# My Backyard Stream

## *Velocity*

### Key Terms:

**Stream Velocity**
The rate at which the water flows, measured in distance per time

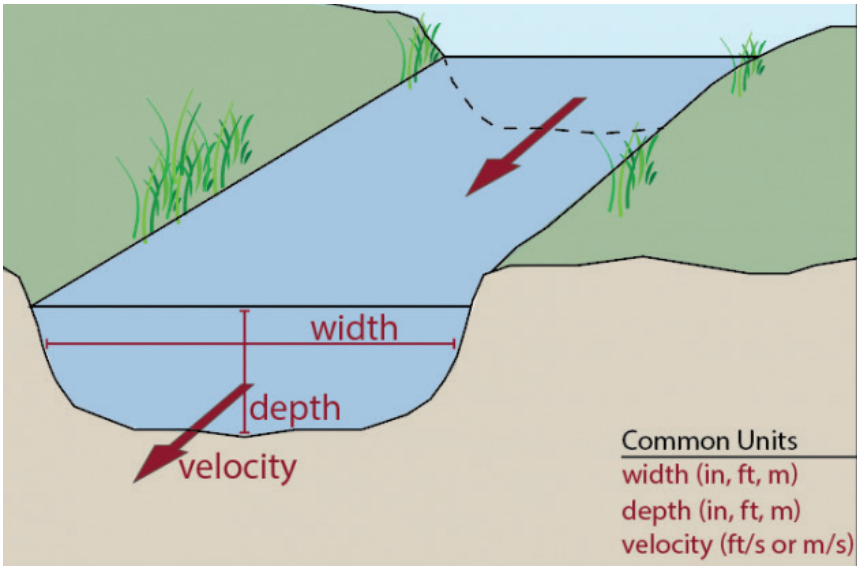
**Stream flow or Discharge:**
The volume of water that moves over a certain point over a fixed period of time, measured in volume per time.

**Rate**
a measure, quantity, or frequency, typically one measured against some other quantity or measure

### What is velocity?

- Velocity is the directional movement of an object or body. It is used to determine how quickly anything in motion will arrive at its destination from a given point.
- In this case, velocity is used to estimate the rate at which the water in the stream is flowing, i.e., determine how fast the stream is moving.
- For this activity, we will be using the float method to determine the stream velocity and stream flow.

**Did you know?** The flow of a stream is affected by weather and increases during rainstorms. The flow decreases during the dry season and when evaporation rates are high, which is usually during the summer months.

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***Safety: Before you get started make sure you are aware of your surroundings and traffic. Always be with an adult while exploring, be cautious of sharp objects that may be in the creek or on the streambank, and never enter a stream with high or fast-moving water.***

# Instructions to find velocity

## STEP 1

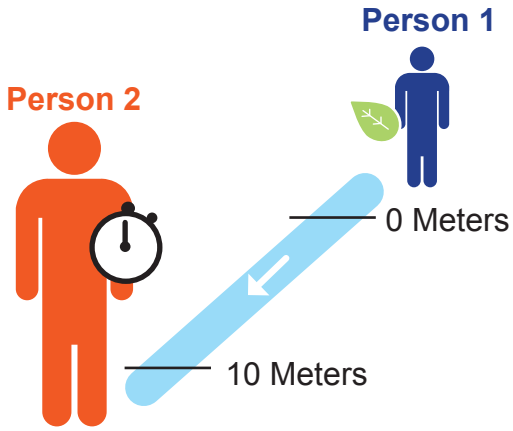
Secure a material that will float on the stream, such as a small stick, leaf, or cheerios work well.

**Note:** If you are using a material that was not nature or biodegradable, make sure to retrieve it before you leave so as not to litter.

## STEP 2

Find and mark 10 meters along the stream with the tape measure, ensuring that the stretch of water is relatively straight for that portion.

## STEP 3




## STEP 4

**Person 1**

Stand at the 0 meter mark with the floating objects in hand.

## STEP 6

**Person 2**

Hold the stopwatch and stand somewhere with a clear view of the marked area.

## STEP 6

**Person 1**

Gently place the floating objects into the water a few paces upstream of the beginning 0 meters mark.

## STEP 7

**Person 2**

Monitor the float and start the stop-watch as soon as it goes across the 0 meter mark.

## STEP 8

**Person 2**

Stop the stopwatch as soon as the float crosses 10 meters.

**Repeat this process two more times.**

## STEP 9

Once the time of float has been **recorded three times,** calculate the average time that the float took to reach 10m

To calculate this, add all three recorded time values together, then divide that sum by three.

Example:

$$\begin{array}{r} 15.1 \\ +\ 13.4 \\ 14.8 \\ \hline 43.3 \end{array}$$

43.7/3 = 14.6

## STEP 10

Now, using the average time it took the float to flow 10 meters, we will find the surface water velocity.

Divide the distance (10m) by the average time, then multiply that total by 0.85

a. Distance (m) / Average Time (s) = Z (m/s)

b. Z x 0.85 (Correction Factor) = Surface Water Velocity (m/s)

Example:

A. 10 meter /14.6 seconds = 0.7 m/s

B. 0.7 x 0.85 = 0.6 m/s

# Instructions to find stream flow or stream discharge

For an added challenge you can calculate the stream discharge measured in volume per time (cubic meters/sec).

## STEP 1

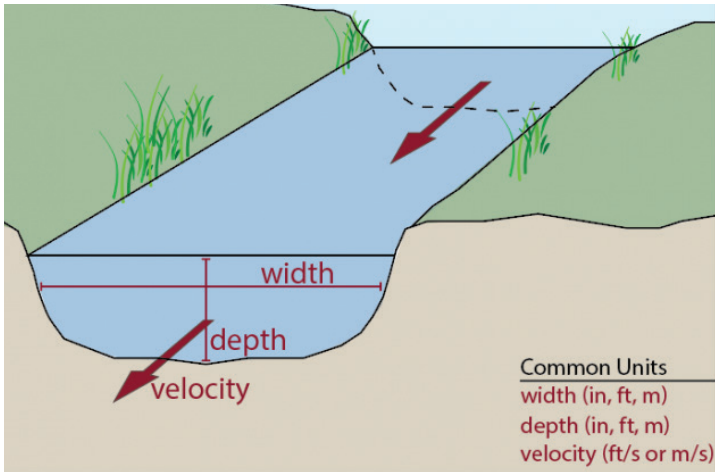
Find that average width and the average depth of the stream by measuring both the width and depth at approximately 5 points along the stream.

**Width:** use the measurement that occurred most frequently or calculate the average

Example Width: **1.2 m**

**Depth:** record the measurement at several points along the width of the stream bed, then take half of the deepest measurement as the average depth

Example Depth: **0.2 m**

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## STEP 2

Multiply the surface water velocity by the average width and average depth in order to calculate the water flow:

Stream flow (m3/s) = surface water velocity (m/s) x average width (m) x average depth (m)

0.6 m/s x **1.2 m** x **0.2 m** = 0.14 cubic meters / second

## STEP 3

Record the estimated streamflow on the physical field sheet

## STEP 4

Once you have collected all the data on the My Backyard Steam physical field notetaking sheet, you can then submit your findings into the My Backyard Stream database!

To do this, visit watersheddata.com/Education/BackYardStreamCode.aspx and click the “Citizen Scientist Data Submission” button.

Enter in the data you collected and submit, remember to take a photo to post with your data.

**For more Information:**
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