

# Flint River GREEN: Total Solids



<b>MATERIALS</b>	<p>Empty Water Bottle (or other bottle that holds &gt; 250 mL)</p> <p>Cooler</p> <p>Gloves (2/person)</p> <p>Safety Goggles (1/person)</p>	<b>VOCABULARY</b>	<p>Total Solids (TS)</p> <p>Total Dissolved Solids (TDS)</p> <p>Total Suspended Solids (TSS)</p> <p>Heavy Metals</p>
------------------	--	-------------------	--

<b>WATER QUALITY STANDARDS</b>	<p><u>DRINKING WATER:</u></p> <ul style="list-style-type: none"> <li>• 500 mg/L Total Dissolved Solids</li> </ul>	<p><u>SURFACE WATER:</u></p> <ul style="list-style-type: none"> <li>• No standards for surface water in Michigan</li> <li>• Generally, excellent is &lt;100 mg/L; good is 101 – 250 mg/L; fair is 251 – 400 mg/L; and poor is &gt; 400 mg/L</li> </ul>
--------------------------------	---	--

<p>Water is often referred to as the universal solvent because so many substances can dissolve in it. As water moves, it picks up a variety of solid materials that can become suspended or dissolved in the water or can settle out farther downstream. <b>Total Solids (TS)</b> is a measure of a combination of <b>total suspended solids (TSS)</b> and <b>total dissolved solids (TDS)</b>. Total suspended solids are substances in water that will not settle at the bottom of a container not in motion, but can be captured by a filter. Total dissolved solids are substances that are dissolved in water. If a solid is heavy enough to settle at the bottom of a container not in motion (such as leaves, soil, and sewage), it is neither TSS or TDS, but is still included in the total solids measurement. High concentrations of total solids may contribute to unpleasant taste in drinking water and affect other water quality measures. This test is done at a professional lab. Students collect the sample.</p>	<b>WHAT DOES THIS TEST MEASURE?</b>
--	-------------------------------------

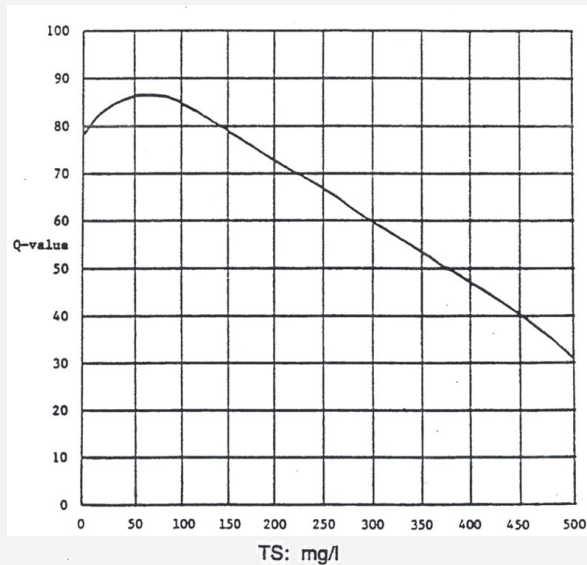
<b>LOOK FOR THESE CAUSES</b>	<p><u>EVIDENCE FOR DECREASES IN TOTAL SOLIDS?</u></p> <ul style="list-style-type: none"> <li>• Are riparian zones vegetated and healthy?</li> <li>• Have nearby communities reduced road salt and chemical usage?</li> <li>• Are sewer and septic systems maintained?</li> <li>• Is the aquatic food web balanced?</li> </ul>	<p><u>EVIDENCE FOR INCREASES IN TOTAL SOLIDS?</u></p> <ul style="list-style-type: none"> <li>• Is there evidence for erosion/excess soil?</li> <li>• Is there industrial waste/sewage entering stream?</li> <li>• Is there potential for excess salts/minerals?</li> <li>• Is there excess phytoplankton/algae growing?</li> <li>• Are there decaying plants and animals?</li> <li>• Are bottom feeding fish present such as carp?</li> </ul>
------------------------------	---	---

<ul style="list-style-type: none"> <li>• High concentrations of total solids can increase turbidity and water temperature.</li> <li>• High concentrations of total solids can decrease photosynthesis by reducing the amount of light accessible to aquatic plants.</li> <li>• High concentrations of total solids can increase the binding of sediment with toxic compounds and <b>heavy metals</b>.</li> </ul>	<b>CONNECTING CONCEPTS</b>
--	----------------------------

<b>WEB LINKS</b>	<ul style="list-style-type: none"> <li>• Video (7 min)—Stream to Street: The Effect of Road Salt on our Freshwater Ecosystem: <a href="https://www.greatlakesnow.org/2017/03/stream-to-stream-the-effect-of-road-salt-on-our-fresh-water-ecosystem/">https://www.greatlakesnow.org/2017/03/stream-to-stream-the-effect-of-road-salt-on-our-fresh-water-ecosystem/</a></li> <li>• Research Paper—Long Term Trends of Great Lakes Ion Chemistry: <a href="https://www.researchgate.net/publication/257230709">https://www.researchgate.net/publication/257230709</a> Long-term trends of Great Lakes major ion chemistry</li> </ul>
------------------	---

1. Check to be sure everyone is wearing gloves and goggles.
2. Inventory: You will need a cooler, a marker/pen, and an empty and rinsed water bottle (or other glass or plastic container that will hold 250 mL or more). A typical water bottle holds 500 mL.
3. Label your container with "Total Solids" along with the date, time, your school, teacher name, and site name (stream name and place).
4. Enter the stream with your bottle, while wearing gloves and waders or boots following standard water sample collection procedures.
5. Fill your collection bottle with at least 250 mL of stream water following standard water sample collection procedures.
6. Cap your sample and immediately place in a cooler. Transfer the sample to a refrigerator as soon as possible. Sample must be kept at or under 6°C (42.8°F).
7. Your teacher or mentor will help get your sample to the lab within 2 days for testing where they will measure, dry and weigh your sample. Currently the City of Flint processes the total solids samples and your teacher will receive a result in 1-2 weeks: **TS: \_\_\_\_\_ mg/L**
8. Use the **TS mg/L** to calculate a Q-Value on the Total Solids Chart. **Q-Value: \_\_\_\_\_**
9. Check your Q-Value by entering your total solids data at <http://www.flintrivergreen.org/add-info/add-data/>

**Total  
Solids  
(TS)  
Q-Value  
Chart**



Note: if TS>500.0, Q=20.0

**WHAT TO  
WATCH OUT FOR**

- Make sure your label is filled out and remains clear to read.
- Be sure to collect the water sample following standard collection procedures so that you do not introduce extra sediment and solids into the sample.
- Be sure to keep your sample refrigerated at all times.