

Unit: Conservation and Sustainability

Synopsis: The theme of this unit is conservation and sustainability. This curriculum would be most appropriate for 8- to 11-year-olds but could be appropriate for students as young as 6. The goals of this unit are that students will gain an appreciation for the vastness of the animal and plant kingdoms as well as discuss similarities and differences. We will then explore the interdependence between animals, plants, and their environment and how humans fit in this system. By the end of the third week, students will have created a short report about the animal they would like for our class pet. This outline will include how to care for the animal, and what sort of environment it needs. Together, we will create a habitat for our class pet.

We will then move into recycling, reducing, reusing and also alternative energy. We will explore ways we can conserve our resources and how to manage humans' appetite for energy. By the end of the fifth week, students will have created a model ecosystem that includes plants, animals and their habitats. The ecosystem must include humans, as well as a source of energy for humans.

Week 1: Animal Kingdoms

Objective: Students will investigate the basic traits of the major animal groups and their similarities and differences. Students will consult with animal experts about animals they are particularly interested in. Students will ask questions relevant to the care of the animal such as how long it lives, what it eats, what temperature it prefers, how much humidity it needs, etc. Students will keep their findings, drawings and other information in an animal behavior journal.

Lesson 1: We will visit the Austin Nature and Science Center. Students will see animals from the mammal and bird groups. I will teach students owl calls. We will also touch and feel animal artifacts (e.g., feathers, bones, furs). We will discuss our findings. We will talk about the parameters of their presentation to be completed by the end of the 3rd week (see week 3 project).

Lesson 2: We will visit Zookeeper Exotic Animals pet store. There we will ask animal keepers questions about a particular reptile and arthropod of interest. As a class, we will discuss our findings. I'll show additional animal artifacts.

Lesson 3: We will visit Aquadome fish store. We will ask animal keepers questions about a particular fish and amphibian. As a class, we will discuss our findings. I'll show additional animal artifacts.

Lesson 4: We will discuss animal super powers! In other words, we will discover our favorite animal adaptations and investigate why certain mysterious traits are adaptive. We will do a Crisco blubber experiment to learn about the adaptation that mammals have to insulate themselves.

Week 2: Plants

Objective: Students will learn how animals use plants for food and shelter. Students will learn about the ecosystem created from dying plants. Students will compare the impact that native vs invasive plants

have on local animals. The lesson on soil will be an appropriate transition into the next week on ecosystems.

Lesson 1: We will visit a nearby meadow where I will point out edible plants and dangerous plants. We will learn about plants that provide food for animals and then plant some animal-attracting plants near our classroom. We will participate in the pollination process by pollinating flowers using pipecleaners.

Lesson 2: We will discuss and search for plants that provide shelter. In particular I will show students prickly pear cactuses. We will see how many arthropods live in a bush by placing a cloth under the bush and shaking the bush. We will observe the arthropods that fall onto the cloth. We will perform a similar activity by creating a bug attracting light that traps bugs in a bucket for us to observe the following morning.

Lesson 3: Students will discover the native and invasive plant species in the local area and we will research whether the plant is contributing food or shelter to native animals or harming them.

Lesson 4: We will discover animals that rely on dead plants and explore the complex society of animals that live in rotting logs. We will examine different types of soils, the animals that live in soil and why soil is important to plants. We will modify the soil that we used for our animal attracting plants based on what we learn about soil.

Week 3: Habitats / Ecosystems

*Objective: Students will visit three different ecosystems: pond, meadow and urban. We will observe and record the plant and animal life in the ecosystem as well as the habitats, weather and other environmental characteristics. Students will keep their findings in nature journals. We will share our findings and discuss the differences between ecosystems. **Project:** As a class, we will pick a class pet. Students will take the knowledge gained from the first three weeks and create fact sheets. Based on our sheets, we will create an ecosystem for our class pet. This will create an opportunity to learn about one particular animal's behavior in detail as well as the plants and animals that live together with our pet.*

Lesson 1: We will visit a meadow ecosystem, and write down as much detail as we can about that ecosystem. We will catch and release insects, observe birds and try to identify species using field guides.

Lesson 2: We will visit a river ecosystem and document our experiences similarly to lesson 1.

Lesson 3: We will visit an urban ecosystem and document our experiences similarly to lesson 1.

Lesson 4: We will present our cases for our preferred class pet and decide together on the animal we choose based on the habitat, food and care that it needs.

Week 4: Recycling, Reducing, Reusing

Objective: Students will begin to understand how much trash exists in their local area. We will discuss why so much trash exists and find creative solutions for trash. We will create classroom solutions to reduce our trash and our footprint. Finally, we will make trash valuable again with a trash auction.

Lesson 1: How much trash is out there? We will collect trash for our trash auction and learn the City of Austin's recycling and trash rules.

Lesson 2: What is upcycling? We will create robots (Markerbots) out of old plastic. Students will brainstorm new inventions using materials from a box of junk.

Lesson 3: Reducing: the greatest of the three Rs. We will make a plan for how we can reduce our footprint in the classroom as well as some methods to measure our progress.

Lesson 4: We will collect trash one more time in preparation for our trash auction. For the auction, I will collect items that were intended to be thrown away. Students will use the trash they collected as a currency to “buy” the interesting junk I found.

Week 5: Alternative Energy

*Objective: Students will learn the difference between renewable and non-renewable energy sources and the pros and cons of each. Students will modify past activities to use a renewable energy source. **Project:** In a culminating project, students will create a model city. The model must include animal habitats plus landmarks essential to the modern human world, such as energy sources (e.g., gas stations or wind turbines), grocery stores, neighborhoods and farms. Students will pick or be assigned a perspective for their city. They will either be the environmental association, neighborhood association, business association or farmers association. They must create the town keeping in mind the priorities of this particular association. Their model may be built using physical materials or created in a virtual world like Minecraft. Other methods to present their model could also be acceptable if a good case is made.*

Lesson 1: We will modify our Markerbots to be solar powered and discuss the city model project. Students will select their perspective for their city plan (environment, neighborhood association, business association, farmers association).

Lesson 2: We will create a wind turbine and observe the best configuration. I will bring in my 3d printer and discuss corn-based plastic such as PLA vs. petroleum based plastics such as ABS. Students will have the opportunity to create models from corn-based plastics for their future projects.

Lesson 3: We will create hydro-powered LEDs, have solar-powered car races and create a compost bin.

Lesson 4: Students will present their model city. Students will discuss their cities based on their personal opinions and their association’s opinions.