

## STEM 5E lesson plan

### Measuring Biodiversity

**Summary:** I created a lesson plan that introduced the topic of biodiversity and how to measure it in nature. I call it a STEM (Science, Technology, Engineering and Math) 5E lesson plan because I involved science and mathematics within the lesson.

**Essential Question:** What is biodiversity and how do we measure it?

#### **Engage:**

I started my lesson by showing a cartoon picture that addressed the loss of biodiversity. The cartoon pictured a series of trees with “lost” and “missing” signs of endangered or extinct species. Similar to those signs posted on bulletin boards and posts when someone loses their dog. I then begin my biodiversity slide show that I created for the lesson plan. I started off the discussion with “what is biodiversity?” and “why do we care?”

#### **Explore:**

After our discussion, I told my students that there are ways of measuring biodiversity and that we were going to do some of those measurements. I split the class into two groups, one for each parking lot, and each parking lot is termed a “community”. A community is a biological term used to describe a group of animals that live together in a common area and this group is comprised of different species. Each group had to go to their assigned parking lot and count the number of “species” in the lot. In this case, the “species” are different car models. There were six species: four door sedan, two door sedan, pick-up truck, SUV, van and motorcycle. The groups went out into the parking lots and counted the number of species in each lot.

#### **Explain:**

The students then returned to the classroom and we went over the various methods of measuring biodiversity. I created a few slides on the common equations used to measure biodiversity and how those equations are used and what they mean. I discussed two main equations: the Simpson Index and the Shannon-Weaver Index. The equations are not hard to use, but can be confusing if you do not know what all the variables are. Therefore, I slowly introduced each equation at a time. I discussed what each equation is used to measure specifically, what each of the variables are and how they relate to each other. After I went through both of the equations, I created an example question and we went through the example together in class.

#### **Elaborate:**

To elaborate on why measuring biodiversity is important I discuss some biological terms such as “hotspots” and “coldspots”. “Hotspots” are small areas with an abundance of biodiversity and habitat degradation. “Coldspots” are large areas with little biodiversity. We then discuss the pros and cons for each type of “spot”. Many of the world’s “hotspots” and “coldspots” are determined using these various biodiversity equations. To even further elaborate my lesson, I created a homework sheet for the students to take home. The series of questions were customized to the field activity the students did earlier. I had the students use both of the indexes to measure biodiversity within their “community”. I then asked a few questions on how to interpret the results and lastly for both of the groups to compare each other’s biodiversity measurements. For example, which community was more diverse or showed more biodiversity?

**Evaluate:**

I evaluated my lesson plan by grading the homework sheets the students completed.

**Reflection:**

After I graded the homework sheets, I noticed that some of the students did poorly. This is because they did not understand how to use some of the equations properly or they did not understand how to interpret the results of the equations. Every student learns differently, whether it is visually, physically, etc. I could try to create different explanations of the biodiversity equations by more visual means such as manipulatives. For example, for a high amount of biodiversity I could use a number of blocks of different colors. For a low amount of biodiversity, I could use a number of blocks of the same color.