



“Toxic Waters – Lessons Learned From the Bald Eagle”

Water Quality Study Elective

Saginaw Bay Visitor Center

School Program Description

Bay City State Recreation Area

Level: 4th, 5th or 6th Grade

PROGRAM DESCRIPTION:

Each student will participate in a water quality monitoring experience which includes the collection of data in the field and interpreting the data by rating the water quality of the Tobico Lagoon. This program focuses on the importance water plays in every living creature’s existence, the factors which indicate good water quality and the role wetlands play in helping to store, clean, and buffer our ponds and lakes. The program opens with a groundwater model demonstration on how man’s use of the land introduces pollutants that are carried to our rivers and lakes by way of the water cycle, and identifies the major pollutants present in the Saginaw Bay. Students then rotate through 3 hands-on activity stations which focus on methods of assessing water quality: Macro Invertebrate Survey, Turbidity & Shoreline Assessment of plants and land use in the area, and water testing in the Wet Lab for pH, Dissolved Oxygen, Nutrients (N & P), and hardness. The trip concludes with a tour of the visitor center museum, which includes participation in a computer touch screen virtual fishing scenario where ultimately the student must catch, measure, and ID a fish then use the Michigan Fish Consumption Advisory to determine whether they will eat it or not.

PROGRAM GOALS:

Each student will understand the connection between water quality of the Bay and the health of the food web within its ecosystem, and have a better understanding how man is a part of the water pollution problem and solution.

PROGRAM OBJECTIVES:

1. Each student will be able to list water as one of the four things every living creature needs to survive.
2. Each student will collect and through comparison and contrasting of physical traits will identify at least four macro invertebrates, which are found in the water.
3. Each student will be able to define the difference between tolerant and intolerant macro invertebrates.
4. Each student will be able to list at least three pollutants which effect water quality.
5. Each student will be able to explain how to use a secchi disk to measure turbidity.
6. Each student will be able to describe sediment as a pollutant which decreases water quality.
7. Each student will be able to give an example of one way man’s use of the land could affect water quality.

8. Students will be able to list two indicators of polluted water.
9. Students will be able to describe how wetlands help keep our water clean.
10. Students will be able to identify several components of an eagle's food web.
11. Students will be able to determine what the fish advisory for a particular fish is by using a measuring stick and the MDCH Fish Consumption Advisory Guide.

PRE-VISIT SUGGESTIONS:

1. Call the visitor center to make you pre-visit classroom program scheduled for part one of you Lessons Learned from the Bald Eagle.
2. Be sure that every student is dressed for the weather conditions. Layers work best. Our weather can be 10 to 15 degrees cooler near the Bay than at your school site. Tell them to wear shoes which can get muddy and or wet.
3. Review Vocabulary: water, wetland, conservation, macro invertebrate, environment, temperature, sediment, turbidity, photosynthesis, oxygen, carbon dioxide, nutrients, pH, pollutant, abiotic, biotic, herbicide, pesticide, toxin, erosion, photosynthesis, runoff, evaporation, condensation, infiltration, precipitation, acid rain, predator, prey, adaptation, watershed, tolerant and intolerant.

POST-VISIT SUGESTIONS:

1. Make a chart or table depicting the data collected by each group. Graph the data collected.
2. Draw an aerial view of the Tobico Lagoon and label the locations of different types of habitats and land use found around the pond. Indicate inlet and out and direction of water flow.
3. Adopt a Stream! Select a site next to your school, draw up a conservation action plan, conduct a litter clean-up and conduct a school river monitoring day twice a year.
4. Keep a class scrapbook on newspaper articles regarding the Dioxin issue and other incidents which affect the water quality of the Saginaw Bay.
5. 5th grade classes can follow up this program by participating in Fishing for Fun at Bay City State Recreation Area.
6. Teachers attend Project WET or Project WILD workshop and get two books bulging with fun interdisciplinary, cross-referenced, hands-on lesson plans for incorporating environmental messages into your current classroom curriculum.
7. Have the students design their own fish, name it and describe its food, water, shelter and space requirements. (
8. Try out these activities with your students: Project Aquatic Wild: Fashion a Fish; What's in the Water?; Wetland Metaphors; Project Wet: Water Address)
9. Visit a DNR Fish Hatchery.
10. Participate in the all new DNR classroom program "Salmon in the Classroom"
11. Participate as a class in the BAY SAIL program. Information on BAY SAIL is available from the Bay Area Visitors and Convention Bureau.
12. Obtain a list of land use precautions that the EPA has identified for people living or using land that has been contaminated by the dioxin.
13. Contact Saginaw or Bay County Health Department and ask for information on other environmental health programs which are available for your students.

14. Call the Saginaw U.S. EPA office and see if a field agent is available to make a visit to your classroom or if they can make supplementary classroom materials available to your students. Mary Breeden, EPA, 111 S. Michigan LL015, Saginaw, MI 48602 (989) 790-5215

COORDINATING WITH MICHIGAN SCIENCE Grand Level Content Expectations:

Science. Inquiry Process: S.IP.04.11, S.IP.04.12, S.IP.04.13, S.IP.04.14, S.IP.04.15, S.IP.04.16, 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,

Science. Inquiry Analysis & Communication: S.IA.04.11, S.IA.04.12, S.IA.04.13, S.IA.04.14, S.IA.04.15, S.IA.05.11, S.IA.05.12, S.IA.05.13, S.IA.05.14, S.IA.05.15, S.IP.06.11, S.IP.06.12, S.IA.06.13,

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.06.14, S.RS.06.15, S.RS.06.16, S.RS.06.17, S.RS.06.19

Physical Science. Properties of Matter: P.PM.04.23

Physical Science. Changes in Matter: P.CM04.11

Life Science. Organization of Living Things: L.OL.04.15, L.OL.04.16, L.OL.05.41, L.OL.05.42, L.OL.06.51, L.OL.06.52

Life Science. Heredity: L.HE.0511

Life Science. Evolution: L.EV.04.21, L.EV.04.22, L.EV.05.11, L.EV.05.12, L.EV.05.14, L.EV.05.21

Life Science. Ecosystems: L.EC.04.11, L.EC.04.21, 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.06.41

Earth Science. Earth in Space & Time: E.ST.04.12, E.ST.05.25

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

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

Geographic Perspective

II.1—I.e.2

II.2—I.e.1, I.e.2, I.e.3, I.e.4

II.4—I.e.5

II.5—I.e.1

Civic Perspective

III.3—I.e.2

II.4—I.e.2

Public Discourse and Decision Making

VI.1—I.e.1, I.e.3