Paper or Plastic?

Grade: K

Subject Areas:
Earth science, Social Science, Mathematics, Language Arts

Skills: classifying, sorting, observing, predicting

Duration: 1 hour

Connections:
materials, wildlife, resource management

Vocabulary
natural resources
renewable
non-renewable
energy
alternatives
plastic
paper
recycle
pollution
cycle

Objective:
Students will be introduced to renewable and non-renewable resources and will make crafts using recycled materials.

Materials
- The book *Earth Friends at School* by Francine Galko
- A puppet that can be used as an Earth mascot
- Several items made from both renewable and non-renewable resources that can be placed around the school yard.
- Labeled resource cards
- 15-25 paper egg cartons
- pipe cleaners for stems and antennae
- non-toxic roll on paint or markers for decorating
- black markers for eyes
- beads, sequins or googly eyes (optional)
- buttons or tissue paper for flowers (optional)
- scissors for punching holes through the egg cartons

Standards
Strands: Excellence in Environmental Education Guidelines
Strand 1 — Questioning and Analysis Skills: C) Collecting information: Learners are able to locate and collect information about the environment and environmental topics.
Strand 2.2 — The Living Environment: C) Systems and connections: Learners understand basic ways in which organisms are related to their environments and to other organisms.
Strand 2.3 — Humans and Their Societies: D) Global connections: Learners understand how people are connected at many levels—including the global level—by actions and common responsibilities that concern the environment.
Strand 2.4 — Environment and Society: C) Resources: Learners understand the basic concepts of resource and resource distribution.
Strand 4 — D) Accepting personal responsibility: Learners understand that they have responsibility for the effects of their actions.

California State Educational Standards:
Earth Sciences 3c: Students know how to identify resources from Earth that are used in everyday life and understand that many resources can be conserved.
Investigation and Experimentation (I and E) 4a: Students communicate observations orally and through drawings.

Background

Renewable or Not?

Every living thing requires resources to survive. **Natural resources** include sunlight, air, water, animals, minerals and plants. When organisms share an environment they compete for resources. Plants compete for light, water, nutrients and space. Many animals compete for food territory and mates. People need resources too. All of the products that people need and use come from natural resources. Today, people are harming the environment by poor management of resources and by using them faster than they can be replaced. The good news is many people are learning to protect the Earth by practicing the three R's: reducing, reusing, and recycling. *(Note: This lesson is somewhat simplified. Many people promote the four Rs; the fourth one being restore).*

Some natural resources can be replaced relatively quickly; say within a few human generations, and are called **renewable** resources. Water, soil and trees are examples of renewable resources. Other resources cannot be replaced quickly and are called non-renewable. **Non-renewable resources** are mostly metals and fossil fuels which are oil, coal and natural gas. Humans use fossil fuels primarily as energy sources.

Any time people make things, energy is required. Forms of energy include light, heat, movement and chemical. Most of the energy used to heat our homes, run our factories and drive our cars comes from the burning of fossil fuels. When people burn things an odorless gas is released called carbon dioxide. Excess carbon dioxide in our atmosphere is causing the planet to warm up which is upsetting many ecosystems. Today, people are finding alternatives to fossil fuels such as solar, wind and biodiesel. **Alternatives** are things that are used in place of something else. Alternative fuels are renewable resources.

Besides providing energy, oil is used to make cheap and convenient materials such as plastic. **Plastic** is light weight and durable. As a matter of fact, it is difficult to find things that are not made of plastic. Containers, tires, computers, and toys are just a few examples of things made of plastic. However, the manufacture, use and disposal of plastic is causing many problems for the environment. The drilling of oil can cause oils spills. The refining of oil causes air and water pollution. And, there is no easy way of getting rid of plastic. Scientists estimate that it takes a plastic bottle in the ocean 500 years to decay. Some countries burn plastic, but burning it releases harmful chemicals into the environment. Harmful chemicals are a source of pollution. And, remember,

Local Connection

Among the many local organizations promoting clean energy alternatives, Shatz Energy Resource Center (SERC) is among the leaders. SERC is comprised of scientists, researchers and students serious about promoting clean energy alternatives. Their work involves research and development, project development, energy system analysis and educational outreach.

An interdisciplinary lecture series available at Humboldt State University or online, addresses a wide range of energy related issues. Guided tours of the Schatz Solar Hydrogen Project in Trinidad are also available. This plant is a renewable hydrogen demonstration plant combined with a large solar array. In addition, SERC has an educational outreach program servicing both K-12 education and higher education. Classroom visits are structured to the age and focus of the students and include games, hands-on activities, physical demonstrations and interactive lectures. This outreach program educates both students and the general public about energy and electricity basics. For more information visit: www.humboldt.edu/~serc

For those interested in alternative energy opportunities specific to Humboldt County, see reports done by the Redwood Coast Energy Authority. This organization does in-depth analyses and assessments. Humboldt County's isolation prevents certain energy alternatives from being affordable, however, it does have a wealth of resources that can be tapped. For more information visit: www.redwoodenergy.org

most plastic is made of oil, and oil is a non-renewable resource.

One of the best ways to reduce plastic is to find alternatives. For instance, instead of buying plastic furniture or plastic toys, wooden ones can be purchased. Instead of usingplastic bags, people can use paper or cloth bags. Cloth bags can be used over and over again just like re-useable water bottles. Another way of reducing plastic is to avoid packaging. Many things are wrapped in plastic packaging which is wasteful.

One alternative to plastic is paper. **Paper** is made from almost anything that is fibrous such as cotton, wood, hemp and flax. These materials come from plants which are renewable resources. The first paper was made in China around 105 A.D. from bamboo and/or silk. Today, paper and paper products are extremely important. People read books and record important numbers on paper. Paper is used for packaging, preserving food, and personal hygiene. People use so much paper that that some modern machines can make a sheet of paper 26 feet wide and 40 miles long in just one hour!

Ways of a Worm

Another way to save resources is to recycle. **Recycle** means to re-make all or part of something to be used again. Many materials can be recycled like paper, plastic, glass and tin. For instance, used aluminum cans can be cleaned, melted and molded into new aluminum cans. Drawing paper can be recycled and turned into other paper products like toilet paper and newspaper. Recycling paper and buying products made from recycled paper saves trees. Trees are an important renewable natural resource.

Energy and water are saved when people recycle too. As a matter of fact, if one person recycled their newspaper every day for a year, 4 trees, 15 lbs. of air pollutants, 2,200 gallons of water, and enough energy to power a 100 watt light bulb for 152 days would be saved. This savings is substantial, especially if a lot of people recycled their newspaper every day.

Saving energy is one of the best ways to save resources. People can save energy in many different ways. Some easy ways kids can save energy is by turning off the lights when they leave a room, wearing warm clothes on a cold day, walking to school if they live close by and buying electronic gadgets that have energy saving devices. It is important that batteries often found in electronic gadgets are recycled because batteries are toxic. Toxic substances when improperly disposed of make pollution. **Pollution** comes from waste products that harm the environment.

One of nature's best recyclers are worms. Worms live in the soil where they constantly recycle plant material. As plants die their stems and leaves fall to the ground. Worms eat the worn out plant parts and turn them into new soil. The new soil is full of nutrients and is just what new plants need to grow. Worms also add oxygen and nutrients to the soil. Worms are part of a cycle. A **cycle** is something that repeats itself. A good place to find worms is in a garden. Starting a compost pile is a great way to encourage worms.

What we use and throw away can harm the environment if we aren't careful. By learning what resources are and where they come from, we can help protect the environment. By protecting the environment we can make a world that is safer, cleaner and healthier for all living things.

Activity 1: Earth Friends

Preparation

Have resource picture cards made ahead of time. The cards should show the term in big letters and have a picture of the resource. The first letter should be emphasized since this age group is just beginning to read. Place several materials in the school yard representing different resources for the resource walk. Make sure the administration knows what you are doing and that kids won't collect the items during recess. Place some objects where they can be easily found and have others slightly hidden so finding them will be more challenging.

Materials

- **The book *Earth Friends at School* by Francine Galko or another book about natural resources**
- **A puppet that can be used as an Earth mascot (a worm puppet makes a great mascot)**
- **Several items made from both renewable and non-renewable resources that can be placed around the school yard (wood, plastic, batteries, clay, cloth, glass, tin, steel, Styrofoam, etc.)**
- **Labeled resource cards (wheat, wool, soil, trees, water, air, metal, chickens, cotton, soybeans, vegetable oil, fossil fuels, paper, etc.)**

Procedure

1. Use a worm puppet to introduce renewable and non-renewable resources. Gather the students around on a reading rug or take them outside if appropriate; and introduce the puppet to the class. A word of caution when questioning young students—most love to talk and will often respond with an imaginary story. You may want to prompt them by saying "wormy only wants truthful answers" or "if wormy picks on you to respond, he wants a truthful answer; not a made up story".

- *Does anybody know where I live? (Worms live underground)*
- *Does anybody know what I do? (Worms help improve the soil)*
- *Does anybody know what I eat? (Worms ea left over materials)*
- *Does anybody know why I am important? (Worms recycle materials and make them useful for other living things)*

2. After each response, have the students repeat the correct answer to reinforce the concept. Explain to the class why the worm is here. Using the worm puppet, introduce the concept of a cycle. Worms break down plants which helps the soil so new plants can grow. Cycles are very important in nature. Cycles are things that repeat themselves.

3. Next, introduce what a natural resource is. "Resources are what plants, animals and people need to survive". Have the students repeat the sentence above together. Explain to the students that a worm is an animal. Animals are a type of resource because they supply things people need and want. See if the students can come up with examples of things made from animals (wool, silk, glue, cheese, leather, etc.). Continue to explain that every living thing competes for natural resources. Ask if they can think of something they cannot live without. List relevant examples and relate them to the pre-made picture resource cards.

- *Like me (referring to the worm), what do animals need to stay alive?*
- *Do plants need these things too?*
- *What kind of resources come from plants? How about people?*
- *What do people need to stay alive?*
- *What do we call these things that everything needs? (You may want to include the things you have placed out in the school yard or are in the book you are about to read to reinforce the nature of these items.)*

4. Briefly introduce renewable resources. For instance, trees are plants that grow and produce seeds. If a tree is cut or falls down, the seed can be planted and it will grow into a new tree. Have the students repeat the phrase: "Renewable resources can be used over and over because they can be replaced". Use the worm puppet as you present renewable resources. Worms will eat plants and live in the soil; both plants and soil are renewable resources.

Activity 1 continued...

5. Next, introduce non-renewable resources. This can be done by having the worm hold up something made of plastic, Styrofoam or metal. These are things that worms don't eat so they can't be broken down fast. Explain where plastic comes from and introduce the term non-renewable. Have the students repeat the phrase: "Non-renewable resources cannot be replaced."

6. Read the book *Earth Friends at School*. This book is a simple way of introducing natural resources and it gives some simple things kids can do to save resources. After reading the book, reinforce the fact that people need to conserve resources to help keep our world clean and the environment healthy. You may want to bring up recycling here. Tell them some materials are harmful to wildlife and pollute the environment; batteries are a good example.

7. Next, get ready to take the students outside to find the resources you have placed around the school yard. Explain to the class that they are going to try to find different natural resources and ways to save resources when they go outside. You may even find a few unexpected and additional things such as a leaky faucet.

8. First have everyone line up and form a living train. In this case, the train can represent a big worm. You may want to have different students come to the front of the line, if they find something. Have each person hold on to the waste line of the person in front of them and then bend forward at the waste as they walk. The leader should be an adult. Together hunt for resources and while each one is found, state what type of resource it is and mention something about it. Collect the items as you go and make your way back to the classroom. This may be a good time to have the students go to recess before proceeding to Activity 2.

Activity 2: Making Caterpillars and Flowers

Preparation

To save time, pre-cut the pipe cleaners to the correct length and cut the egg cartons up. Each caterpillar should have 5-6 "cups". Each flower only requires one "cup". Make sure you have tried to make both of the objects ahead of time.

Materials

- 15-25 paper egg cartons (not styrofoam)
- pipe cleaners for stems and antennae
- non-toxic roll on paint or markers for decorating
- black markers for eyes
- beads, sequins or googly eyes (optional)
- buttons or tissue paper for flowers (optional)
- scissors for punching holes through the egg cartons

Procedure

1. Explain to the students that they are going to reuse a resource to make art projects. Ask them what egg cartons are made of and have them predict if egg cartons come from recycled paper. Be sure to state that they are not recycling the egg cartons, they are re-using them before they are disposed of. Egg cartons, if made from paper, can be composted. In other words, worms can eat them!

Directions for caterpillar:
Place two dots for eyes on one end of 5-6 consecutive cups. You can also glue sequins or googly eyes (optional). This is the head. Punch two holes on either side above the eyes using a pair of scissors. Next pull the pipe cleaners up through the holes above the eyes to make antennae. Have the students decorate their caterpillar with paint or markers (there are many things that can be used to decorate these).

Directions for flowers:
Have the students color the inside and outside of a cup. At the base of the cup, punch a hole. Make a stem, by pushing a pipe cleaner through the hole. Twist the pipe cleaner end so it cannot be brought back through the hole. You may want to attach a button here. The cup should stand upright on the stem. Several flowers can be made and then placed in a bundle and put inside a vase. These vases can be placed around the room as decorations.

Extensions

- Places different materials in either a compost pile, a worm box, or in see through containers to observe rates of decay.
- Sing songs and/or read poetry about protecting the earth.
- Count or weigh the numbers of papers in the recycling bin.
- Look at materials under magnification.
- Use the letter E to introduce other environmental concepts.
- Have the students come up with a resource or product that begins with the first letter of their name.

References

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FOSS Connection

Grade K
Physical Science: Wood and Paper, Fabric
Life and Earth Sciences: Trees

Wool

Vegetable Oil

Chickens

Wheat

Soybeans

Trees

Air

Cotton

Water

Fossils

Soil

Metal