



Water Watchers

Level: Middle School & High School

PROGRAM DESCRIPTION:

This program is a limnological study of the Tobico Lagoon, using water quality monitoring techniques. Students will rotate through four hands-on lab activities where they will determine and rate the water quality of the Tobico Lagoon. The four labs which they participate in are: Macro Invertebrate Survey where they will use nets to sift through bottom sediments for bug larva, snails and worms; Turbidity and Temperature Survey where they will man canoes and determine the depth of the photic zone of the Tobico Lagoon and rate the turbidity of the water; Water Tests will be conducted in the Wet Lab where students will work with a partner to determine the Dissolved Oxygen, the pH, Nutrients, Silica, and hardness of the pond water; Shoreline Assessment will be conducted along the perimeter of the pond where students look at the plant make-up, erosion potential, area land use and other factors to determine risk factors for poor water quality. In conclusion, students will be led through a discussion focusing on how wetlands act as nature's water filter.

PROGRAM GOALS:

To instill in the students who participate an awareness and appreciation for Michigan's aquatic habitats and the wetlands, which help insulate them from contaminants.

PROGRAM OBJECTIVES:

1. Students will be able to list the four things that every living thing needs for survival.
2. Students will collect and identify at least four macro invertebrates.
3. Students will be able to define the difference between tolerant and intolerant macro invertebrates.
4. Students will be able to list at least three types of pollutants, which decrease water quality.
5. Students will be able to demonstrate how to use a secchi disk.
6. Students will be able to calculate the turbidity index for a body of water using a simple formula.
7. Students will be able to list two indicators of water pollution.
8. Students will be able to describe how wetlands function to help keep the water clean.
9. Students will be able to identify at least three common shoreline plants.

PRE-VISIT SUGGESTIONS:

1. Each student should be dressed for weather conditions, which are generally 10 degrees cooler near the Bay. Wind can be much harsher and a jacket or coat should be worn regardless of weather conditions at your school. Bring a box of trash bags with square bottoms to use as emergency rain ponchos. Shoes should be selected for outdoor exploration and boots worn when weather is snowy or muddy.
2. Arrange to bring 2 adults who would be willing to help supervise the canoe activity throughout the day.
3. Suggested vocabulary words: Limnology, Conservation, Wetland, macro invertebrate, turbidity, photic zone, sediment, photosynthesis, respiration, nutrients, carbon dioxide, phosphates, nitrates, hardness, titration, environment, tolerant and intolerant.

4. Borrow the “Save Our Streams” video from the park and have your class watch members of the Issac Walton League learn how to monitor water quality.

POST-VISIT SUGESTIONS:

1. Locate a stream or river site close to your school and conduct a water monitoring day once a year at that site. Send the results into the Department of Environmental Quality, Surface Water Quality Division, Attention: Charlie Bauer, at the Saginaw Bay District Office on Euclid in Bay City.
2. Graph the data collected by each group. Have the students compare the water quality to last year’s data. Did water quality change? Why or why not?
3. Start a scrapbook on newspaper and magazine articles on the Saginaw Bay and water quality issues.
4. Project Aquatic Wild: Deadly Waters: students learn about water chemistry as they analyze a drop of “water” and graph its contents on a chart; Something’s Fishy Here: students read and discuss a story inventing their own endings that lead to environmental action in their community.
5. Project WET: Rainy Day Hike: students are introduced to the concept of watersheds by collecting data about water flowing over school grounds; Where Are the Frogs?: through experimentation and simulation students learn how acidic water has endangered the quality of aquatic life. Capture, Store & Release: Macro Invertebrate Mayhem: students learn about tolerant and intolerant species as they role play macro invertebrates.

COORDINATING WITH THE MICHIGAN SCIENCE GRADE LEVEL CONTENT EXPECTATIONS:

Science. Inquiry Process: S.IP.05.11, S.IP.05.12, S.IP.05.13, S.IP.05.14, S.IP.05.15, S.IP.05.16, S.IP.06.11, S.IP.06.12, S.IP.06.13, S.IP.06.14, S.IP.06.15, S.IP.06.16, S.IP.07.11, S.IP.07.12, S.IP.07.13, S.IP.07.14, S.IP.07.15, S.IP.07.16

Science. Inquiry Analysis & Communication: S.IA.05.11, S.IA.05.12, S.IA.05.13, S.IA.05.14, S.IA.05.15, S.IA.06.11, S.IA.06.12, S.IA.06.13, S.IA.06.14, S.IA.06.15, S.IA.07.11, S.IA.07.12, S.IA.07.13, S.IA.07.14, S.IA.07.15

Science. Reflection & Social Implications: S.RS.04.11, S.RS.04.14, S.RS.04.15, S.RS.04.16, S.RS.04.17, S.RS.04.18, S.RS.04.19, S.RS.05.11, S.RS.05.12, S.RS.05.13, S.RS.05.15, S.RS.05.16, S.RS.05.17, S.RS.05.19, S.RS.06.11, S.RS.06.12, S.RS.06.13, S.RS.06.14, S.RS.06.15, S.RS.06.16, S.RS.06.17, S.RS.06.18, S.RS.06.19, S.RS.07.11, S.RS.07.12, S.RS.07.13, S.RS.07.14, S.RS.07.15, S.RS.07.16, S.RS.07.17, S.RS.07.18, S.RS.07.19

Life Science. Evolution: L.EV.05.12

Life Science. Organization of Living Things: L.OL.05.41, L.OL.05.42, L.OL.06.51, L.OL.06.52, L.OL.07.21, L.OL.07.23, L.OL.07.24, L.OL.07.31, L.OL.07.32, L.OL.07.61, L.OL.07.62, L.OL.07.63

Life Science. Ecosystems: L.EC.06.11, L.EC.06.21, L.EC.06.22, L.EC.06.23, L.EC.06.31, L.EC.06.32, L.EC.06.42, L.EC.06.41

Earth Science. Solid Earth: E.SE.06.11, E.SE.06.12e, SE.06.13, E.SE.06.14

Physical Science. Energy: P.EN.07.43

Physical Science. Properties of Matter: P.PM.07.11, P.PM.07.21, P.PM.07.23, P.PM.07.24

Life Science. Heredity: L.HE.07.21

Earth Science. Earth Systems: E.ES.07.11, E.ES.07.12, E.ES.07.41, E.ES.07.42, E.ES.07.81

COORDINATING WITH M.E.A.P. SOCIAL STUDIES CONTENT STANDARD BENCHMARKS:

Geographic Perspective

II.2—m.s.1, m.s.2, m.s.3, m.s.4, m.s.5, h.s.1, h.s.2

II.4—h.s.3

II.5—m.s.2

