Ecosystem Stability and Monkeys in the Amazon

Lesson plan for grades 6-8
Length of lesson: 1 hour and 30 minutes (Can be divided into two 45 minute classes)
Authored by: Mary Fuentes, Environmental Science Institute, May 2014

SOURCES AND RESOURCES:
- State of Texas Science TEKS, http://ritter.tea.state.tx.us/rules/tac/chapter112/ch112c.html
- Ecosystems, NatureWorks http://www.nhptv.org/natureworks/nwepecosystems.htm
- BBC's Documentary- The Magical Forest, https://www.youtube.com/watch?v=3SJiHfpqNRo
- ESI Hot Science Cool Talks lecture # 90, Dr. Anthony Di Fiore, Primate Social Behavior, http://www.esi.utexas.edu/hot-science-cool-talks/378-primate-social-behavior

POTENTIAL CONCEPTS TEKS ADDRESSED THROUGH THIS LESSON:
(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:
   (F) Describe how environmental change can impact ecosystem stability.

Overview. In this lesson, the students will be able to predict how a disruption to the environment, such as a change in climate, habitat destruction and the introduction of an invasive species, will affect parts of an ecosystem, such as their producers, consumers and decomposers. The students will study these relationships and how they are affected. In addition, the students will also model a food web from a group of given organisms and use such model to display their predictions of the ecosystem change.

CONCEPTS:
- Everything in the natural world is connected!
- By definition, an ecosystem is "a community of living and nonliving things that work together"
- Ecosystems have a lot of different living organisms that interact with each other.
- There are three types of consumers: herbivores, carnivores, and omnivores.

MATERIALS
- Sandwich-sized baggies
- Pictures of various organisms, with their abiotic and biotic factors, and descriptions based on ecosystems covered (i.e., rain forest, desert, ocean, arctic)
- A way to show the first minute and a half of the BBC documentary, The Magical Forest, https://www.youtube.com/watch?v=3SJiHfpqNRo
- Handouts or classroom posters with basic definitions of an ecosystem and its components. (Tip: Refer to Ecosystems, NatureWorks http://www.nhptv.org/natureworks/nwepecosystems.htm.)
- Copies of recent articles about changes in various ecosystems for students to read (i.e., rain forest, desert, ocean, arctic), and highlight with highlighter markers
- Blue, green, pink, and yellow highlighter markers

PREPARATION:

The teacher should prepare the different baggies for the food web before coming into the classroom. These baggies should contain a picture of the organisms as well as their abiotic and biotic factors. The teacher should also include a small description for each organism within the baggie. These should be completed for every ecosystem the teacher wants to cover (i.e., rain forest, desert, ocean, arctic). The teacher should also have a handout or classroom poster with for the definition and examples of the components of an ecosystem prepared and printed for the students to use.

The teacher should have the articles for the students to read already prepared for each ecosystem. For example, they can use an article about habitat destruction in the rain forest. OPTIONAL. The teacher can also make the students research their own environmental change, if the students are in a higher grade. The teacher may also create a handout with questions that the students can answer as other students are presenting their final findings.

ENGAGE and EXPLORE:

Day 1

Students should be in groups of 4.

The lesson will be introduced by first asking the students what they think the definition of an ecosystem is. The students will then think about it by themselves and then talk to their shoulder partners to make a group definition.

The teacher can show the first minute and a half of the BBC documentary, The Magical Forest, https://www.youtube.com/watch?v=3SJiHfpqNRo. While the students are watching this short portion of the video, ask them to write down things that catch their attention. This should also help them come with a group definition of an ecosystem.

The groups will then be given a baggie with various organisms and their descriptions from a particular ecosystem (such as ocean, desert, rain forest, arctic) and their biotic and abiotic factors.

In groups, the students will create a food web and write a small description of the ecosystem and the relationships between the organisms.

The students will also discuss what the parts of an ecosystem are, and the roles the organisms play within it. (Please see the first note in "teacher talk".)

Day 2:

The students will predict what would happen in situations where some aspects of the ecosystem have undergone changes, based on the food web that they have created. The groups will be given a recent article of different real world scenarios that explain the effects of these changes on the rest of the ecosystem.

Each group will be given an article that describes an ecosystem and a change that has taken place, like the deforestation of forests.

Each student will have a role to use highlighter markers to highlight the following in the article:

- Blue, for environmental changes
- Green, for producer changes
- Pink, for consumer changes
- Yellow, for human role in the changes

The students will then be asked to consider how the event affected the ecosystem and how it will impact the area in the future. The students will make an initial prediction, and then determine if their predictions were correct from the readings in the articles. (Please see the second point below).

EXPLAIN:

1. After the students have created their food webs, the teacher can create a class discussion of the students' food webs, what the components of an ecosystem are, and the roles that each component plays within ecosystems. The teacher can guide the discussion and introduce terms (such as producer, consumer, decomposer). The teacher can create a table where the students can write down the name of the ecosystem component, their definition, and an example from each of the different ecosystems that each group has.
2. After the students find the effects on the environmental change of their ecosystem, the students can then show their findings to the classroom. The teacher can also make a handout with questions that will help the students with their predictions of how this change can affect their food web. The students will then revisit their food web and model what would happen in the food web after the environmental change they have research. This will be presented to other groups via a gallery walk.