

Water Filtration Activity

Objectives: Filter dye (Kool-aid) from water.

Materials:

1.) 10 empty water bottles (bottoms cut out)

2.) 1 bag of cotton balls

3.) 1 bag of fine grit sand

4.) 1 bag of beach sand

4.) 10 pieces of nylon fabric 5x5 inches

5.) 1 bag of activated carbon

6.) 10 pieces of cotton cloth 5x5 inches

7.) 12 rubber bands

8.) 50 8oz clear plastic cups

9.) 2 gallons of blue Kool-aid

Student materials:

1.) Writing utensil

2.) Paper

Steps:

- 1.) Create groups of 3 or 4 if necessary (materials cover up to 30 students)
- 2.) Give each group one of the five options for water filtration: 1, cotton balls 2, fine grit sand 3, beach sand 4, nylon fabric 5, activated carbon.
- 3.) Hand out materials: all groups receive one water bottle, one rubber band, one cotton cloth, two clear cups, (fill one cup with Kool-aid), everyone in the group also receives one cup of Kool-aid to enjoy during activity
 - a.) Cotton ball group- half a bag of cotton balls.
 - b.) Fine grit sand group- cup of fine grit sand
 - c.) Beach sand group- cup of beach sand
 - d.) nylon fabric group- 5 pieces of nylon fabric and 1 rubber band
 - e.) activated carbon group- cup of activated carbon
- 4.) Build filtration systems: all groups use rubber bands to attach the piece of cotton to the small end of the water bottle
 - a.) Cotton ball group- place cotton balls into water bottle packing as many as the group thinks is necessary to filter out the water. Cost, \$50,000 per cotton ball.
 - b.) Fine grit sand group- pour the amount of sand the group thinks is necessary to filter out the water. Cost, \$1,000,000 per quarter cup of sand.

c.) Beach sand group- pour the amount of sand the group thinks is necessary to filter out the water. Cost, \$500,000 per quarter cup of sand.

d.) Nylon fabric group- attach as many pieces of fabric as the group thinks is necessary to filter out the water by placing the fabric over the large end of the water bottle leaving slack so the nylon sags into the water bottle and using a rubber band to secure the nylon to the water bottle. Cost, \$300,000 per piece of nylon.

e.) Activated carbon group- pour the amount of activated carbon the group thinks is necessary to filter out the water. Cost, \$1,500,000 per quarter cup of carbon.

5.) Each group hypothesize what they think will happen and how long the filtration will take.

Record this on the piece of paper.

6.) Start filtration by pouring the Kool-aid into the filtration system pour rate is up to the group however pour rate effects cost; fast pour costs \$1,000,000 takes 10 years medium pour costs \$2,000,000 takes 25 years and slow pour costs \$3,000,000 takes 50 years.

7.) Record the pour rate, the filter rate, and the effectiveness.

8.) Compare results to the hypothesis.

9.) Clean up

10.) Class discussion on activity.