Name:

Date:

Period:

**Go with the Flow!
*Does the slope or substrate have a greater impact on the speed of water flow?***

**Pre-Lab Questions**

1. Define the following words:

A. Slope:

B. Substrate:

C. Permeability:

D. Impervious surface:

2. Fill in the **numerator** and **denominator** in the equation for calculating speed below.

$$Speed= \frac{Distance Traveled }{Time of Travel}$$

3. What is a **continuous** variable?

4. What is a **discrete** variable?

**Hypotheses.** Develop your **hypotheses**. First, draw the relationship you expect to find on the two graphs below. Then**,** write your hypotheses in words and complete the tables beneath your graph.  ***What do you think will happen to the speed of water flow when….***

***….you move from a shallow to steep slope?******….you change the type of substrate?***

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| **Speed of Water Flow (cm/s)**Slow 🡪 🡪 🡪 Fast |  | **Speed of Water Flow (cm/s)**Slow 🡪 🡪 🡪 Fast |  |
|  | Shallow 🡪 🡪 🡪 Steep**Slope (°)** |  |  None Clay Sand Gravel Sod |
| **Substrate** |

|  |  |
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| **Hypothesis 1:** | **Hypothesis 2:** |
| **Type of data** (circle one): Continuous Discrete | **Type of data** (circle one): Continuous Discrete |
| **Independent variable** (what you will change): | **Independent variable** (what you will change): |
| **Dependent variable** (what you will measure): | **Dependent variable** (what you will measure): |
| **Variables kept constant** (what you will keep the same): | **Variables kept constant** (what you will keep the same): |

**Experiment 1: Changing the Slope.** Test the effect of **five** different slopes on the speed of water flow. Record all of the information in the data tables. After you have tested each slope once, test them again if you have time and make your own data table to record your results.

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| **Slope (°)** | **Distance Traveled** | **Time of Travel** | **Speed (v = d/t)** |
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**Draw a line graph of the slope vs. average speed of the water. Label your title and axes.**

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**Experiment 2: Changing the Substrate.** Conduct your experiment that tests the effects of different substrates on the speed of water flow. Record your data in the tables provided. Repeat your test for each substrate at least three times.

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| **Substrate** | **Trial #** | **Distance Traveled** | **Time of Travel** | **Speed (v = d/t)** | **Average Speed** |
|  | **1** |  |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
|  | **1** |  |  |  |  |
| **2** |  |  |  |
| **3** |  |  |  |
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| **2** |  |  |  |
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**Draw a bar graph of the variable you tested vs. average speed of the water. Label your title and axes.**

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**Explain your results. Was your hypothesis supported? Why or why not?**