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60-90 Minutes

Description

In this lesson, students explore the concept of sustainability by participating in a game in which they act as condo development owners collectively drawing from the same reservoir. They learn about the sustainability of natural cycles, and how human activity designed to meet present-day needs can interfere with those cycles and be unsustainable.

Objectives

- Students will summarize how nature's cycles work and why they are sustainable.
- Students will explain how human activity can be unsustainable.
- Students will develop a definition of sustainability that incorporates both words and visuals.

Materials

- *Handout: Cycle of Materials* (class set)
- *Transparency: Reservoir Game*
- *Sticky notes* (four or five pads of 100 sheets)

Background

There are many interpretations of the term sustainability. Generally, sustainability refers to methods, systems, or practices that meet present needs for our continued survival without compromising the ability of future generations to meet their needs. Stewardship of environmental resources is a key component of sustainability.

Advance Preparation

Before class, review the steps and guidelines for conducting the Reservoir Game outlined in the Mini-Lesson. This game is based on a dilemma first described in 1968 by Professor Garrett Hardin in an article called, "The Tragedy of the Commons," and is intended to help students understand how sustainable and unsustainable behaviors differ.



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Do Now

In their notebooks, have students list any terms or phrases that they think are related to the term, “sustainability.”

Mini-Lesson

1. Tell students that they are going to explore the concept of sustainability, a term which is important in understanding the purpose and principles of green building. As a class, they are going to play game in which they assume the role of condo development owners.
2. Place students in groups of five. Explain that each group represents owners who draw water from the same reservoir. Give each group a stack of 25 sticky notes and explain that it represents the water in the reservoir.
Project Transparency: Reservoir Game and review the guidelines with the students. Tell students that they will play multiple rounds, with each round representing one calendar year. In each round, students must each take at least one sticky note from their group’s pile. Once a sticky note is removed from the pile, it cannot be put back. Tell students that if they decide to maintain a special amenity one year, they do not have to maintain it the next.
4. Conduct the first round of the game by allowing students the opportunity to take what “water” they would like for their development from the “reservoir.” Afterward, explain that it was a particularly rainy year and add five sticky notes to each group’s stack to replenish their “reservoir.”
5. Continue with a second and third round. After the second round, explain that it was a very dry year, and add only one new sticky note to each group’s stack. Add three sticky notes after the third round to reflect a normal year for precipitation.
6. Expect that some groups will drain their reservoir by running out of sticky notes. When this happens, announce that those owners must now share water resources with another group of owners. Those students should join another group for any subsequent rounds.
7. Repeat this process until the class has either drained all of the reservoirs or has attained sustainable water use (meaning every owner can still take at least one sticky note to meet basic needs during each round).



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8. Hold a class discussion. Ask,
 - How did you feel when you realized you had drained your reservoir? How did you feel when other owners joined your group?
 - What actions did owners take to drain the reservoirs? Were these actions absolutely necessary to meet their basic needs?
 - This game is an example of human activity that is not “sustainable.” What do you think this means? What might “sustainable” water use look like?
 - What does this game tell you about the concept “sustainability?”

Activity

1. Ask students to sketch and label two diagrams in their notebooks. The first diagram should represent what they think happens to an apple core when it is dropped on the ground. The second diagram should represent what they think happens to a plastic bottle if it is also dropped on the ground. Below their diagrams, students should write a brief response to the question: Which of these diagrams shows “sustainability” and why do you think so?
2. Have students pair up and share their diagrams and responses with their partners. Then, invite volunteers to share them with the class.
3. Explain to students that the apple core is an example of sustainability because it is part of a natural cycle that can continue indefinitely without cost to the environment. The apple core eventually becomes part of the earth that supports the tree on which new apples grow. The plastic bottle is not an example of sustainability because it is not part of a natural cycle where used bottles become new ones. We cannot continue to make plastic bottles indefinitely without cost to the environment.
4. Give each student a copy of Handout: Cycle of Materials. Have students read the handout and discuss the questions with a partner. Review responses as a class.
 - What was the most interesting or surprising thing you learned in this article?
 - Based on this article, what is “nature’s way?” (every atom of matter on earth gets used over and over)



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- In nature, elements pass back and forth between what two parts of the environment? (abiotic and biotic)
 - Based on what you read, how long do you think these natural cycles last? (indefinitely)
 - “Nature’s cycles are sustainable” – what do you think this means? (these cycles can continue indefinitely without cost to the environment)
 - In what ways are human activities a part of these cycles? In what ways do they interrupt these cycles?
 - In what ways are human activities a part of these cycles? In what ways are they not?
5. Wrap up the lesson by asking, Should we be concerned about the sustainability of human activity? Why or why not?

Assessment

Have students create an illustrated dictionary entry for the word “sustainability.” Students should sketch a simple visual that they think best illustrates the word, come up with a two- or three-sentence definition, and briefly explain why it is important.

Modifications

For younger students, consider having students use the diagram on the handout as a way to discuss the questions.