Modeling Blood Flow

Name: _____

Date: _____

Student worksheet

Directions: Answer the questions below before you do your experiment.

1. Before the Experiment

a. What materials will you use for blood and arteries in your blood flow model?

b. What will you measure during your experiment?

c. Which straw do you think water will flow through faster? Why?

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Directions: Follow the steps below to do your experiment.

2. Experiment

Follow the steps below for your experiment. The images help show the steps described.

Trial 1: narrow straw (smaller diameter)

- Put the straw into the cup with the smaller hole.
- The hole should not squeeze the straw.
- Point the straw down so the water can flow out.



- Use modeling clay on the inside and outside of the cup to seal the hole around the straw.
- Do not block the hole of the straw with clay.



- Put the cup into the aluminum tray.
- Use a piece of modeling clay to seal the end of the straw sticking out of the cup.
- Let your teacher fill the cup with water.



- Check if your clay seal leaks or not.
- Fix the leak if there is one.
- Get your stopwatch ready.
- Remove the clay seal from the straw and quickly start the stopwatch.



- Stop the stopwatch when the water stops flowing through the straw.
- Your measured time was: _____ seconds



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Directions: Follow the steps below to complete your experiment and analyze your data.

- Empty the aluminum tray.
- Pour all water into an extra cup.

Trial 2: wide straw (larger diameter)

- Repeat trial 1 with the wider straw.
- Use the same aluminum tray to collect the water.
- Your measured time was: _____ seconds

3. After the experiment

Optional: *Do this step if your teacher tells you to and you are familiar with long division. Otherwise, skip this step and continue with step 3.b.*

a. Calculate the *water flow rate* from your results.

- In the beginning, you had 400 milliliters (mL) water in your cup.
- Divide the water volume (in milliliters) by the measured time (in seconds).
- Your result will be the water flow rate in milliliters per second (mL/s).

Flow rate narrow straw (smaller diameter): _____mL/s

Flow rate wide straw (larger diameter): _____mL/s

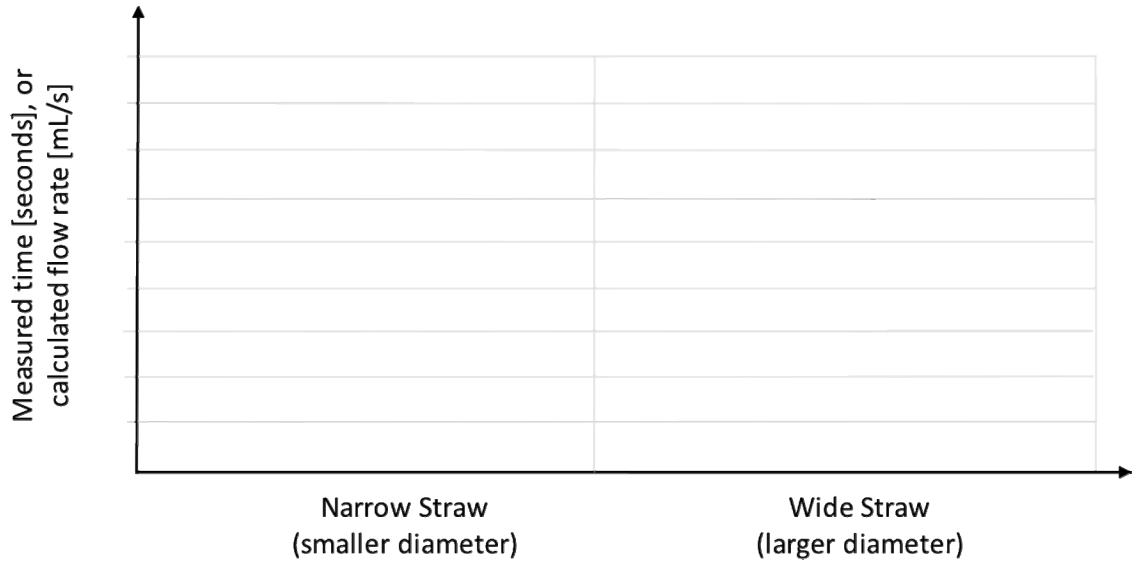
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Directions: Follow the steps below to graph your data and reflect on the experiment.

b. Plot your results on the graph given below.

- Label the vertical axis (y-axis) so that your measured times (or calculated flow rates) fit within the range of your y-axis.
- Draw two bars that show the measured time (or calculated flow rate) for each of the straws.



c. Which straw had the faster water flow? Did you predict this result?

d. In your own words, explain what your results mean for a person whose arteries are getting narrower due to plaque buildup.