

UNIT 5 | PEOPLE AND RESOURCE USE

SOMETHING FOR EVERYONE

METHOD

In a simulation game, students draw renewable resources from a common pool and determine short-term consumption strategies that will preserve a long-term supply of the resource for all.

MATERIALS

- Math counter chips
- Candies, stickers, or other small prizes
- Music

INTRODUCTION

A **renewable resource** is a resource that can replace itself in the course of a human life. Trees and fish are examples – their populations can be maintained if managed properly. But if not given an opportunity to replenish, these resources can be exhausted quickly, especially as the demand for the resources grows. When managing renewable resources, it is important for people to work cooperatively and not sacrifice long-term sustainability for short-term gains. It is valuable to understand the benefits of cooperation and sustainable resource management in order to preserve Earth's resource base as the human population continues to grow.



CONCEPT

Sustaining our natural resource base requires the cooperative use of shared resources.

GRADE LEVEL

Upper elementary

SUBJECTS

Social Studies, Science, Math

OBJECTIVES

Students will be able to:

- Identify and implement a strategy that would result in sustainable use of a renewable resource in a simulation game.
- Draw parallels between the chips used in the game and renewable resources upon which people depend.
- Explain the similarities between the actions of participants in the game and the actions of people in real-world situations.

SKILLS

Cooperating, problem solving, collaborating in a large group

PROCEDURE

1. Before class, count out 10 chips for each student in the class. Put one-fourth of them in a separate pile. For example, if you have 10 students, use 100 chips and separate out 25.
2. Seat the students in a circle. In the center of the circle, place the pile comprising one-fourth of the chips.

If you have more than 15 students, it works well to create two student circles. Set up the chips for each circle as you would for a whole class (e.g. count out 10 chips for each person in the circle, then put one-fourth of those chips in the center at the start of the game).

3. Read the following rules carefully to the students. **Do not** refer to the chips as renewable resources.

Rules

1. You may not communicate with anyone during the game. This of course means no talking, but also no hand motions, winking, nudging, etc.
2. The chips belong to all of you.
3. Music will be played, and while it is playing, everybody may take chips out of the pool in the center.
4. You may not put chips back in the pool once you've taken them out.
5. When the music stops, I will distribute candy to anyone with 10 chips.
6. Before starting the music again, the number of chips left in the pool will double.
7. However, there will never be more chips in the pool than there are at the start of the game; this is the maximum number of chips the pool can hold.
8. There is no limit to the number of rounds we play.

NOTE: The length of time that the music is played before stopping to double the pool can be varied, but should be consistent within the game. Try 30 seconds to begin with (probably less in subsequent rounds).

4. Play one round of the game! The players will most likely empty the pool while the music plays. Point out that double zero is still zero, so the game is over. Ask students if they'd like to try again. Each student must return all of their chips to the pool.
5. Continue to play the game for two more rounds without allowing students to communicate in between. When doubling the chips in the pool, remember (and remind students that) there can never be more chips in the pool than at the start of the game.

6. If after three rounds, your students are still emptying the pool of chips, allow them to talk. Most likely, some students have realized that they need to leave some chips in the pool in order for there to be more chips in the next round.
7. Let the group work out a strategy for removing chips. If they don't come to a cooperative strategy on their own, you may need to encourage them to think of ways they could work together to allow more of them to get 10 chips without depleting the pool of chips in the center. Discuss ideas as a class as needed. Common strategies include each student taking one chip per round, and students taking turns removing 10 chips each round.
8. Play again using the strategies developed by the students. If time permits, continue the simulation game until all students accumulate 10 chips.

During game play, some students may break from the agreed upon strategy, or even remove all of the chips in one round. That is okay and can become a teachable moment. If this happens, ask students to think about how they are feeling so that you can discuss as a class later on.

9. Tell students that the chips represent resources. Explain that resources can either be renewable or nonrenewable and go over their definitions.

Renewable resource: a resource from the Earth that can be regenerated, such as trees which are planted to produce more trees over time.

Nonrenewable resource: a resource from the Earth that cannot be replaced or remade within our lifetime (or many lifetimes), such as a rock.

Ask students, "Were the resources in our game renewable or non-renewable? (*Renewable*) How do you know?"

10. Ask students to name examples of renewable resources. (*E.g. trees, fish, flowers, cows, corn, etc.*)

DISCUSSION QUESTIONS

1. What happened in the early rounds of the game, before you were allowed to communicate?

It is likely that in the early rounds of the game, all the chips were taken out of the pool and no one got any candy.

2. Knowing that the chips represent renewable resources, what does removing all the chips represent in the real world?

This could represent any situation where a renewable resource is used up faster than it can regenerate. Examples include: cutting down all the trees in a forest so there are no seeds for new trees to grow, or catching all the fish in a pond so it is empty with no fish left to reproduce.

3. How did communicating make you play the game differently? What might this represent in the real world?

After talking about the game, students likely developed a strategy so that everyone could get chips and the pool of resources was not depleted. This would represent people cooperating and developing plans to preserve the Earth's natural resources.

Introduce the concept of **sustainability**. In reference to natural resources, it means managing resources to be able to provide them not only for people today, but also to be able to provide them to people in the future.

4. Did everyone follow the plan that you came up with to share the chips? If not, how did this impact the game? Do you think this might happen when managing resources in the real-world?

Answers will vary. If some students didn't follow the agreed upon plan, it is likely that the resource was used up too quickly and that other players felt the game was not played fairly. Students may make connections to shared resources like forests, streams, or shared park spaces that sometimes do not get treated properly, even though there are rules and laws outlining how they should be used.

5. Was there an ideal number of chips to take out of the pool? If so, what was it and why?

Students build up their individual supplies of chips fastest if they take exactly half of the chips out of the pool during each round. That allows the maximum number to be added for the next round. If students take more than half, the number of chips left in the pool to be doubled is lower and there will be fewer available to take in the future. If they take fewer than half, it will take them longer to get their 10 chips necessary for a prize. Wildlife managers call this concept the Maximum Sustainable Yield and use it to figure out limits for hunting and fishing.

6. The chips belonged to everyone. Can you think of resources that belong to everyone?

Answers may include: classroom materials, water, air, public lands like national parks, oceans, etc.

7. Have you experienced a situation at home, with friends, or in your community where a shared resource is overused? (You may wish to provide an experience of your own to help students see the similarities, such as several people in the house competing for the hot water in the morning.)

Answers will vary.

8. Can you think of any rewards or penalties that are sometimes put into place to encourage groups to maintain common resources or space?

Answers may include: fines for littering or not cleaning up after pets so that communities can stay clean; a 5 cent bonus for bringing a reusable bag to the grocery store (or a 5 cent fine for not doing it), etc.

MEASURING LEARNING

Students write their answer to the question “What was the main idea of this activity?” on an exit slip.

FOLLOW-UP ACTIVITIES

1. Read the short story “The Tale of the Humpback Whales” from the book *Happy Stories for Nature Lovers* by Dawn Casey (2022). The story chronicles the near extinction of humpback whales due to hunting, then highlights the cooperation and protections that have allowed the species to rebound. The story is one of many in the book that illustrate the power of working together to enact positive change.
2. Introduce students to the Tragedy of the Commons theory, which asserts that people tend to do things that are best for them but not necessarily best for the “common good,” by showing the National Science Foundation video [Tragedy of the Commons \[Part 1\] | NSF Chalk Talk](#). Since it was first developed in the 1960s, the theory has been challenged as scholars have highlighted countless examples of people throughout history cooperating in the best interest of their communities rather than themselves.