

Use Less

Grades: 4-5

State Standards: Grade 4: Science, Investigation and Experimentation 6.a Students differentiate observations from inference (interpretation) and know scientists explanations come partly from what they observe and partly from how they interpret their observations. Grade 5: Science, Investigation and Experimentation 6.h Students will draw conclusions from scientific evidence and indicate whether further information is needed to support a specific conclusion.

Preparation Time: 25 minutes

Activity Time: 1 hour

Key Words: Reduce

OBJECTIVE

Students will

1. Define “reduce” and describe at least three ways to decrease the use of paper items.
2. Form a hypothesis and collect data using a survey to support or refute their hypothesis.

MATERIALS

Students: “Use Less Homework” sheet (one per student) “Record Data Class Survey” worksheet (one per student)

Teacher: “Use Less Homework” sheet overhead “Record Data Class Survey” worksheet overhead, poster paper (one sheet per group of five students.)

BACKGROUND

In 2000, paper accounted for 23 percent of waste by weight generated in Tehama County that ended up in the landfill. When paper is thrown away, many resources required to produce the paper including wood, pulp, water and energy are lost. Trees are one of the many natural resources harvested to make paper. In the United States, we produce one-quarter of the world’s paper and consume almost 30 percent of forestry products including paper. Americans alone used an average of 718 pounds of paper products, per person in the year 2000 (<http://www.forestinfo.org/Products/eco-links/13-2Tech-Mill-lo.PDF>). The process for making paper utilizes other resources besides trees. The manufacturing process requires oil, electricity, coal and water. Many chemicals such as chlorine are often used in the bleaching process. Recycling paper reduces the use of these resources and reduces pollution; however, recycled paper fibers break down over time, so eventually new trees must be harvested and added to the paper production process.

Vocabulary:

Reduce: to use less “stuff” and produce less waste.

PROCEDURE

1. Tell the students they will be learning about the top of the 4Rs hierarchy. The 4R's hierarchy is reduce, reuse, recycle and rot/compost. Ask whether they can define "reduce" (to decrease the amount of waste generated). Put the definition on the board.
2. Tell the students that paper makes up 27 percent or 5,507 tons of what we find in the Tehama County/Red Bluff Landfill. Ask the students what they know about paper and how it is made. What is it made from? Ask students to share their answers with the class. Ask/discuss what other resources are required to make paper:
 - Producing recycled paper requires about 60 percent of the energy used to make paper from virgin wood pulp. ([EPA, 2008](#))
 - Recycling 1 ton of paper saves 17 mature trees, 7,000 gallons of water, 3 cubic yards of landfill space, 2 barrels of oil, and 4,100 kilowatt-hours of electricity — enough energy to power the average American home for five months. ([EPA, 2008](#))
 - De-inked paper fiber is the most efficient source of fiber for the manufacturing of new paper products; one ton of de-inked pulp saves over 7000 gallons of water, 390 gallons of oil, and reduces air emissions by 60 lbs compared to traditional virgin fiber processes ([Abitibi Consolidated, 2005](#)).
 - Some types of minerals used to make glossy paper are kaolin clay, limestone, sodium sulfate, lime, soda ash, titanium dioxide (Women in Mining).
3. Tell the students they will be learning about ways to reduce the amount of paper they use at home and school.

For Homework:

1. Put up the overhead of the "Use Less Homework" sheet.
2. Tell students that for homework, they will identify five different paper items that are discarded in the family garbage. Ask students to give some examples (paper plates, paper cups, newspaper, sheets of paper in a letter, paper towels). They will fill out only the first column "Name of paper item" on their homework sheet.
3. Pass out the "Use Less Homework" sheet to each student.

In-Class:

1. Put students in groups of four to share their lists of items and try to identify ways to use less paper or replace the use of the paper items with another more durable item. (For example, ceramic plates can replace paper plates and can be washed for reuse. Paper towels can be replaced by cloth towels that are washed for reuse. Newspapers can be replaced by obtaining the news on TV or online. Paper that has writing on one side can be saved for reuse on the backside. When using a computer, print only the section that is needed; do not print the entire document.)

2. Now that the students have analyzed their paper use at home, they will examine how paper is used in the classroom by conducting a survey to determine whether paper use is reduced or conserved in the classroom.
3. Ask students to think about how paper is used in the classroom. Do they think their class makes an effort to reduce the amount of paper used? Explain that they will form a hypothesis, which is a testable scientific guess, about whether students use less paper or conserve paper in their classroom based on their own knowledge and observations of how classmates use paper.
4. Ask each student to write a hypothesis on scratch paper describing whether they think their class uses paper wisely. For example, “I think my class conserves paper because I often see students using both sides of a piece of paper before recycling it” or “I think paper is wasted in the classroom.”
5. Ask the students to share ideas about how they will find the answer to their hypothesis.
6. Explain that each student will investigate the paper-using habits of a classmate in order to answer their hypotheses. They will conduct a survey to gather data, which will support or refute their hypotheses.
7. Organize students into pairs and pass out a “Record Data Class Survey” to each student. Have the students interview each other and complete the survey.
8. Collect the surveys and record the class results on the “Record Data Class Survey” overhead.

Final Class Activity:

1. Once you have recorded all the class data on the overhead, organize the students into groups of five and give each group a copy of one survey question and the class results.
2. Have each group create a pie chart that shows their survey results on a large piece of paper. Then have each group present their pie chart and explain the results to the class.
3. Once all the groups have presented their results, have the students come back together as a class and decide whether the poster results support or refute their hypothesis. Ask students to describe why they came to this conclusion.
4. Ask students to come up with solutions for how they can reduce paper use in the classroom or share ways they are currently using less paper.
5. Record their ideas on a poster that can be placed on a wall in the classroom.
6. Ask students to explain why reduce is placed at the top of the 4Rs hierarchy and share at least one way they will reduce the amount of paper they use at home or school.

ANALYSIS

Students understand paper waste recycling and reuse efforts to reduce the amount of wasted paper in their classroom and home. They will apply the knowledge they gain by making changes in some of their consumer use choices.

Use Less Homework

Directions:

Homework: Identify up to five paper items that are thrown away at home. Describe how each paper item is used.

Group Work: Identify ways to use less paper or replace the paper item with something more durable.

Name of Paper Item	Use of Paper Item	How can you reduce the use of this paper item?
1		
2		
3		
4		
5		

For the Teacher: Record Data Class Survey

1. I recycle paper after I am done using it.

How many students answered:

almost always _____ **total** sometimes _____ **total** never _____ **total**

2. When I take my lunch to school, I use a lunch box that I can reuse instead of using a paper bag.

How many students answered:

almost always _____ **total** sometimes _____ **total** never _____ **total** doesn't apply _____ **total**

3. I use both sides of a piece of paper before recycling it.

How many students answered:

almost always _____ **total** sometimes _____ **total** never _____ **total**

4. I print lots of stuff from the Internet that I later throw away.

How many students answered:

almost always _____ **total** sometimes _____ **total** never _____ **total**

5. I often grab more paper towels than I end up using after washing my hands in the restroom.

How many students answered:

almost always _____ **total** sometimes _____ **total** never _____ **total**

Students: Record Data Class Survey

1. I recycle paper after I am done using it.

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almost always _____ **total** sometimes _____ **total** never _____ **total**

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