



RISE at **DUKE**
Raising Interest in Science Education

Teaching Units for High School Science Developed by
Duke University Graduate Students in Pharmacology 693/694
Master of Arts in Teaching (MAT)

<http://sites.duke.edu/rise/duke-courses/pharm-693694/>

Measuring Stream Discharge

Your Name(s) _____

Stream Name _____ Date _____ Time _____

Location _____

Current and Recent Weather _____

1. Record the length of the stream section in meters _____

Distance Traveled (m)

2. Record the elapsed orange travel time in the table below.

Trial	Time Elapsed(seconds)
1	
2	
3	
4	
5	
Average Time	

_____ Average Time (sec)

3. To calculate the stream velocity, divide the distance the orange traveled (stream section length) by the average time.

$$\frac{\text{Distance Traveled}}{\text{Average Time}} = \text{Average Stream Velocity (m/sec)}$$

4. Record the depths and stream segment widths in the following table. For example, if you divided your stream into 50 cm segments, then the "Stream Segment Width" in the table will be 50 cm. Be sure to record your data in meters.

5. Multiply the depth by each segment width to get the segment area, and then total the segments' areas to get the Total Stream Cross-Section Area.

Section #	Depth (m)	Stream Segment Width (m)	Stream Segment Area (m ²)
Total Stream Cross-Section Area (m²)			

6. To calculate the "Total Stream Discharge," complete the following equation.

$$\frac{\text{Total Stream Cross-Section Area (m}^2\text{)}}{\text{}} \times \frac{\text{Average Stream Velocity (m/sec)}}{\text{}} = \frac{\text{Total Stream Discharge (m}^3\text{/sec)}}{\text{}}$$

7. To calculate the "Corrected Total Stream Discharge," multiply the Total Stream Discharge by the appropriate correction factor: 0.8 for sandy or muddy stream bottoms, and 0.9 for rocky stream bottoms.

$$\frac{\text{Total Stream Discharge (m}^3\text{/sec)}}{\text{}} \times \frac{\text{Correction Factor (0.8 or 0.9)}}{\text{}} = \frac{\text{Corrected Total Stream Discharge (m}^3\text{/sec)}}{\text{}}$$

Using your Corrected Total Stream Discharge, calculate the discharge for different time units.

Per Minute: _____ <div style="text-align: center;">Corrected Total Stream Discharge (m³/min)</div>	Per Hour: _____ <div style="text-align: center;">Corrected Total Stream Discharge (m³/hour)</div>
Per Day: _____ <div style="text-align: center;">Corrected Total Stream Discharge (m³/day)</div>	Per Month: _____ <div style="text-align: center;">Corrected Total Stream Discharge (m³/month)</div>