

FILTRATION EXERCISE

1. Introduce the exercise.

Water Mission is a Christian engineering nonprofit that builds sustainable safe water solutions for people in developing countries, refugee camps, and disaster areas. What do you do when you wake up in the morning? How much time does it take you to get ready for school?

Pause

Now imagine that every morning before school, you also had to walk more than three miles to collect water for your family. You may also need to wait in line for hours to get the water. The full bucket you carry home would be heavy and the path can be dangerous. Then, even when you get home, the water may be unsafe and make you painfully sick.

A moment ago, I told you that Water Mission is a Christian ENGINEERING nonprofit organization.

2. Ask students: What does an engineer do?

Let students answer in their own words.

Engineers are problem solvers! So, engineers:

1. Identify a problem.
2. Research and gather information about the problem.
3. Develop possible solutions to the problem.
4. Select the best possible solution.
5. Build a solution.
6. Test and evaluate the solution.
7. Redesign if necessary.

An engineer's goal is to solve the problem.

3. Challenge Students: You are part of a team of engineers.

You are an Engineer at the Environmental Engineering Company. The problem is that the water is dirty. Your job is to develop a filtration system to eliminate as much dirt, or "pollution," as possible from a provided water sample.

How will you take this dirty water and make it look completely clear?

Filtration.

4. Ask students: What is filtration?

Let students answer in their own words.

Filtration is the mechanical or physical process used for the separation of one substance from another.

There are many different ways to filter. Many of us have of us have filters in our home—a colander or sieve, coffee maker, shrimp net, or crab trap.

The goal of filtration is to separate. Filtration systems are important for making water clean and safe. We can use many different materials to help filter.

5. Challenge Students: Design a filter.

Plan

Materials available:

- Funnel with mesh or cloth
- Filter paper (coffee filter)
- Sand
- Small pebbles
- Large pebbles
- Charcoal

Design!
Gather!
Build!
Test!

FILTRATION DATA COLLECTION WORKSHEET

You will be given a sample of dirty water.

Describe the “polluted” water before treatment. What do you see? What do you smell?

Make a prediction:

What do you think will work as an effective filter? Why?

Draw your filter set up to the right and share your reasoning beneath the picture.

Materials available:

- Funnel with mesh or cloth
- Filter paper (coffee filter)
- Sand
- Small pebbles
- Large pebbles
- Charcoal

Now, pour the water through your filter.

Did your filtration system clean the water?

In the table below, write the type of materials each filter removed.



Treatment Type	Removed This Type of “Pollution”
Funnel	
Filter paper (coffee filter)	
Sand	
Small pebbles	
Large pebbles	
Charcoal	



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If time permits, repeat the process with a new design to improve your outcome. Detail the changes you will make and why below.



Did your filtration system clean the water?

Water Mission is a Christian engineering nonprofit that builds sustainable safe water solutions for people in developing countries, refugee camps, and disaster areas. Since 2001, Water Mission has served more than 8 million people in 60 countries, sharing safe water and the message of God's love. Charity Navigator has awarded Water Mission its top four-star rating 15 years in a row, a distinction shared by only 1% of the charities rated by the organization. To learn more, visit watermission.org.

Our vision is that all people have safe water and an opportunity to experience God's love.