



Effects of Weather/Process of Science

High School Environmental Science | Advanced Module 2 | Lake Lotus Park

NGSSS Big Idea: Standard 17—Interdependence

- A. The distribution and abundance of organisms is determined by the interactions between organisms, and between organisms and the non-living environment.
- B. Energy and nutrients move within and between biotic and abiotic components of ecosystems via physical, chemical and biological processes.
- C. Human activities and natural events can have profound effects on populations, biodiversity and ecosystem processes.
- D. Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

Benchmark Code & Description:

SC.912.L.17.4—Describe changes in ecosystems resulting from seasonal variations, climate change and succession.

SC.912.L.14.6—Explain the significance of genetic factors and pathogenic agents to health from the perspective of both individual and public health.

NGSSS Big Idea: Standard 1—The Practice of Science

- A. Scientific inquiry is a multifaceted activity. The processes of science include the formulation of scientifically investigable questions, construction of investigations into those questions, the collection of appropriate data, the evaluation of the meaning of those data and the communication of this evaluation.
- B. The processes of science frequently do not correspond to the traditional portrayal of “the scientific method.”
- C. Scientific argumentation is a necessary part of scientific inquiry and plays an important role in the generation and validation of scientific knowledge.
- D. Scientific knowledge is based on observation and inference. It is important to recognize that these are very different things. Not only does science require creativity in its methods and processes, but also in its questions and explanations.

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),
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.



LEARNING GOALS/OBJECTIVES

- To learn about the processes of science and the effects of weather on the earth and its organisms.
- To utilize the scientific process to determine water samples origins.



PREREQUISITES

Review:

- Vocabulary Words
- Water Quality Worksheet
- Applicable Textbook Sections



VOCABULARY

- Absolute barometric pressure
- Humidity
- UV
- Units
- Inference
- Observation
- Longitude
- Latitude
- Chlorine
- Conductivity
- pH
- Dissolved Oxygen
- Temperature
- Turbidity
- Phosphorus
- Nitrate



HANDS-ON ACTIVITIES

Task(s):

- Students will conduct measurements of various environmental conditions and documenting the data.
- Students will use various measurement techniques to measure water quality.

Provided Materials:

- Wireless Weather Forecast Station
- Digital Thermometer
- General Light and Moisture Meter
- GPS Device
- Fixed Weather Station
- Labquest Meter
- Meter Probes: Nitrates, Phosphates, Turbidity, pH, Dissolved Oxygen, Chlorides
- Gloves
- Safety Glasses
- Colorimeter
- Nitrate Test Strips
- Water Meter

Career Options: Meteorologist, Laboratory Technician, Biologist, Water Quality Technician, Park Ranger, Scientist

Lesson Steps:

1. Students will compare their predictions of what they would find in the different ecosystems (biotic and abiotic components) to actual observations of wildlife, plants, water levels, etc. as they tour the park.
2. In each of the four ecosystems, we will be observing and/or documenting the following:
 - a. Temperature
 - b. Humidity
 - c. Sunrise
 - d. Sunset
 - e. Moon Phase
 - f. Longitude
 - g. Latitude
 - h. Absolute Barometric Pressure
3. We will be taking soil temperature and moisture, UV and solar radiation readings.
4. We will be observing the microclimate of each ecosystem:
5. Students will be split into 3 groups.
 - a. Wet
 - b. Dry
 - c. Sunny
 - d. Shady
6. Instructions will be given for tests/meters.
7. Students will rotate through 3 stations and record test results on the worksheet provided.
8. Using the information provided on the worksheet, students will infer which water source they tested.
9. All equipment will be calibrated, used and cleaned using true field practices.
10. Each group will have a student that will double check earlier samples using the Labquest meter.
11. Students will discuss the importance of using scientific process when conducting experiments and taking measurements.

Data Recording Sheet

	Sunny	Shady	Wet	Dry
Air Temperature				
Humidity				
UV/Solar Index				
Sunrise/Sunset				
Longitude				
Latitude				
Moon Phase				
Barometric Pressure				
Soil Temperature				
Soil Moisture				



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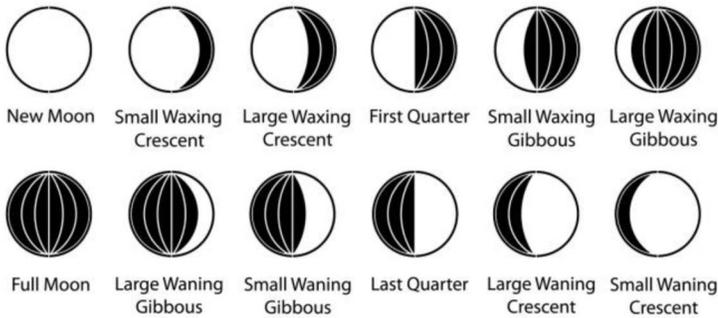
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DATA RECORD

Moon Phases



Full & New Moon = Spring tide (TIDE HI)

Quarter = Neap tide (TIDE LO)

Other = Mean water level (TIDE MID)

The tides reflected on this station are based on the ebb and neap tides of the lunar month. Not daily high and low tides.

Data Recording Sheet

	Sunny	Shady	Wet	Dry
Air Temperature				
Humidity				
UV/Solar Index				
Sunrise/Sunset				
Longitude				
Latitude				
Moon Phase				
Barometric Pressure				
Soil Temperature				
Soil Moisture				

Flora Observed

Sunny	Shady	Wet	Dry

Fauna Observed

Sunny	Shady	Wet	Dry