

Ben Kahn
Stephanie Smith
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Salinity in Mill Creek

Grade Level: 5th Grade

Duration: 1 day

Utah State Core Curriculum:

Standard 1: Students will understand that chemical and physical changes occur in matter.

Objective 2: Evaluate evidence that indicates a physical change has occurred.

Materials and Equipment:

- Water samples from three different locations of Mill Creek-one above road closure, one by Wasatch Blvd., and one by lower Mill Creek. (Or take water samples of any stream that flows next to a road where salt is used. Take 3 samples in different locations.)
- 3 large jars
- Salinity meter
- Thermometers
- Science lab notebooks

Lesson Objective:

Students will be able to use water samples collected at three different locations of Mill Creek to test the salinity of the water. Students will be able to hypothesize about the salinity levels at the three locations.

Rationale:

The purpose of this lesson is to determine if the road salt put on the road near Mill Creek has any affect on the salinity of the river.

Resources use in planning this lesson:

<http://www.wrc.wa.gov.au/waterdef/s.html>

Terminology:

Salinity- The percentage of dissolved salt contained in a solution.

Background Information:

The purpose of this unit is to examine the impact of road salt on the surrounding environment. This experiment needs to be done in the winter to be able to get the true salinity samples of Mill Creek. Salinity is the measure of total soluble (or dissolved) salt i.e. mineral constituents in water. Water resources are classified on the basis of salinity in terms of Total Soluble Salts (TSS) or Total Dissolved Salts (TDS). TSS and TDS are measured by different processes, but for most purposes they can be read as the same thing. Measurements are usually in milligrams per liter (mg/L) or parts per thousand (ppt). Measurements in ppt can be converted to mg/L by multiplying by 1000, e.g. seawater is approximately 35ppt or 35 000 mg/L TSS. Salinity is also often expressed as electrical conductivity, measured by an electronic probe (conductivity meter).

Assessment of Prior Knowledge:

The introduction lesson is an opening and will set the tone for this experimental lesson. The introduction lesson will teach the students about salt and water and what happens when you put salt on ice. Before testing the salinity of the water samples a short discussion should take place to introduce the idea. This can serve as an assessment of prior knowledge and introduce the experiment.

Methods:

Students make a hypothesis and an educated guess about the three different locations of water samples from Mill Creek and the salinity level of each. The students will then conduct an experiment to test their hypothesis and test the salinity levels.

Procedures:

- At the beginning of this lesson the teacher will ask the students if they know what salinity means. Have a short discussion about the meaning of salinity.
- Students should be in groups of three to five for this experiment. The students need to test water samples from three locations of Mill Creek- above road closure, Wasatch Blvd., and lower Mill Creek. The students also need to record the water temperature of each sample. The temperature should be recorded when the water samples are gathered.
- In their same groups, students need to come up with a hypothesis about what they think might happen with the different water sample and the salinity level of each location. Students will write their hypothesis down in science lab notebook.
- After a hypothesis is completed the students need to test the salinity of each water sample with the salinity meter. The class needs to be informed of how to use the meter and how to change the number to a percentage.
- All students need to record their hypothesis, temperature, salinity measurements, materials, methods, results, conclusions and future directions down in their science lab notebooks.
- After all students have completed everything up to this point, the class needs to state their findings- their salinity levels, temperatures, and their reasoning of why they got the results they got. Have the students discuss the discussion questions as a whole group.
- Have the students write down three things they thought were very interesting, might want to experiment further, or know about this experiment.

Discussion Questions:

- Did the salt have an effect on Mill Creek?
- Why would the road salt have any effect on Mill Creek?
- What conclusions can be made about the levels of salinity at each location?
- Is there a definite location that has a higher salinity level than another location?
- Did the temperature have anything to do with the salinity levels?
- What do you think might happen if we took samples during a different time a year?
- What would happen if the water samples were taken where there was ice and/or snow in the river/stream, or in parts of the river/stream?

Evaluation:

Students will be assessed by their performance in this experiment. They need to include in their science lab notebook and do:

- Collect the water samples and take the temperature of three locations on the field trip
- Write a hypothesis
- Test the salinity level
- Tie the hypothesis to the actual results (conclusions)
- Write down any further questions
- Write down future directions
- Write down observations of physical and/or chemical change that might have occurred with salting the roads.

Extensions:

- Have the students test the salinity of Mill Creek later on in the year; see how long the salt affected the creek.
- The students could see if the snow had any effect on other rivers, creeks, and lakes.