

Flint River GREEN: Turbidity



MATERIALS	<p>LaMotte Turbidity Test Kit Bottled or Clear Tap Water Gloves (2/person) Safety Goggles (1/person)</p>	VOCABULARY	<p>Jackson Turbidity Units (JTU) Erosion Turbidity Waste Water Discharge Designated Use Urban Runoff Clarity Suspended Solids Light Penetration Base Flow</p>
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WATER QUALITY STANDARDS	<p><u>DRINKING WATER:</u> State of MI: 0.5 JTU Most drinking water providers strive for even better at 0.1 JTU</p>	<p><u>SURFACE WATER:</u> There is no state standard except to say that turbidity should not occur in any unnatural quantity which is or may become harmful to any designated use.</p>
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WHAT DOES THIS TEST MEASURE?	<p>Turbidity is a physical measure of the clarity of water: the greater the turbidity, the less clear the water. Increased amounts of suspended solids in water will reduce the light penetration into that water. A recent rain or runoff event can also greatly affect turbidity. If you have a turbidity reading of over 25 Jackson Turbidity Units (JTU), try to explain why this is the case by looking at the surrounding landscape and checking recent weather reports. Turbidity can be caused by materials such as clay, silt, fine particles of inorganic and organic matter, algae, and plankton. This test compares the turbidity of stream sample water to that of clear water.</p>
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LOOK FOR THESE CAUSES	<p><u>EVIDENCE FOR DECREASES IN TURBIDITY?</u></p> <ul style="list-style-type: none"> • Have there been periods of low flow (base flow)/reduced stormwater run-off? • Are there industry-specific best management practices (BMPs) in place such as vegetated shorelines and buffer strips? 	<p><u>EVIDENCE FOR INCREASES IN TURBIDITY?</u></p> <ul style="list-style-type: none"> • Is there soil erosion? • Is there waste water discharge upstream? • Any recent urban runoff from rain/flooding? • Are there bottom-feeding fish (like carp)? • Do you see algal growth? • Has there been recent flooding?
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<ul style="list-style-type: none"> • As light penetration decreases, so does photosynthesis by plants. This decreases food for herbivores and also results in decreases in oxygen production. • High turbidity can make it difficult for predators that use sight to see and capture their prey. This explains why a rain event can also lead to bad fishing until the water clears back up. • Sediment in the water also can carry phosphorus and other contaminants. • The frequency and intensity of storms have increased in the Great Lakes region over more than 50 years. 	CONNECTING CONCEPTS
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WEB LINKS	<ul style="list-style-type: none"> • Gov- ernment Document: Department of Environmental Quality Water Bureau Water Resources Protection Part 4. Water Quality Standards: (See Rule 323.1100; pg. 67—Designated Uses): http://dmbinternet.state.mi.us/DMB/ORRDocs/AdminCode/302_10280_AdminCode.pdf • Article: Heavy Downpours More Intense, Frequent in a Warmer World: https://www.climate.gov/news-features/featured-images/heavy-downpours-more-intense-frequent-warmer-world • Factsheet: US Global Change Research Program—2014 National Climate Assessment: Midwest Fact-
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1. Check to be sure everyone is wearing gloves and goggles.
2. Inventory the supplies in your turbidity test kit.
3. Fill one turbidity column (A.) to the 50 mL line with the stream sample water from an area of the stream that no one has walked around in yet. If you cannot see a dot at the bottom when looking down the water column, pour out the water until you reach the 25 mL line and note this for later.
4. Fill the second turbidity column (B.) with an amount of bottled or “clear” water equal to the amount in turbidity column A.
5. Place the tubes side by side and notice the difference in clarity by observing the black dot at the bottom of the turbidity columns. *TIP: View over white paper to make comparison easier.*
6. If both turbidity columns are equally clear, the turbidity is zero and you will not need to add any chemical; proceed to step 12. If the black dot at the bottom of turbidity column A appears more cloudy/hazy, proceed to step 7. *TIP: use the edges of the black dot to compare cloudiness.*
7. Shake the Standard Turbidity Reagent vigorously. **DO NOT FORGET TO SHAKE IT UP.**
8. Using the dropper, add 0.5mL of Standard Turbidity Reagent to turbidity column B (the clear water) then stir the tube to equally distribute turbid particles. Compare the columns.
9. Keep adding Standard Turbidity Reagent in 0.5mL intervals, stirring and comparing the columns until turbidity column B (clear water) is as cloudy/hazy as turbidity column A (stream sample water). Keep track of the number of additions of Turbidity Reagent: _____ **# of 0.5 mL additions**

10. Calculate and record the turbidity in Jackson Turbidity Units. If your samples are 50mL, each 0.5ml addition equals 5 JTU. If a 25mL sample is used, each 0.5L addition of Reagent equals 10 JTUs. Use the chart at the right: _____ **JTU**

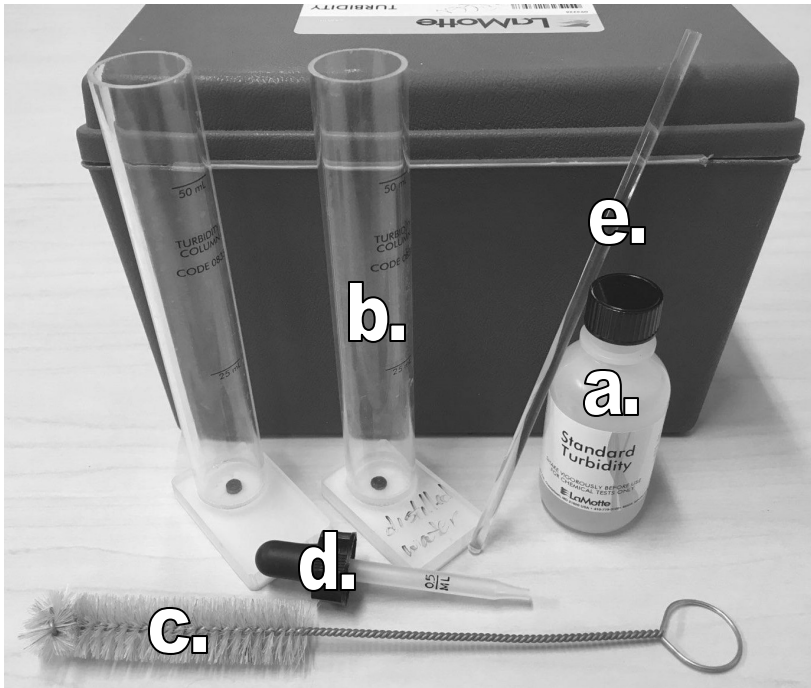
TURBIDITY TEST RESULTS			
Number of Measured Additions	Amount in mL	50 mL Graduation	25 mL Graduation
1	0.5	5 JTU	10 JTU
2	1.0	10 JTU	20 JTU
3	1.5	15 JTU	30 JTU
4	2.0	20 JTU	40 JTU
5	2.5	25 JTU	50 JTU
6	3.0	30 JTU	60 JTU
7	3.5	35 JTU	70 JTU
8	4.0	40 JTU	80 JTU
9	4.5	45 JTU	90 JTU
10	5.0	50 JTU	100 JTU
15	7.5	75 JTU	150 JTU
20	10.0	100 JTU	200 JTU

11. Dispose of your samples and rinse the test tubes into the hazardous waste container.
12. Calculate a Q-Value on the Turbidity Chart.
Q-Value: _____
13. Check the Q-Value by entering your pH data at <http://www.flintrivergreen.org/add-info/add-data/>

Figure sourced from LaMotte Turbidity Test Kit (7519-01) instructions

WHAT TO WATCH OUT FOR

- Retrieve your stream sample upstream from other students or from a part of the stream that no one has been walking around in yet.
- Be sure to add the Standard Turbidity Reagent to the “Clear” water (Column B) and NOT to the stream sample water (Column A)
- Make sure you shake up the Standard Turbidity Reagent before use.
- Be sure to use the stir stick to stir the water after each addition before comparing columns.
- Disregard the color of the water and focus only on the cloudiness or clarity.



Turbidity Kit

Contents

- a. Standard Turbidity Reagent - [7520-H]
- b. (x2) Turbidity Columns - [0835]
- c. Test Tube Brush - [0513]
- d. Pipet, 0.5mL, plastic, w/cap
- e. Plastic Stirring Rod - [1114]

Turbidity Q-Value Chart

