vital venture
engaging learners • exploring watersheds • connecting communities

Finding Balance

© C. Michael Lewis 2011

QUESTION(S)

What is the difference between a renewable and a non-renewable resource?

OVERVIEW

To help students understand that there are different categories of natural resources, they will model different types of resources to discover the difference between renewable and non-renewable resources. They will apply this knowledge by labeling resources identified in **Maine: A Natural Resource Rich State** as either renewable or non-renewable. This activity can be done inside or outside and modified to model different resources.

Author(s):

Gayle Bodge, *Gulf of Maine Research Institute*

Katie Flavin, *Gulf of Maine Research Institute*

Andrew Whitaker, *Gulf of Maine Research Institute*

Grade Level: ,

Themes: ,

Activity Type: ,

Setting: ,

Part of the Natural Resources Watershed Experience

STANDARDS (MLR)

Science & Technology

A. Unifying Themes: Students apply the principles of systems, models, constancy and change, and scale in science and technology.

A2. Model

3-5 Students use models to represent objects, processes, and events from the physical setting, the living environment, and the technological world.

6-8 Students use models to examine a variety of real-world phenomena from the physical setting, the living environment, and the technological world and compare advantages and disadvantages of various models.

A3. Constancy and Change

3-5 Students identify and represent basic patterns of change in the physical setting, the living environment, and the technological world.

6-8 Students describe how patterns of change vary in physical, biological, and technological systems.

A4. Scale

3-5 Students use mathematics to describe scale for man-made and natural things.

6-8 Students use scale to describe objects, phenomena, or processes related to Earth, space, matter, and mechanical and living systems.

Mathematics

B. Data

Measure and Approximation

5 Students understand and use measures of elapsed time, temperature, capacity, mass and use measures of mass and weight.

Data Analysis

5 Students read, construct, and interpret line graphs.

LEARNING OBJECTIVES

• Students will be able to explain the difference between a renewable and non-renewable resource.

• Students will be able to categorize a resource as either renewable or non-renewable.

MATERIALS

Class list of Maine's natural resources from **Maine: a Natural Resource Rich State**

Sticky (Post-it) notes

Flip-chart paper or white board

Markers or other writing utensils

Internet or reference books

3 buckets or large bowls

One spoon or paper/plastic cup per student

A scale or measuring stick

Materials to represent resources, for example: If you're outside you could use water, sand, or gravel. If you're inside, you could use beans, buttons, or beads.

TIME NEEDED

90 minutes

ACTIVITY PROCEDURE

Modeling Resource Use

Set up the play area with a central "resource pool" bucket in the middle and two buckets about 10 yards away, one on either side. One of the side buckets will be "additional resources" and the other will be "used resources". Fill the "resource pool" bucket with the materials you are using to represent the resource and the "additional resources bucket" to represent resources being added to the resource pool. Leave the "used resources" bucket empty.

Round One:

Set the stage…Wow! You just returned from an exploration of the Great Maine Woods…and you found this really cool "thing" that everyone will want and will make you wicked rich!! This thing is in the "resource pool" bucket and you will make money by getting it to the "used resources" bucket.

1. Weigh or measure the "resource pool" bucket. If measuring, you can "measure down" from the top of the bucket to the resource.
2. Give each student a spoon or cup and 60 seconds to move as much of the resource from the "resource pool" bucket to the "used resources" bucket.
3. After 60 seconds, weigh and/or measure the two buckets. Record your data.
4. Reflect:

   What happened? Did you make any money?

   How much of the resource is left?

   Can you make money tomorrow, in a month, in a year?

   What type of resource does this represent? (non-renewable)

   What are some examples of non-renewable resources?

Round Two:

Set the stage…After discovering the next "big thing" in the Great Maine Woods, you send a team of scientists up to learn all about it.

They learned that this "thing" has a natural replenishment rate! Yeah…let's harvest and make some money!!

1. Weigh or measure the "resource pool" bucket.

2. Give each student a spoon or cup.

3. Divide the class into 2 groups or equal sizes. One group is sent to harvest the resource. They will move the resource from the "resource pool" bucket to the "used resources" bucket. The other group will represent the replenishment of the resource. They will move the resource from the "additional resources" bucket to the "resource pool" bucket.

4. After 60 seconds, weigh and/or measure the two buckets (resource pool and used resources). Record your data.

5. Continue for another 60 seconds and then weigh and/or measure the two buckets Record your data.

6. Continue for another 60 seconds and then weigh and/or measure the two buckets Record your data.

7. Analyze your data (create a line graph for each bucket). Reflect:

   What happened to the amount of resources in the "resource pool" bucket?

   What happened to the amount of resources in the "used resources" bucket?

   Can you make money tomorrow, in a month, in a year, in 5 years?

   What type of resource does this represent? (renewable resource)

   What are some examples of renewable resources?

Defining Renewable and Non-Renewable

1. Engage the class in a discussion of the meanings of renewable and non-renewable resources, focusing on how they are different from each other. Ask students to give an example of both resources.

   Non-/Renewable Resource: cannot be produced, grown, generated, or used on a scale that can sustain its consumption rate (fossil fuels, mined minerals, etc) **Round One

   Renewable Resource: replaced by natural processes at a rate comparable to or faster than its rate of consumption by humans (timber, fish, freshwater, deer, etc) **Round Two

   **If needed, edit these definitions so that they make sense to students.

2. Have students work in groups of 4 to 5, and give each group two pieces of flip chart or other large piece of paper with some markers. Ask each team to label "renewable" on one paper and "non-renewable" on the second, along with the class definitions for each.

3. Using sticky notes and the list of Maine's natural resources the class generated in the previous activity: **Maine: A Natural Resource Rich State**, ask students to write down one natural resource per sticky note.

4. Have students place each resource sticky note under the category they belong: renewable or non-renewable.

5. When teams are finished, hang all the posters around the room and have students walk around to see the results of other teams.

6. Discuss as a class each resource, and why it belongs in the renewable or non-renewable category. Students may not agree. Make note of these resources. Can they belong in both categories? See Reflection and Extension Ideas.

7. Give students time to work in their teams and edit their renewable/non-renewable lists.

REFLECTION/FORMATIVE ASSESSMENT IDEAS

An alternative method to define a term with your students is to use the Frayer Model. This can also be used to assess understanding of new terms.

Could a natural resource be considered both renewable and non-renewable? Fresh water, for instance, is plentiful and renewable in Maine. However in many parts of the U.S. and world it is seen as scarce and non-renewable.

EXTENSION IDEAS

Repeat the rounds above in the activity description. Except vary the sizes of the teams (resource users and replenishment team). Try a round with more users than replenishers, and another with more replenishers than users. What happens? Analyze data and reflect. What resources would these models represent?

Some renewable resources are further categorized as inexhaustible. An inexhaustible resource is one that is continuously available and its quantity is not affected by human consumption (sunlight, wind, air, etc). Look at the renewable resource posters and see if any of theses sticky notes could also be placed in this category.

RESOURCES

Have a great idea to share? Please leave a comment below.

REFERENCES

http://en.wikipedia.org/wiki/Natural_resource

http://www.justreadnow.com/strategies/frayer.htm