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Introduction to Algae

Topic: Algae

Abstract: Students will be introduced to different types of algae found in both local regions of Salt Lake and different parts of the world. Through this investigation students will gain a better understanding of the algae and it's properties when living in

Grade Level: 6

Utah Elementary Core Curriculum Standards:

Standard 5: Students will understand that microorganisms range from simple to complex, are found almost everywhere, and are both helpful and harmful.
Objective 1: Observe and summarize information about microorganisms.

In-Class Instructional Time: 1 hour

Terminology:

Algae- Any of various chiefly aquatic, eukaryotic, photosynthetic organisms, ranging in size from single-celled forms to the giant kelp. Algae were once considered to be plants but are now classified separately because they lack true roots, stems, leaves, and embryos.

Osmosis- The passage of water from a region of high concentration of solute through a semi-permiable membrane to a region of low concentration of solute.

Organism- An individual form of life, such as a plant, animal, bacterium, protist, or fungus; a body made up of organs, organelles, or other parts that work together to carry on the various processes of life.

Ecosystem- An ecological community together with its environment, functioning as a unit.

Intended Learning Outcomes: Students will discover different types of algae found in an ecosystem and the significance and function it serves. Students will define osmosis to better understand the importance it plays in their experiments with algae.

Background: Algae are simple chlorophyll containing organisms. They are simple organisms composed of one cell or grouped together in colonies or as organisms with many cells sometimes collaborating together as simple tissues. Algae are found in the sea, rivers, lakes, soils, walls, in plants and animals- just about anywhere there is light to photosynthesize.

Materials: **c**omputers, task cards, paper, pencils, worksheet

Assessment of Prior Knowledge: Discuss with students what an organism is and have them come up with a few examples of different organisms. Ask students what they think of when they hear the word algae. Make a list of adjectives on the chalkboard. Ask them if they know what algae are and what purpose they serve in an ecosystem. Define ecosystem and algae to students. Ask if they know what osmosis means. Define osmosis. Tell students it is important to learn what algae and osmosis are because both are involved in the experiment they will be conducting.

Instructional Procedures:

1. Students will work in groups of four. Each group will be given one task card to complete together. A task card is a web site with focus questions included.
   Example: http://botserver2.nuigalway.ie:16080/Algae/
   Answer the following questions about algae:
   1. Name five different types of algae
   2. Click on the "Red algae" link at the top of the page. What causes algae be red in color?
   3. Where are blue-green algae found?
2. The group will look up the web address printed on their task card and answer the questions about algae or osmosis.
3. Each group will present their findings and teach the class what they learned from their website.
4. Every student will be given a separate sheet of paper with all of the task card questions printed on it. When the groups present, students can fill in the answers to those questions.

Closure: Ask students what they have learned about algae and osmosis. Ask students to discuss what they think would happen if algae was taken from one ecosystem and put into another. Tell them about going on a fieldtrip to the Great Salt Lake to collect samples of algae. Students will compare the algae from the Great Salt Lake to the algae found in Emigration Creek (or any fresh water ecosystem).

Assessment Strategies:
Groups will be graded based on their effort and participation while looking up their websites and answering the questions from their task card. Students will evaluate themselves and each other on a scale of 1-5, five being excellent effort and participation. Teacher will gather the scores, average them out, and give the student the appropriate grade.

References:
http://seaweed.ucg.ie/Algae (info about algae)

http://www.m-w.com/netdict.htm (Merriam-Webster's on-line dictionary for our vocabulary words)

http://www.xmission.com/~fogsl/ (info about the GSL)

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Algae Experiment: Will They Survive?

Abstract: This experiment educates students about the types of algae found in different ecosystems. Through hands-on learning and experimentation, students will collect samples, observe, and hypothesize about the outcome of changing algae from one ecosystem to another. Osmosis will play an important role for the students' experiment with algae.

Topic: Algae experiment

Grade Level: 6

Utah Elementary Core Curriculum Standards
Standard 5: Students will understand that microorganisms range from simple to complex, are found almost everywhere, and are both helpful and harmful.

Objective 2: Demonstrate the skills needed to plan and conduct the experiment to determine a microorganisms requirement in a specific environment.

In-Class Instructional Time: 1 hour + periodic check of algae throughout the week.

Terminology: Osmosis: 1. Diffusion of fluid through a semipermeable membrane from a solution with a low solute concentration to a solution with a higher solute concentration until there is an equal concentration of fluid on both sides of the membrane. 2. A gradual, often unconscious process of assimilation or absorption.

Intended Learning Outcomes: Students will discover the difference between algae from Emigration Creek (or any fresh water ecosystem) and algae from the Great Salt Lake. Students will transfer algaes to opposite ecosystems and observe throughout the duration of the week what changes have occurred and why.

Background Information: Changes will occur when the algae are switched from one ecosystem to the other due to osmosis. Osmosis is the passage of water from a region of high concentration of solute through a semi-permeable membrane to a region of low concentration of solute. In this case, the region of high concentration of solute is the water from Great Salt Lake and low concentration of solute is the water from Emigration Creek.

Great Salt Lake
At 12-25% salinity, the Great Salt Lake is one of the saltiest seas in the world. Plankton, algae, brine shrimp, and brine flies form the base of a food pyramid that supports one of the largest biomasses on the North American continent. Vast numbers of birds flock here. The whole system is delicate. The depth of the Great Salt Lake varies in size throughout its entirety. The Great Salt Lake is shallow along its mudflats and shorelines, but has an average depth of 20 to 30

feet, 50 feet maximum. The Great Salt Lake has an area just slightly less than the state of Connecticut. The area that is actually sailable is about the size of Delaware. The area south of the railroad causeway that crosses the lake is about the size of Rhode Island.

Materials: field microscopes, microscope slides, baggies, paper, markers, colored pencils, and butcher paper, lab notebooks, samples of algae from Emigration Creek (or any freshwater area), gallon of water from Emigration Creek (or any other freshwater area)

Assessment of Prior Knowledge: Ask them to recall what they learned yesterday about algae and osmosis. Ask students what they think will happen when the algae from one ecosystem is transferred to the water of another ecosystem.

Procedures:

1. Arrange for the class to go on a fieldtrip to the Great Salt Lake.
2. At the Great Salt Lake, gather algae samples from rocks found in the water, or algae floating nearby.
3. Students will each have one baggie to place two cups of Great Salt Lake water into. They will then collect approx. 1 tablespoon of algae to put in the baggie with the water (using tweezers is an effective method for scraping algae from the rocks).
4. Return to class and divide students into groups of four.
5. Students will observe algae from the Great Salt Lake under the field microscopes by taking tweezers and grabbing a small sample of algae to place on a slide. Students will sketch their observations in their lab notebooks.
6. Students will then be given algae from Emigration Creek to observe with field microscopes and sketch findings in their lab notebooks next to their sketches of algae from the Great Salt Lake.
7. In their groups students will setup for their experiment. Handout two baggies to each group. Assign one member from each group to measure one cup of Emigration Creek water and Great Salt Lake water to put inside the baggies. Students will then switch Emigration Creek algae to Great Salt Lake water, and Great Salt Lake algae to Emigration Creek water.
8. Students will then form a hypothesis and write about what they believe will happen to the algae, in their new ecosystems, in their notebooks.
9. Students will make observations every other day for a two week period. They will take samples from each bag and observe it underneath the microscope for any changes to the algae. They will also record their findings each time through pictures or words in their lab notebook.

Closure: Have students share and compare hypotheses with the whole class. Volunteers from each group will write down their hypotheses on a piece of butcher paper to be displayed in front of the class.

Assessment Strategies: Students will be informally assessed based on the following: sketches of the algae in their lab notebooks, written notes that accompany the sketches, hypotheses from groups, participation, attendance, and their conclusion of the experiment. They will need to

describe changes that may have occurred in the color of the algae, or the size of the algae (any explanation of what has occurred will do). The main goal of this assessment is to see what the students observe and why they think it happened that particular way. There is no right or wrong answer because this is not a controlled experiment (i.e. temperature and light variation). Each group experiment may turn out differently or turn out the exact same. Documentation needs to be made in their lab notebooks as to why think changes did or did not occur with the algae.

References:

http://seaweed.ucg.ie/Algae (info about algae)

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