Altamonte Springs
SCIENCE
INCUBATOR

Name: _____
Date: _____

Chemical Effects on Wastewater

High School Environmental Science | AP Module 3 | Regional Water Reclamation Facility

NGSSS Big Idea: Standard 1—The Practice of Science

Benchmark Code & Description:

SC.912.N.1.1—Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following:

1. pose questions about the natural world,
2. conduct systematic observations,
3. examine books and other sources of information to see what is already known,
4. review what is known in light of empirical evidence,
5. plan investigations,
6. use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),
7. pose answers, explanations, or descriptions of events,
8. generate explanations that explicate or describe natural phenomena (inferences),
9. use appropriate evidence and reasoning to justify these explanations to others,
10. communicate results of scientific investigations, and
11. evaluate the merits of the explanations produced by others.

NGSSS Big Idea: Standard 17—Interdependence

Benchmark Code & Description:

SC.912.L.17.14—Assess the need for adequate waste management strategies.

SC.912.L.17.15—Discuss the effects of technology on environmental quality.

SC.912.L.17.16—Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.

LEARNING GOAL/OBJECTIVE

Students will learn how different chemicals (alum and polymer) react with wastewater and are used to enhance treatment processes.

PREREQUISITES

Review:

- Vocabulary List
- Applicable Textbook Sections

VOCABULARY

See vocabulary sheet.

HANDS-ON ACTIVITY

Task(s):

Testing chemical reactions with wastewater using jar test equipment.

Provided Materials:

- Clipboard and Pencil
- Worksheet
- Safety Glasses
- Gloves
- Lab Coats
- Lab Quest 2
- Turbidity Sensor

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

Lesson Steps:

1. Students will be provided lab coats, safety goggles and gloves to wear.
2. Students will be given a safety presentation.
3. The instructor will demonstrate and explain the use of jar testing equipment and turbidity meters.
4. Students will hypothesize how chemical dosages affect flocculation.
5. Students will separate into five groups.
6. Each group will perform 4 jar tests at varying times and mixing speeds.
7. Following flocculation students will test turbidity of supernatant to determine water quality.
8. Students will use results to validate hypothesis.