



Four Winds Nature Institute
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STRUCTURE AND FUNCTION

Why do grass plants have nodes and raspberry plants have thorns? Why do insects have wings and beavers have water repellent fur? The physical structure of an organism helps it to survive in its environment – to avoid predation, to gather the food and water it needs, to find a mate. We'll compare different organisms to think about how particular physical characteristics relate to important skills and behaviors, and ultimately to survival.

Throughout this yearlong study, students will explore the characteristics of organisms, look for similarities and differences among them, and learn about natural selection and the role of evolution.

Vermont Standards: Inquiry *7.1*, The Living World *7.13*, Natural Resources and Agriculture *7.16*, Listening *1.13*, Questioning *2.1*, Sustainability *3.9*, Understanding Place *4.6*

New Hampshire Standards: Science Process Skills *SPS1*, *SPS3*, *SPS4*, Life Science *LS1*, *LS2*, *LS3*

INSECT ANATOMY: Picture a ladybug, a grasshopper, and a butterfly. These insects look and behave differently, but they share some common traits. So, what makes an insect an insect, and how is it different from a spider, a clam, or a human? We'll examine a variety of different insects, looking at their basic structure and noting the special adaptations that allow for great diversity among them. Outside we'll watch insects as they gather food, pollinate, and move, marveling at the amazing success of this large group of small animals.

GRASSES AND GRAINS: Grasses can stand up in high winds, hold onto slippery slopes, and grow back after being mown or grazed. What characteristics allow grasses to be such survivors? We'll look at lots of different types of grasses and compare the similarities and differences in this widespread family of plants. It's surprising to discover how many different species of grass grow right in your own backyard.

BEAVERS AND MUSKRATS: With their round, furry bodies, twinkling eyes, and dexterous front feet, these two rodents have a certain charm that endears them to us. We'll look at the characteristics of these distantly related cousins to see how well they are adapted to live and work in a wetland habitat. A field trip to a beaver pond is essential!

PREDATORS AND PREY: Herbivores and carnivores both must eat, but the challenges these two groups of animals face in getting enough to eat are very different. Plant eaters don't have to stalk their food, but they do need to keep from being eaten while they browse. And carnivores spend lots of time and energy looking for and capturing their prey. We'll compare the characteristics of both of these groups and discover that it is indeed eat or be eaten out there.

SKULLS AND DIET: What can we tell about an animal by looking at its teeth, the structure of its skull, the shape and size of its eyes? Skulls tell us a great deal about the habits of an animal. We'll look at a variety of skulls to compare herbivore and carnivore adaptations, thinking about what the shape and structure tell us about the animal itself.

BIRDS' BODIES: Bird's bodies come in a gazillion shapes, sizes and colors. Each bird species is adapted to survive in its own particular environment. Looking at different birds and comparing their characteristics and behaviors gives us a wonderful opportunity to see how structure and function go hand in hand in the natural world.

CALLING ALL OWLS: Imagine the challenge of finding a tiny mouse in the grass in the dark. Now imagine that if you don't find it, you'll be very, very hungry! As nocturnal predators, owls face some challenges in finding food and a mate. We'll look at some of the characteristics that help owls be successful. And we'll determine where on the food chain owls fit when we dissect a pellet to see what these nighttime hunters are eating.

PLANT AND ANIMAL DEFENSES: A prickly thorn, a painful bite, a hard shell, a scary bark, plants and animals have developed many different defense strategies to protect themselves. We'll look at a variety of these natural defenses and learn how these different structures help living things survive.

FROGS AND TOADS: As amphibians, frogs and toads live part of their lives in water and part on land. How can they change from algae-eating tadpoles to insect-eating adults? We'll look at the process of metamorphosis and compare differences between tadpoles and frogs. This remarkable change in structure is key to the survival of these remarkable creatures. A field trip to a frog pond completes this workshop.