

**Background:** Biodiversity refers to the variety of life that exists on earth. Biodiversity is often an important measure of the health and functioning of an ecosystem. The goal of this activity is to introduce students to this idea and think about why it is important. Students will also explore how scientists actually measure biodiversity.

**Grade level:** 6-8

**Academic Standards**:

**Time:** 45-60 minutes

**Logistics**: Break the class into small groups

**Materials**:

-Measuring tapes (one per group)

-“Short Guide to Major Insect Orders” document from the Insect Discovery website

-Notebooks for students or small whiteboards and markers.

-“Aquatic Insects” video from the Insect Discovery website.

**Preparation:** Download and print the “Short Guide to Major Insect Orders” document from the Insect Discovery website (enough for each group): <https://extension.arizona.edu/sites/extension.arizona.edu/files/mblock/insect-discovery-short-guide-major-insect-orders.pdf>

 Scope out locations for groups to explore and sample. If possible, choose areas that are very different from one another. For example, if you are at school, choose one location that is more natural and one that is more impacted by humans. Or If you are in a park choose one area that is rockier and one area that is grassier or vegetated. Queue up the “Aquatic Insects” video from the Insect Discovery website: https://extension.arizona.edu/arizona-insect-videos

**DO - Activity**:

**1.)** *Setting the stage* Ask students if they know what biodiversity means. Ask students why they think biodiversity is important. Are ecosystems healthier with lower or higher biodiversity? Why? Reinforce the idea that different types of plants and animals play different roles in the ecosystem. When there is a higher variety of plants and animals, more of these roles are covered. Insects play many important roles in our ecosystems. Ask students if they can name some roles that insects play (pollinators, decomposers, predators of pests, etc.).

**2.)** *Take samples* Split students into small groups and assign each group an area to sample. Each group will use their measuring tape to demarcate a 1m x1m square. Then students will observe/ explore the square for 2-3 minutes and identify all the insects that they see. Repeat this process for 3-5 observations. Another option is to use the measuring tape to walk a 20m transect if that is easier than making a square. Students will identify (to order) all the insects they can see and record total numbers on a small white board. Emphasize that it is ok if students do not know what the insects are they are seeing, as long as they can make an educated guess as to what order it falls into.

**3.)** *Calculations* Explain how to calculate biodiversity. There are two ways we can measure biodiversity. *Abundance* is the total number of insect orders identified (note that this is not the same total number of individual insects they counted). Ask students to count how many orders they identified. *Evenness* isthe relative abundance of the different insects present. Does one type of insect dominate? Or is abundance similar across orders? For each insect order, students will calculate how “dominant” this order is by calculating a percentage.

Dominance = Number of individuals in an order / Total number of individuals found

This calculation should be done for each order the students identified. After doing this, students should look at their percentages. If the percentages are similar there is high species evenness, if the percentages are disparate there is low species evenness.

**REFLECT**

1. Bring groups together to compare the biodiversity of the different areas sampled. Have everyone share their abundance and evenness findings. Is one area more diverse than the others? What might be some explanations for the differences?
2. Why do we have two measures of biodiversity? What would happen to an ecosystem with low evenness (e.g. only one type of insect dominates)?

**APPLY**

Watch the “Aquatic Insects” video on the Insect Discovery website. What roles do you think aquatic insects play in these environments? From this video, what was the abundance and evenness found in Cañada del Oro stream?