Altamonte Springs
SCIENCE
INCUBATOR

Name: _____
Date: _____

Impact of Nutrients on Ecosystems

Middle School Life Science | Fall Module 2 | Regional Water Reclamation Facility

NGSSS Big Idea: Big Idea 1—The Practice of Science

Benchmark Code & Description:

SC.6.N.1.1, SC.7.N.1.1, SC.8.N.1.1—Define a problem from your curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.

SC.6.L.14.3—Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.

NGSSS Big Idea: Big Idea 6—Earth Structures

Benchmark Code & Description:

SC.7.E.6.6—Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.

NGSSS Big Idea: Big Idea 17—Interdependence

Benchmark Code & Description:

SC.7.L.17.3—Describe and investigate varius limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.

NGSSS Big Idea: Big Idea 18—Matter and Energy Transformations

Benchmark Code & Description:

SC.8.L.18.1—Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll, production of food and release of oxygen.

LEARNING GOAL/OBJECTIVE

Students will learn how nutrients can positively and negatively affect ecosystems.

PREREQUISITES

Review:

- Vocabulary List
- Applicable Textbook Sections

VOCABULARY

See vocabulary sheet.

HANDS-ON ACTIVITY

Task(s):

Use microscopes to identify algae structures.

Provided Materials:

- Clipboard/Pencil
- Worksheet
- Microscopes
- Algae Specimens

Career Options: Engineer (BS Degree), Mechanic (Certification), Electrician (Certification), Operator (High School Diploma and Certification), Instrumentation Specialist (Certification)

Lesson Steps:

1. City staff will provide presentation on photosynthesis and the relationship between nutrients and aquatic ecosystem.
2. Students will use microscopes to identify algae specimens.

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Regional Water Reclamation Facility Life Science Vocabulary List

Algae—single or multi-celled autotrophic organisms that range in size from microscopic to 213 feet long.

Autotrophic—organisms that can use the suns energy or chemical energy to create organic compounds from inorganic compounds.

Cellular Respiration—the opposite reaction of photosynthesis. Cells convert sugar and oxygen to carbon dioxide, water and energy.

Ecosystem—a community of living and non-living things that interact with their environment.

Eutrophication—a water body that has too many nutrients leading to excessive algae and plant growth. This can lead to a lack of oxygen and the death of other living organisms such as fish.

Heterocyst—cells that carry out nitrogen fixation.

Nitrogen—another essential element used by all life forms. Nitrogent makes up approximately 78% of the air on Earth.

Nitrogen Fixation—converting atmospheric nitrogen (N2) into ammonia nitrogen (NH3) which the algae can use for other processes.

Nutrient—a chemical or substance that is necessary for life. Nitrogen and phosphorus are important factors in aquatic health.

Phosphorus—an essential nutrient for all life forms. This is the backbone and is present in every cell of the human body.

Photosynthesis—the opposite of cellular respiration. Cells use sunlight to create chemical energy in the form of sugars.

SCADA (Supervisory Control and Data Acquisition)—computer system that monitors pumps, motors and plant processes.