



## CHATHAM CONSERVATION FOUNDATION, INC.

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### **Lesson Plans in Conservation of Earth's Natural Resources**

Per the NGSS standards revision on April 16 2016

MA DESE template

Strand: Earth's Systems

Standards Covered: 7.MS-ESS3-4

Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per capita consumption of natural resources on the environment.

**Essential Question:** How have humans influenced the availability of natural resources (both renewable and non-renewable)?

#### **Introduction:**

The resources that provide the energy or materials that we use everyday can be divided into two different groups; renewable and nonrenewable. Renewable resources are those that we can use over and over again as they can be resupplied. Non-renewable resources are those that are used and cannot be recreated in a short period of time. In this activity, each group of students will be given a bag of beans. Each bag will contain both renewable (white beans) and nonrenewable (brown beans) resources. They will "use" both resources by randomly picking beans from a bag. They will observe what happens to the renewable/non-renewable resources that remain after many years of use.

#### **Content vocabulary:**

Non-renewable resource, renewable resource

#### **Assessing Prior Knowledge:**

Place the students in small groups to compose a 2 column list of the types of resources as a review.

**Materials:** One brown lunch bag (so the students cannot peek!), 90 brown dried beans and 10 white dried beans (the brown and white beans should be of the same size, so that they cannot

distinguish them by touch), a data table or science notebook to record each round representing one year, pencil. *You could also use colored beads of the same size and shape.*

**Procedure:**

1. The teacher will decide the type of resource that the students are using such as energy.
2. Split the students into groups of 2-3.
3. Have one person from each group pick out 10 beans without looking. These beans represent the resource, such as energy, that is used in one year.
4. Count the number of brown and white beans and record the number on a data table or in their science notebooks.
5. The brown beans must not be returned to the bag, as they have been “used up”. The white beans should be returned to the bag.
6. Another student in the group then repeats the process.
7. Repeat the process, returning all white beans to the bag until all of the brown beans are gone.
8. Complete the Results and Discussion questions.

**Results and Discussion:**

1. How many years (each turn was one year) did it take for the non-renewable resources to run out when you used 10 beans per year?
2. What does this activity demonstrate about our consumption of resources? And what will happen if we continue to use non-renewable resources?
3. Describe what happens to the proportion of renewable vs. nonrenewable resources that remain available, as they are used over time.
4. What are some of the pros and cons of using renewable resources as a substitute for non-renewable resources?
5. Choose ONE: What could be some effects, on the natural resource availability, of:
  - Natural disasters: wildfires, flooding, etc..
  - Advanced technology
  - Human population growth
  - Disease
6. Explain why an increased dependence on renewable energy sources is certain to be part of our future.

**Further Extensions:**

Have the students make 2 columns in their science notebooks labeled renewable and non-renewable resources. Have them list examples of each that they observe around the classroom. This can also be done at home.

Question 4 above could easily become a research project.