**Aquatic Ecology Syllabus**

**September 28th: Introduction to Ecology and Water**

A review of Minnesota biomes, habitats and general ecology vocabulary including understanding biotic and abiotic factors. Map MN biomes based on rainfall amounts.

**October 5th: Introduction to Aquatic Macroinvertebrates**

What are the major orders of aquatic macroinvertebrates? Learn and practice sampling techniques and analysis of these creatures and learn how they can be used as indicators of water quality.

*HW: Research one of Minnesota’s endangered species that relies on water for at least part of its life cycle; briefly summarize its life cycle and describe what factors are contributing to its decreasing population size*

**October 12th: Macroinvertebrate Sampling**

**Field Trip:** *Environmental Nature Area, Brooklyn Park*

Use your knowledge macroinvertebrates in the field to collect macroinvertebrate samples and analyze the data collected to determine the water quality of a local stream and/or pond/lake. Also conduct a stream discharge calculation.

*HW: Write a brief analysis of the quality of the water based on the macroinvertebrates found in the pond and stream. Describe how the flow of the stream could impact the life found in the stream.*

*\*\*Bring water sample from local creek, pond, etc.*

**NO CLASS OCTOBER 19th**

**October 26th: Introduction to Water Quality**

Learn how the chemistry of the water – pH levels, amount of oxygen, levels of nitrogen and phosphorous – affect life in the water. Use the water samples brought in for homework to test the quality of the water.

**November 2nd: Water Quality Testing**

***Full Day*** **Field Trip** *Cedar Creek Ecosystem Science Reserve, Bethel*

Use your knowledge from the previous week in the field to collect water samples from locations within Cedar Creek Ecosystem Science Reserve, run chemical tests, and analyze the data. Sample macroinvertebrates and compare this information with the macroinvertebrate data collected from the Environmental Nature Area.

*HW: Briefly write an analysis of the water tests conducted at Cedar Creek. Compare this information with what was found at the Environmental Nature Area. Describe any differences in data collected between the two sites.*

**November 9th: Non-point Source Pollution**

Learn about types of pollution, specifically non-point source pollution. Through a group activity analyze clues from a hypothetical situation to determine where the source of the water pollution is coming from.

*HW: Research the Dakota Pipeline; briefly describe the controversy; why are people protesting the construction and use of the pipeline? Why do people want the pipeline? What are the benefits and costs of the pipeline? Do the benefits outweigh the costs?*

**November 16th: Bioaccumulation and Food Webs**

Learn what bioaccumulation is and how it affects food webs within in aquatic ecosystems through a hands on activity.

**NO CLASS NOVEMBER 23rd – THANKSGIVING**

**November 30th: Wetlands**

Learn about the many types of wetlands found within our state and country. Learn how these habitats provide safety for animals and people. Through a hands on activity, discover how wetland plants help to clean the water.

**December 7th: Watersheds and The Dead Zone**

Use a topographic map to explore the concept of a watershed and watershed monitoring. Discover the differences in value between an individual data set collected at one place and time on watershed versus a series of water quality data sets collected at various points along a watershed over time. Learn about The Dead Zone in the Gulf Coast.

*HW: Research The Dead Zone in the Gulf of Mexico; create a hypothesis for the cause of the Dead Zone and design an experiment to test the hypothesis; create a presentation*

**December 14th: Fishable Waters and Water Management & Presentations**

Present your research and experiment plan for The Dead Zone. Describe the value of clean water and a healthy fish population through a card game simulation. Explore the Clean Water Act and Minnesota’s local regulations. Learn how water is managed and regulated within our state by analyzing data.