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COMMUNITY RESOURCES FOR SCIENCE

BASIS Lesson Plan

Lesson Name: Planet Protectors! Resource Use and Conservation

Grade Level Connection(s)

NGSS Standards: Kindergarten (K-ESS-3)
FOSS CA Edition: Kindergarten, Earth Science

**Note to teachers: Detailed standards connections can be found at the end of this lesson plan.*

Teaser/Overview

This hands-on lesson introduces students to the concept of resource use and conservation. Students will discover some ways kids, teachers, and families can help protect the planet: by conserving resources; by not polluting; and by sorting trash to recycle and compost.

Lesson Objectives

- Students will discover how they can impact the world around them and make choices to reduce their footprint on the environment.
- Students will use models to represent different ways humans interact with natural resources.
- Students will understand that events such as littering and resource waste create observable environmental problems.
- Students will explore and communicate solutions that will reduce the impact of humans on the local environment.

Vocabulary Words

- **Resource**: things found in nature that humans use (for the purposes of this lesson, resources are understood to be limited; we will not cover renewable resources)
- **Conservation**: to use carefully, avoiding waste or overuse
- **Compost**: food scraps and paper that can be turned back into soil
- **Recycle**: to use again or turn into something new
- **Waste**: trash and other materials we discard

Materials

Volunteers will bring:

- Conservation Station:
  - 1 large tray
  - Approx 50 paper "trees"
  - 10 small cups
- Pollution Station:
  - 1 water tub
  - Paper towels
  - Bottle of canola oil
  - Bits of misc trash (candy wrappers, etc.)
  - 6 spoons
  - 6 strainers
- Composting/Recycling Station:
  - Green, blue, and black-labeled buckets (1 each)
  - Laminated pictures of trash items

Classroom Set-Up

Please have the students sitting together on a carpeted area; later, they will be split into three groups. Access to water required unless discussed in advance.

Classroom Visit

1. Introduction (10 minutes)

Role Model Introduction:
Being a role model is an important part of being a BASIS volunteer! Begin your lesson by explaining who you are and what you do as a scientist. Feel free to tell your "story" as if giving an elevator pitch to kindergartners: Why did you become a scientist? What questions are you trying to figure out? What do you do in your job? Why should students relate to you? Feel free to bring in photos, specimens, and other props. Let your personality shine through!

Topic Introduction:
After you introduce yourselves as role models, take some time to introduce the topic of this lesson: resource use and conservation. It may be helpful to keep the suggested take-away in the back of your mind throughout the lesson: **We can help the planet by using resources responsibly.**

Your topic introduction should cover, at a minimum, the following information. As much as possible, try to frame this information as questions posed to the class, rather than as a lecture. This helps active students' prior knowledge and facilitates student-guided conversation.

- Everything around us was at one time part of the earth! Our earth is made up of all kinds of materials and chemicals that we can use to make our lives better.
- Who can think of something that comes from the earth? [eg water, food, wood, metal]
- What do we do with those things? [make houses and furniture, drink or cook, make paper for books, etc.]
- How do we use those things to make our lives better?
    - Anything that humans use to make their lives better is called a **resource**. The examples you just gave are resources! [write all vocab words on the board]
- Does it matter how, or how quickly, we use resources? What would happen if we used too many resources? What if we wasted resources by using some we didn't need? [eg there might not be enough for everyone]
- Does anyone have any ideas of what we can do to **conserve** (or save) them for a long time so everyone will be able to enjoy them? [eg share things, save things instead of throwing them away, write on both sides of paper, wash a glass instead of using a new plastic cup, etc.]
- We're going to do some fun activities to learn more about using **resources** and **conserving** them!

Teaching Tip: Say, Write, Show

- Bring in photos and props to illustrate the topic intro
- Write new vocabulary words, key terms, and brainstorm lists on the board
- Refer back to the board to engage visual learners and English Language Learners

2. Learning Experience (35 minutes)

Students will be split into three groups. Each group will head to one of three stations set up around the room; at each station, they will interact with a new volunteer and explore a new way of protecting the planet through resource use and conservation. One volunteer (or the teacher) will keep time; every ten minutes, the groups will rotate to a new station. Remember that all three of these stations are designed to address the takeaway in a particular way: **We can help the planet by using resources responsibly.**

Station 1: Forest Conservation

1. Engage students in a conversation about how humans use trees
    a. Students may think of wood for houses and furniture; paper; etc.
    b. Discuss why we want to make sure there are always plenty of trees in the forest (animals live there, we need trees to give us air we breathe, etc.)
    c. Introduce the idea that wood is a **resource** that we all need to help conserve; otherwise, we'll destroy forests before they have time to grow back
2. Do the forest conservation experiment
    a. Set up a tray full of "trees" in the middle of the table. Explain to students that they'll take turns taking trees to use for wood, and that the goal is for everyone to get enough wood.
    b. One at a time, invite students to grab as many trees as they want.
    c. After everyone has had a turn to take trees (or not, if there aren't any left!), engage students in observing and discussing the distribution of trees among their classmates. Do they all have enough to make a house? Are there any trees left in the forest? What can we do to make sure all our friends have enough trees, AND there are trees left in the forest? If we each take fewer trees and use less wood, we are **conserving** trees.
    d. Repeat the experiment.
    e. Repeat the conversation.
3. Connect the activity to the big picture
    a. Invite students to reflect on the importance of conserving resources, just as they share things with their classmates at school.
    b. Emphasize the overall takeaway of the lesson: **We can help the planet by using resources responsibly: for example, by using less and sharing better!**

Teaching Tips: Guide Discussion with Kindergarteners

- Start with something all students can relate to, so everyone can start on the same page: eg, Many homes in Oakland are made of wood, which comes from trees
- Be explicit about new vocabulary so that all students can follow along
- Guide students to figure things out together by turning your statements into questions
    - Instead of saying: "We need to conserve forests because if we cut down trees too quickly, there won't be enough left."
    - Try: "Why should we conserve forests? Do trees grow quickly or slowly? What if we cut them down before new ones grow?" etc.

Station 2: Water Pollution

1. Engage students in a conversation about how humans use water
    a. Students may think of drinking, bathing, cleaning, cooking, swimming, etc.
    b. Discuss how we only have a certain amount of clean water on earth to drink.
    c. Introduce the idea that water is a **resource** that we all need to help conserve; otherwise, we could run out of water
2. Guide students through the water pollution activity
    a. Show students the bucket of fresh, clean water
    b. Discuss what happens when our trash and waste ends up in the rivers, bays, and oceans. This is **pollution**.
    c. To demonstrate, add some oil to the water, and invite students to take turns adding trash to the water.
    d. Give each of the students a spoon or strainer to try and get the trash out of the water.
    e. Engage students in observing and discussing their progress at cleaning up the water. What was easy to remove? What was hard? Would it be better to spend time cleaning up the water, or to avoid polluting it in the first place?
    f. Guide the students to discuss the importance of keeping water clean (human uses, as well as plant and animal uses)
3. Connect the activity to the big picture
    a. Invite students to reflect on the importance of not polluting water, just as they keep their classroom, playground, and neighborhood clean.
    b. Emphasize the overall takeaway of the lesson: **We can help the planet by using resources responsibly: for example, by not polluting!**

Classroom Management Tips: Station Rotation

- It helps to keep things orderly. When it's time to rotate, have the leader announce that all students should stand up in place and NOT MOVE until you say so; point out where each group will move to; confirm that everyone understands; THEN instruct students to move to the next station.
- Have a volunteer keep time and tell station leaders to wrap up at 9 minutes.
- Remember that students might visit your station first, second, or third: don't assume prior knowledge from another station!
- For more classroom management tips, visit www.crscience.org/volunteers/volunteertools

Station 3: Composting and Recycling

1. Engage students in a conversation about what happens to trash when we throw it away
    a. Where do students put their trash? Where do they think it goes?
    b. Has anyone noticed the different colored trash cans at school or on the street?
    c. Explain the difference between the different bins:
        i. If you put it in the black bin, it goes to the dump, where it is covered with dirt and breaks down very, very, very, very slowly, so it sits there for many years.
            1. What do students think of this? What are some reasons to avoid too much landfill? How many landfills do we want in our area?
        ii. If you put something in the blue bin (like papers, cans, wood, bottles, and plastics), it will go to a big warehouse where it will be turned into something new! That's called **recycling**.
            1. What do students think of this? Why might it be good to recycle?
        iii. Who knows what might go in the green bin? Your food scraps and napkins! They are taken to an area where they can be quickly turned into soil. This is called **composting**.
            1. What do students think of this? Why might it be good to compost?
2. Guide students through the trash sorting activity
    a. Have students work in pairs to sort photos of different kinds of trash into a blue, green, or black can.
    b. Guide the students to discuss the importance of recycling, and whether it was a hard or easy process.
3. Connect the activity to the big picture
    a. Invite students to reflect on the importance of recycling and composting.
    b. Emphasize the overall takeaway of the lesson: **We can help the planet by using resources responsibly: for example, by recycling and composting!**

3. Wrap Up: Review and Discuss the Learning Experience (5 minutes)

Have students rejoin you on the carpet for a wrap-up discussion.

- What are resources?
- What did we learn at station 1/2/3?
- Reiterate how it is everyone's responsibility to care for our planet, because we all share it.
- Prompt students to think about what other questions they would investigate in the future to better understand how to protect the planet

4. Connections & Close (10 minutes)

Draw in connections to the real world around students:

- What can we do in this very classroom to help conserve resources?
- If possible, tie lesson into your research or role model story
- Suggest some more examples of ways volunteers like to conserve resources (eg turn off water when brushing teeth; turn off lights that aren't being used)

Close:

- Reiterate for students that science helps us learn about the planet and come up with ways to protect it
- Ask students if they have any questions about science or being a scientist
- Close with a good bye and a thank you, and encourage the kids to keep thinking about ways they can help care for the planet

Follow Up: After the Presentation

Teachers who wish to extend the impact of this lesson may find the following CRS web pages useful:

- http://www.crscience.org/educators/helpfulreports
- http://www.crscience.org/educators/treasuretrove

Standards Connections

NGSS:

- Connections by topic
  Life Science: K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment
- Connections by disciplinary core ideas:
  Life Science: K-LS1 From Molecules to Organisms: Structures and Processes
  Earth & Space Science: K-ESS3 Earth and Human Activity
- Connections by scientific & engineering practices
  1. Asking questions & defining problems
  2. Developing and using models
  8. Obtaining, evaluating, and communicating information

- Connections by crosscutting concepts
  - 2. Cause and effect: Mechanism and explanation
  - 4. Systems and system models
  - 5. Energy and matter: Flows, cycles, and conservation
- Connections by performance expectation:
  - K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
  - K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

FOSS CA Edition kit: Wood and Paper Trees