# Eco Observers – 2nd Grade


## Summary

On a hike through the ENC, students use maps, experiment with how water can change land, and play a game to learn about the process of pollination. They discover the importance of biodiversity and learn about the significance of seed dispersal. *This is a 2 hour program.*


## Objectives

- Students will understand that water and wind cause *erosion* of the land
- Students will be able to label observations of landmarks, erosion, and biodiversity on a *map*
- Students will grasp that when some animals eat nectar from flowers they also *pollinate* those flowers
- Students will determine methods of *seed dispersal* by testing them
- Students will understand how increased *biodiversity* results in a heathier ecosystem

**Key Terms**

*Erosion* – the process of land being destroyed by wind, water, or other natural causes
*Biodiversity* – a variety of living things in a particular habitat or ecosystem
*Pollination* – the process of pollen being transferred from flower to flower, often with the help of animals called 'pollinators'

**Background Information**

*Pollination*

All flowering plants rely on the process of pollination (transferring pollen grains from the male anther to the female stigma) to make new plants. Not all plants rely on pollinators. For example, some orchids, peas, and sunflowers have the ability to 'self-pollinate' (flowers that shed pollen directly into the stigma). But for the rest of the flowering plant world, pollinators are key. A pollinator technically doesn't even have to be an animal – anything that moves pollen (like wine) is a pollinator. But for some reason, people always visualize one animal when they think of the word 'pollinator' – the bumblebee. Bees do provide a wonderful service to flowering plants, but they're not alone. Butterflies, bats, moths, beetles, birds, and even rodents and lizards can help pollinate. This is because pollinators aren't even aware that they're pollinators. They are simply going about their lives, looking for food, and they accidentally transfer pollen in the process. Imagine a hungry bee that has just landed on a flower – it quickly finds the nectar and drinks it up. While drinking nectar, it's belly, legs, and antennae all get covered in those tiny pollen particles. Then, the bee flies to the next flower and some of the pollen from the first flower transfers over. It's that simple.

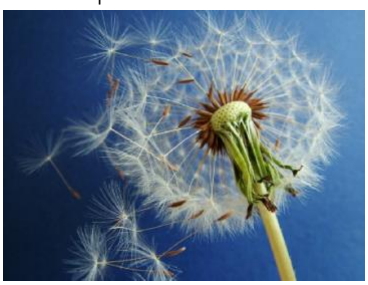
*Biodiversity*

Ecologists often use biodiversity of a measure of ecosystem health, but this can be a tricky thing to asses. It is not as simple as counting up how many animals live in a particular habitat. Some habitats may not have as much biodiversity due to having a more shallow food web. Imagine a desert that has 3 kinds of animals living there – beetles, roadrunners, and vultures. If you tally up all the specimens there are 100 animals altogether. Now imagine a different desert that has 350 animals residing there. At first glance you may think that this habitat is healthier because it can support more animals, but they you realize that there is only 1 species represented – vultures. What will these vultures eat if there are no prey animals around? What will happen to this population over time? In the case of ecology, quality always trumps quantity – it is always more important to have a variety of species than to have a lot of specimens. But the details are relative to the particular habitat and food web. Historically we have seen bad things happen when biodiversity is intentionally or accidentally eliminated. When farmers plant only one kind of crop – corn, for example – this is called a monoculture. The risk of planting a monoculture is that the plants are all susceptible to catching disease and being wiped out (this has happened many times in history!). Since diseases are often species-specific (you can't catch a cold from your dog, for example), it is advantageous for

habitats to have many different kinds of organisms represented. A disease won't spread nearly as rapidly or as widely as long as there are other things living there.

*Seed Dispersal*

All plants need water, air, sunlight, and space to survive. The first three needs mentioned are obvious, but many people overlook 'space'. We forget about how important a plants' root structure is. It not only absorbs groundwater for the plant (which is then needed for photosynthesis), but the root structure also keeps the plant in the ground and upright, so that the plant can reach up towards the sunlight (also needed for photosynthesis). Plants make more plants by creating and releasing seeds at different times of the year. If these seeds fell straight to the ground and stayed there, they would not be able to grow. The shadow cast by the parent tree's canopy would prevent sunlight from reaching the seeds, any water that falls on the ground will get sucked up by the parent tree, and most importantly there is not enough SPACE for the new seeds to spread their roots. Therefore, seeds must travel to new places. They can do this several clever adaptations. Some seeds are lightweight and aerodynamically shaped to be able to fly in the wind. Other seeds are buoyant and can float in water. Some seeds are round and prone to rolling away. Some seeds even rely on animals for their dispersal. Some animals accidentally pick up barbed seeds in their fur (see Velcro example above), while others ingest seeds that are encased in delicious fruits (like a peach or an apple) and then conveniently fertilize these seeds upon defecation! Here are some examples of seed shapes that allow for different types of dispersal:



*Erosion*

Erosion can be caused by bodies of water (waves crashing onto the coastline, rivers carving out canyons), natural disasters (earthquakes, mudslides), or wind (dune formations). There are even other agents, like acid rain, that can weather away land formations. Erosion most often occurs very slowly, over thousands of years. Although we tend to think of erosion as being a slow, gradual process, there are instances when erosion can happen suddenly (such as in the case of natural disasters). Below are a few examples of erosion: