collect data on factors that affect carrying capacity of organisms.
9-12	HS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics	<i>Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.</i>	Observe organisms in your outdoor classroom and model the food web, energy, or nutrient cycle.
9-12	HS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics	<i>Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.</i>	Observe organisms in your outdoor classroom and model photosynthesis, carbon cycle, or nutrient cycle.
9-12	HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics	<i>Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.</i>	Explore Wildlife and Climate Change webpages: https://www.wildlife.nh.gov/wildlife-and-habitat/climate-change-and-wildlife
9-12	HS-LS2-8 Ecosystems: Interactions, Energy, and Dynamics	<i>Evaluate evidence for the role of group behavior on individual and species’ chances to survive and reproduce.</i>	Observe group behavior among wildlife and plants in your outdoor classroom.
9-12	HS-LS3-1 Heredity: Inheritance and Variation of Traits	<i>Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.</i>	Create an outdoor “lab” in your outdoor classroom space to observe traits that are passed from parents to offspring.
9-12	HS-LS3-3 Heredity: Inheritance and Variation of Traits	<i>Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.</i>	Create an outdoor “lab” in your outdoor classroom space to explain variations in traits among plants.



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9-12	HS-LS4-1 Biological Evolution: Unity and Diversity	<i>Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.</i>	Have students create posters and present information about biological reproduction happening in the outdoor classroom.
9-12	HS-LS4-2 Biological Evolution: Unity and Diversity	<i>Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.</i>	Observe and collect evidence from your outdoor classroom about how plants and wildlife use the habitat to reproduce, compete for resources, and survive.
9-12	HS-LS4-3 Biological Evolution: Unity and Diversity	<i>Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.</i>	Collect data on wildlife and plant species that live in your outdoor classroom or habitat. Allow a portion of your area to grow “wild” and observe what plants and insects prosper there.
9-12	HS-LS4-4 Biological Evolution: Unity and Diversity	<i>Construct an explanation based on evidence for how natural selection leads to adaptation of populations.</i>	Using organisms found in your outdoor classroom, collect data and explore how natural selection leads to adaptation.
9-12	HS-LS4-5 Biological Evolution: Unity and Diversity	<i>Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.</i>	Explore Wildlife and Climate Change webpages: https://www.wildlife.nh.gov/wildlife-and-habitat/climate-change-and-wildlife

*Some of the lesson ideas only partially meet the NGSS.