

# Be a Biodiversity Detective!

### LESSON

### **GRADE LEVEL** K-8

**CATEGORY** Earth, Ecosystems and Ecology

**TOPIC** Ecosystems, food webs and species diversity

### LENGTH

Part 1: one science period. Part 2: two science periods plus field trip.

### MATERIALS

- Biodiversity Clues sheet,
- Hula hoops
- Flagging tape
- Poster or mural sized paper and art supplies for extensions.
- Animal and plant identification books for your area.

SETTING

Outdoors mostly

**GROUP SIZE** One class (teams of three)

**SUBJECT AREAS** Biology and Science

### **SKILLS**

Observing, hypothesizing, counting, assessing, recording, research, drawing, reading

#### **KEYWORDS**

Species, ecosystems, living and non-living, differences, similarities, biodiversity, and niche



### Overview

Students investigate biodiversity of wildlife in their backyard (schoolyard) by selecting and mapping out areas they expect to be high in biodiversity in part one. Part two uses a larger area to make observations about the area by using "biodiversity clues".

### Objectives

Students will be able to:

- Understand the concept of species diversity within an ecosystem and between ecosystems.
- Explore the idea of measuring biodiversity through ecosystem and or species diversity.

### Background

Humans share the planet with millions of types of other living things. All living things, including humans, are interconnected through food webs and energy flow (see other food web and food chain activities). Ecosystems and habitats are resilient and adaptive to change because of the variety of living things interacting within and between them through energy flow in food webs. This variety of living things is called biodiversity. Biodiversity exists at ecosystem; species, and genetic levels.

Ecosystem diversity can range in size from local (forest and stream) to global (temperate rain forest vs. artic tundra) to systems that are somewhere in between such as B.C.'s mountains, deserts, and river valleys. Great differences can exist within two of the same ecosystem (e.g. forest) because each ecosystem may have a unique living and non-living components in combinations that each have, in turn, their own individual differences. But the two ecosystems would never the less still be called a "forest ecosystem".

The next level of diversity is species diversity which refers to the variety of all the different living species of wildlife from Canada goose, to orca, moss to maple tree and all the others in between in an area of interest. A species is a group of plants or animals that are more or less alike and that are able to breed and produce fertile offspring under natural conditions. From the time of the great biologist Linneaus in 1756, scientists have created a system that classifies all living things. In this classification system, every living thing is assigned to a species. For example, all breeds of domesticated dogs are members of the same species. One way of describing the biodiversity of a region or area is to measure the number of species of living things. This is called species diversity. Climate, geography, history

and other environmental factors of the ecosystem being studied influences species diversity.

Environmental factors such as air to breathe, a source of nearby water, food, safe shelter, and enough space in which to grow and live are the components of a habitat. The more and varied ways in which these environmental factors are provided for or arranged within an ecosystem generally means a greater diversity of species. Each species has a niche (or role) to play within an ecosystem if it has the right environmental factors of that species' habitat.

This activity centers around counting species diversity as a way to measure and explore the concept of species and ecosystem biodiversity.

## The Activity

#### Procedure

### PART 1: HULA HOOP DETECTIVES

1. Students measure (count) the species diversity in different locations of your schoolyard (or local park) by using small groups and hula-hoops to define the study area for each group. If appropriate, invite students to use their knowledge of food, water, shelter and space to select different areas to study by supposing (making a hypothesis) about what they think will be the biodiversity results in each area. You can do this anywhere around the school such as on the pavement, a track field, grassy area, shrubby location, or a forest depending on the understanding and ability of your students. If very young, select two very different areas and direct students where to place the hula hoops.

If necessary, review the concept difference and similarity by reviewing how we know plants and animals are different from one another (different species). (e.g. they make different sounds - bird songs, squirrel chatter, cats meow, dog bark and visible signs such as different number of legs, different plant leaves / tree bark / branch placement, growing habitats, etc.). Practice counting different types of things before doing the activity.

2. Working in small teams of three or four, ask students to count the different living things they can find within the hula hoop. If they know the name of what they see that is great, but do not get hung up on researching the name of everything. Focus the students on counting how many different kinds of living things they find and how they

know they are different. You may also allow the students to lift leaves and branches.

3. Discuss the results (which area had the highest number of different species (living things)? How did you know they were different? Where there any special places or things they found? Debrief the results by focusing the discussion on the difference in habitat components in the two locations. Can they hypothesize about other areas, test the hypothesis if desired.

### PART 2: BIODIVERSITY BLITZ (GRADES 3-8)

#### Warm up

- Copy the "Biodiversity Clues" worksheet on the dotted lines and put all of the clues in an envelope. Add five more clue cards for special features in your area identified in the results in 1 above or if at a local community area of that area. Put all the clues in an envelope.
- 2. Plan a trail through a variety of habitats at your school or local community area such as a park or inter-tidal zone in walking distance. Mark out two or three safe areas as "biodiversity search sites". Use flags to set the boundaries.
- **3.** Divide the class into "search parties" of three members each. Search parties will each receive two clues from the envelope.

### Procedure

- Point out the flagged safe areas and fan out the teams along the trail. Ask students to find what your clues ask you to find. Don't touch anything (or do any collecting). Just make a mental or written note of the location. Identifying the items is not important at this point.
- 2. After no more than 15 minutes, regroup with the rest of the class at a central point and walk the class through the flagged area. Students can describe what they found along the way. Collect the flagging tape while the teams pick two things they want to research back in the classroom. For each item, one team member should take notes about them, another should draw or take a picture, and the third member should take notes about the location in which the items are growing/living (on the ground, in a tree, near this and that, etc).
- 3. As a class discuss:
  - What kinds of/how many different plants grow in your study area?





- What kinds of/how many different animals (birds, mammals, insects and others) live there?
- Where could we look to find out more information or the names of species we saw?
- Was there one area where there were more clues than others? why?
- Brainstorm some words that describe the biodiversity of your area.
- 4. The teams should discuss the two things they agreed to research further and gather all the information they know about them in one location. The teams should then research the scientific names of the two things they selected or create their own meaningful and consistent names.
- Create a Biodiversity Taxonomy Chart for your class by recording on a big sheet of poster paper the names of all the organisms identified by the detective teams in your class.

### Assessment

Using all the different clues you collected and the Taxonomy chart, create a class biodiversity picture / mural for your study area and use the words you brainstormed to name the area. Add to the picture such things as more species diversity, ecosystem diversity and genetic diversity within the picture; identify food webs and food chains in the picture; and, how many non-living things can students identify in the picture and then add more of any as necessary to complete the picture.

### Extensions

- Have this class lead a younger aged class through a biodiversity area studied during the biodiversity blitz. The team researchers should be in charge of a small group of younger students as they go through the trail. Allowing the younger students to explore areas with their "researchers" who verbally ask them some of the biodiversity clues. Share the results in a sharing circle.
- 2. Save the data from your detective team and do a biodiversity search during another season. Compare the result. Repeat the mural exercise or add to the first one.

