



## Climactic Interactions

Middle School Earth Science | Spring Module 3 | Lake Lotus Park

### NGSSS Big Idea: Big Idea 7—Earth Systems and Patterns

The scientific theory of the evolution of Earth states that changes in our planet are driven by the flow of energy and the cycling of matter through dynamic interactions among the atmosphere, hydrosphere, cryosphere, geosphere, and biosphere, and the resources used to sustain human civilization on Earth.

### Benchmark Code & Description:

**SC.6.E.7.4**—Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.

**SC.7.L.15.3**—Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.

**SC.8.E.5.9**—Explain the impact of objects in space on each other including: (1) the Sun on the Earth and (2) the Moon on the Earth.



## LEARNING GOAL/OBJECTIVE

Observe the interactions within the biosphere and hydrosphere to see the effects of development and man's manipulations.



## PREREQUISITES

### **Review:**

- Vocabulary Words
- Applicable Textbook Sections



## VOCABULARY

- Geosphere
- Hydrosphere
- Macroinvertebrate
- Cryosphere
- Atmosphere
- Biosphere



# HANDS-ON ACTIVITY

---

## **Task(s):**

- Collect and identify lake organisms
- Measure and document water conditions

## **Provided Materials:**

- Dip net
- Buckets
- Aquarium
- Microscope/Projector
- Labquest Meter
- Meter Probes: Nitrates, Phosphates, Turbidity, pH  
Dissolved Oxygen, Chlorides
- Clipboard/Pencil

**Additional Reference Info:** Macroinvertebrate poster, Seminole Co. samples

**Career Options:** Biologist, Engineer, Water Resource Management

## **Lesson Steps:**

1. Students will work together in teams collecting samples in the lake to capture different organisms that live in the lake and its sediment.
2. Collected organisms will be identified and used to determine the health of the lake. The Labquest meter will be used to measure various elements in a lake sample and students will document this data. Comparisons will be made to see if captured organisms are truly reflective of the health of the lake versus what the Labquest measurement tells us.



## Climactic Interactions

Middle School Earth Science | Spring Module 3 | Lake Lotus Park

### NGSSS Big Idea: Big Idea 7—Earth Systems and Patterns

The scientific theory of the evolution of Earth states that changes in our planet are driven by the flow of energy and the cycling of matter through dynamic interactions among the atmosphere, hydrosphere, cryosphere, geosphere, and biosphere, and the resources used to sustain human civilization on Earth.



### LEARNING GOAL/OBJECTIVE

Observe the interactions within the biosphere and hydrosphere to see the effects of development and man's manipulations.



### DATA RECORD

#### Questions:

1. Could your collection be different at another location in the river? \_\_\_\_\_  
\_\_\_\_\_
2. How do you think the weather would affect your findings? \_\_\_\_\_  
\_\_\_\_\_
3. How do human activities affect the aquatic habitat? \_\_\_\_\_  
\_\_\_\_\_
4. What trash lasts a long time in the environment? \_\_\_\_\_  
\_\_\_\_\_
5. How can we help change things? \_\_\_\_\_  
\_\_\_\_\_

# Water Quality

Sample	Temperature	Dissolved Oxygen	Nitrates	Phosphates	pH
1					
2					
3					
4					
5					

## Organism & Fish Checklist

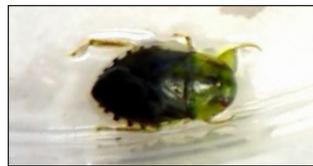
Check off the organisms and fish you found today.



Darner Dragonfly Larva  
*Anax junius*



Damselfly Larva  
*Calopteryx maculata*



Diving Water Beetle  
*Dytiscus marginalis*



Southeastern Waterbug  
*Abedus immaculatus*



Freshwater Mussel  
*Elliptio buckleyi*



Gilled Snail  
*Viviparus georgianus*



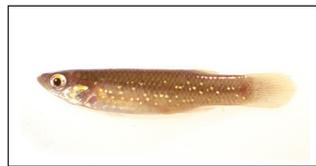
Glass Shrimp  
*Palaemonetes kadiakensis*



Swamp Darter  
*Etheostoma fusiforme*



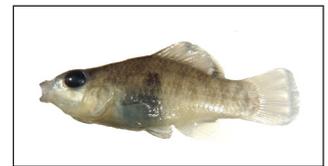
Banded Topminnow  
*Fundulus cingulatus*



Golden Topminnow  
*Fundulus chrysoths*



Seminole Killifish  
*Fundulus seminolis*



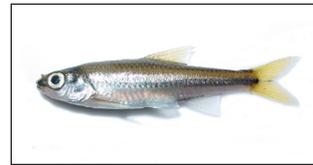
Flagfish  
*Jordanella floridae*



Rainwater Killifish  
*Lucania parva*



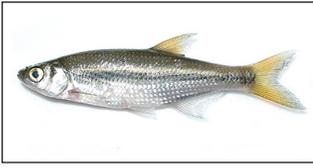
Bluefin Killifish  
*Lucania goodie*



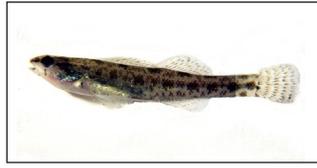
Costal Shiner  
*Notropis petersoni*



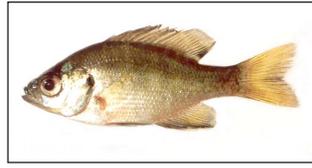
Ironcolor Shiner  
*Notropis chalybaeus*



Southeastern Golden Shiner  
*Notemigonus crysoleucas bosci*



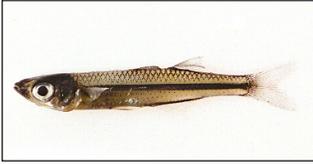
Blackbanded Darter  
*Percina nigrofasciatus*



Bluegill  
*Lepomis macrochirus purpurescens*



Redear Sunfish  
*Lepomis microlophus microlophus*



Inland Silversides  
*Menidia beryllina atrimentis*



Least Killifish  
*Heterandria formosa*



Sailfin Molly  
*Poecilia latipinna*



Eastern Mosquitofish  
*Gambusia affinis holbrooki*

**Other Organisms Found:**

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_