

# Paper Cup Challenge

## Lesson Objective

In this lesson, students will be able to:

- Design a solution to reduce the cost of producing a paper cup but stay within given restraints
- Implement and evaluate the solution
- Communicate observations

## Activating Prior Knowledge & Concept Building

The purpose of this activity is to provide students with an opportunity to redesign the classic paper cup so that no tape, glue, or staples are necessary, reducing production costs and the cost of individual paper cups. Each group of students will be given a stack of paper to design a new paper container that can hold water for a short period of time.

Practicing the three R's helps us lessen the environmental impact that manufacturing and distributing products have on our environment. **Reducing** waste is the most effective 3R practice, because it means not producing unnecessary waste in the first place—so there's zero impact on the environment.

Next best is **Reuse**, because it extends the life of a product. That item still had to be made, but it is used over and over, reducing the need to make new stuff.

**Recycling** is the reprocessing of materials. Recycling prevents that new natural resources such as trees, petroleum or metal ore have to be extracted. This reduces pollution and damage to the environment. However, recycling still creates *some* pollution because it is an industrial process. That's why **Reducing** and **Reuse** are the most important steps of the cycle.

## The Science Behind It

Consider this example: As much as two thirds of all paper products in North America are manufactured from new fiber. That means cutting down trees—sometimes from old growth forests—not to mention water and air pollution from the paper-making process. On the other hand, recycling just one Sunday newspaper every month for a year saves a full-grown tree and reduces contributions to air pollution by 95%! That's because office paper, tissue paper and cardboard can easily be made from recycled paper instead of trees.

## Materials:

- 2–3 large basins filled with water
- 2 measuring cups per basin
- several towels
- 1 small towel
- 5–10 pieces of 8 1/2" × 11" paper (recycled if possible)

## Instructions for Instructor:

1. Set out the basins and water at a testing station, in the center of the room if possible. Place the measuring cups next to the basins. Place several towels at the testing station.
2. Introduce the activity to the students by explaining that their challenge will be to redesign the classic paper cup so that no tape, glue, or staples are necessary, producing a proto-type for a cup that could lower production and product costs.

In addition, their paper container must meet these criteria:

- The container must be made from only *one* sheet of paper, 8 1/2" × 11" in size.
- The paper may not be cut, torn, taped, glued, or stapled. It can be folded in any way.
- It must hold as much water as possible.
- It must be sturdy.

3. Divide the class into teams of 3-5 students.
4. Discuss the issue of timing with students and come up with a method that everyone agrees will work. Timers are impractical for the activity because the cup needs to move from person to person. Establish a method for counting to thirty seconds (one Mississippi, two Mississippi...) that everyone will use to ensure the cups are tested under fair conditions. To ensure that everyone understands the testing process, below, the teacher might give a demonstration, with the help of several students.
5. Allow students ample time to design and construct their paper container, encouraging experimentation and testing.

## Closing

Review the activities of the day with the students and assess what concepts they took away or what they missed. List the key learning points on the board. Have students reflect on the activity by sharing out and writing about it in their science journals (or activity document).

**Debrief Questions:** How much water did the best cup hold? How did the designs of the different teams compare and differ? Which were the most unusual or creative designs? One that seems most marketable? What would students do differently if they were to refine their design?

Source:

[http://www.svswa.org/why\\_reduce\\_waste.cfm](http://www.svswa.org/why_reduce_waste.cfm)  
<http://teachers.egfi-k12.org/lesson-paper-cup-challenge/>