

AIS Program Summary

This Aquatic Invasive Species (AIS) educational tool kit contains lessons for up to one week of classes. Each day's activity is designed to fill an hour of class time, but activities can be shortened or lengthened to fit the teacher's plans and available time. Lessons can be given consecutively over a week, or individually as stand-alone lessons. All supplies, diagrams, printouts and worksheets will be provided electronically in a kit. Prior research can be assigned as preparatory homework for the class, or research material can be provided during class.

Minnesota Academic Standards met by this program:

See page 3 for detail on standards and benchmarks

- 9.1.3.1.1
- 9.1.3.3.3
- 9.4.2.1.2
- 9.4.2.2.2
- 9.4.4.1.2
- 9.4.4.2.4

Day 1: Introduction to Aquatic Invasive Species (AIS)

What are AIS and where are they?



Summary

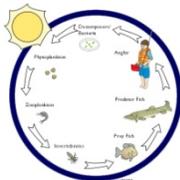
Day one is an introduction to AIS through watching a DNR documentary video (Aquatic Invasive Species – Minnesota Waters At Risk, 25 minutes), and then discussing which AIS are present in Hubbard County. AIS specimens will be provided for hands-on learning about the identification of these species.

Supplies Provided

DVD, Powerpoint, preserved AIS specimens, AIS Guide Book, map of MN Infested Waters

Day 2: Ecosystems and Food Webs

How do AIS affect our lakes?



Summary

Students are presented information about aquatic food webs and the specific biology of selected aquatic invasive species (what they eat, etc). Small groups will be assigned 1-2 AIS, and using the information about basic aquatic food webs and AIS biology they will explain how that AIS will affect the aquatic food web. Then each small group presents their findings to the class.

Supplies Provided

Powerpoint, electronic files for handouts or electronic distribution

Day 3: Case Study: the Zebra Mussel

Where could Zebra mussels invade? Risk assessment for lakes.



Summary

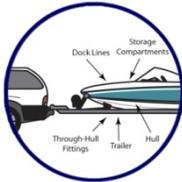
Students are given information about how Zebra mussels spread and their biological requirements. They are also given lake data and characteristics for Hubbard County lakes. In small groups, they will use the lake data and characteristics to assess the risk of each lake for being infested with Zebra mussels in the future. Then each small group presents their findings to the class.

Supplies Provided

Powerpoint, electronic files for handouts or electronic distribution, real lake data from Minnesota lakes

Day 4: AIS Prevention

What can we do to prevent the spread of AIS?



Summary

Students are given information about what is being done in Minnesota to prevent AIS and the current Minnesota laws meant to stop the spread of AIS. They are also taught how to inspect a watercraft for AIS by going outside and working through an actual boat. A boat will be provided from a volunteer boat provider list (Hubbard COLA).

Supplies Provided

Powerpoint, boat inspection video, possible list of DNR and volunteers to bring their boat to campus for students to inspect

Minnesota Academic Standards and Benchmarks met by this program:

Grade	Strand	Substrand	Standard "Understand that ..."	Code	Benchmark	How it applies to this program
9-12	1. The Nature of Science and Engineering	3. Interactions Among Science, Technology, Engineering, Mathematics, and Society	1. Natural and designed systems are made up of components that act within a system and interact with other systems.	9.1.3.1.1	Describe a system, including specifications of boundaries and subsystems, relationships to other systems, and identification of inputs and expected outputs. <i>For example:</i> A power plant or ecosystem.	Ecosystem and aquatic food web.
9-12	1. The Nature of Science and Engineering	3. Interactions Among Science, Technology, Engineering, Mathematics, and Society	3. Science and engineering operate in the context of society and both influence and are influenced by this context.	9.1.3.3.3	Describe how scientific investigations and engineering processes require multidisciplinary contributions and efforts. <i>For example:</i> Nanotechnology, climate change, agriculture, or biotechnology.	Complex problems such as AIS require multidisciplinary contributions and efforts such as biology, water chemistry, local and international regulation, etc.
9-12	4. Life Science	2. Interdependence Among Living Systems	1. The interrelationship and interdependence of organisms generate dynamic biological communities in ecosystems.	9.4.2.1.2	Explain how ecosystems can change as a result of the introduction of one of more new species. <i>For example:</i> The effect of migration, localized evolution or disease organism.	How lake ecosystems changes with the introduction of aquatic invasive species.
9-12	4. Life Science	2. Interdependence Among Living Systems	2. Matter cycles and energy flows through different levels of organization of living systems and the physical environment, as chemical elements are combined in different ways.	9.4.2.2.2	Explain how matter and energy is transformed and transferred among organisms in an ecosystem, and how energy is dissipated as heat into the environment.	Ecosystem and aquatic food web – how energy is transformed and transferred.
9-12	4. Life Science	4. Human Interactions with Living Systems	1. Human activity has consequences on living organisms and ecosystems.	9.4.4.1.2	Describe the social, economic and ecological risks and benefits of changing a natural ecosystem as a result of human activity. <i>For example:</i> Changing the temperature or composition of water, air or soil; altering the populations and communities, developing artificial ecosystems; or changing the use of land or water.	How AIS change lake ecosystems and how that affects lake users and lake residents, property values, etc.
9-12	4. Life Science	4. Human Interactions with Living Systems	2. Personal and community health can be affected by the environment, body functions and human behavior.	9.4.4.2.4	Explain how environmental factors and personal decisions, such as water quality, air quality and smoking affect personal and community health.	Personal decisions, such as not properly cleaning your boat, can introduce AIS into a new lake.