

NAME \_\_\_\_\_

# MUSSELS: NATURE'S WATER FILTER CREATURES ACTIVITY

In the documentary *Watershed Warriors*, Gary talks about how mussels are an indicator species that help tell us if a river is healthy.

Mussels are filter feeders meaning they take water in through their gills to collect food and then push water back out clearer than it was before.

Like fish, their gills are also how they breathe! Mussels are very sensitive to environmental changes, like pollution and habitat destruction. This means if mussels are found in a river, the river is healthy and has good quality water.

## Your Group Will Need:

- 6 Clear Plastic Bottles  
(Cut in Half)
- Tape
- Marker
- Coffee Filter
- Coffee Grounds
- Sponge
- Fabric Square (4x4)
- Cotton Gauze
- Gravel (Large enough to not fit through the bottle opening)
- Rubber Band
- 1/2 Measuring Cup
- 1 Tablespoon
- Tea Leaves
- Coffee Grounds

In this experiment, we will model mussel gill filtration to remove pollution from water and analyze different filtration materials to better understand mussel gill anatomy.

## DIRECTIONS:

### Form a Hypothesis

Fill in the statements below picking from the filtration material options (coffee filter, cotton gauze, fabric, sponge, gravel, and activated charcoal).

Make your educated guesses before the experiment.

If I filter with a **coffee filter**, then the polluted water will look \_\_\_\_\_  
after going through the filter because \_\_\_\_\_.

If I filter with a **cotton gauze**, then the polluted water will look \_\_\_\_\_  
after going through the filter because \_\_\_\_\_.

If I filter with **fabric square**, then the polluted water will look \_\_\_\_\_  
after going through the filter because \_\_\_\_\_.

If I filter with a **sponge piece**, then the polluted water will look \_\_\_\_\_  
after going through the filter because \_\_\_\_\_.

If I filter with **gravel**, then the polluted water will look \_\_\_\_\_  
after going through the filter because \_\_\_\_\_.

## Form a Hypothesis - Continued

I think the \_\_\_\_\_ filtration material will be the **most** clear and clean because\_\_\_\_\_.

I think the \_\_\_\_\_ filtration material will be the **least** clear and clean because \_\_\_\_\_.

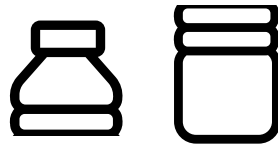
I think the \_\_\_\_\_ filtration material will filter through the funnel the **fastest**.

I think the \_\_\_\_\_ filtration material will filter through the funnel the **slowest**.



## Create a Funnel

1. Take one plastic bottle and cut it in half around the middle.



2. Take the top half of the bottle and place it upside down and inside the bottom half of the bottle. Tape the two parts together on the sides.

3. Label the side of the funnel with the kind of filtration material that will go in it.

Example: coffee filter, cotton gauze, sponge piece, fabric square, gravel

# Filtration Test

## Step 1

Place one of the filtration materials (coffee filter, cotton gauze, fabric square, sponge, gravel) in the top of the funnel.

### Important notes!

- Coffee filter should be opened and placed in the funnel
- Cotton gauze should be placed in the funnel but not pushed down into the bottom of the funnel.
- Fabric square should be pushed down into the funnel (like the coffee filter).
- Sponge should be placed into the bottom of the funnel but not shoved into the bottom of the funnel.
- Gravel should fill the funnel halfway.

## Step 2

Polluted Water: Measure out and add to the filter two tablespoons of coffee grounds and one tablespoon of tea leaves. Measure out  $\frac{1}{2}$  cup of water but do not pour it into the filter yet.

## Step 3

Have one person start the stopwatch while another person carefully pours all the water over the filtration material at the top. Stop the timer when all the water has gone through the filter at the bottom.

## Step 4

Fill in the observation table on page 5 with your data.

## Step 5

Do not dump the test funnel after the water is done filtering. Set it aside for later.

## Step 6

Repeat for each filtration material.

## Observation Table

<b>Filtration Material</b>	<b>Time</b> (min: sec)	<b>Description</b> (color, light/dark, clear/cloudy, etc.)	<b>Particles</b> (Draw what the particles look like in this box.)
Coffee Filter			
Cotton Gauze			
Fabric			
Sponge			
Gravel			

## Results Analysis

**Turbidity** is how cloudy or murky a liquid is, caused by tiny particles floating in it that you can't easily see or remove. It is one way biologists describe water samples from a river or stream. They use special tools and charts to measure the clarity of the stream, like a turbidimeter, a turbidity tube, and a Secchi disk. For this experiment, just use your eyes.

# Results Analysis - Continued

With your group, put your six filtration tests in order from most clear to least clear, then answer the following questions:

1. Which is the clearest? Which is the least clear? Why?

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2. Look at your data table/chart. Which filtered the fastest? Which filtered the slowest? Why?

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3. How do your test results compare to your hypotheses?

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# Discussion Questions

Answer in complete sentences.

1. Is the “polluted” water a solvent, mixture, or pure substance? How can you tell?

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2. How does the water look after filtering through the cotton gauze compared to the gravel?

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3. What part of this experiment represents a mussel’s gills?

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## Discussion Questions - Continued

4. If there is a lot of pollution and muck, then a mussel has to do a lot of filtering. How does pollution and mucky water affect a mussel's gills and respiration?

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5. What might happen to the river's water health if mussels disappear from the ecosystem?

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