Ripple Effects

Lesson 08: Why Do They Thrive?

Grade Level

7-12th

Subject

Science

Class Time

3 CLASS PERIODS

Next Generation Science Standards

www.nextgenscience.org/

MS-LS2-2
MS-LS2-4
MS-LS2-5
MS- ESS3-3

Great Lakes Literacy Principles

www.cgll.org/purpose-principles/

Principles 5, 6, 8

BE A HERO TRANSPORT ZERO™

TRANSPORTZERO.ORG

Activity at a Glance

Students research the physical, biological, and behavioral characteristics of aquatic invasive species (AIS) that help them to out-compete native species. The activity concludes with an Aquatic Invasive Species Advantage Forum where students present their findings and conclusions.

Objectives

Students will be able to:

- Compare and contrast an AIS with a similar native species.
- Describe their life cycles, habitat needs, physical structures, and behavioral characteristics.
- Identify specific adaptive characteristics of AIS that help them to be successful in the environments to which they are introduced.

Materials

- ☐ Aquatic Invasive Species Advantage Forum Rubric
- ☐ Preserved specimens of native and invasive species from the same habitat (if legal to obtain, i.e. zebra or quagga mussels and native mussels). Detailed anatomical charts will suffice.
- ☐ Photographs of AIS and the native species being researched.
- ☐ Information on the life cycle and behaviors of the animals or plants being compared.
- ☐ Computers or tablets with internet access for student research

Vocabulary

- Adaptation
- Competition
- Dispersal
- Habitat

Last Updated: 01/09/2026.

Background

Animal and plant anatomies and adaptations are often studied in life science classrooms. Animal behavior is studied less frequently, particularly during the middle school or junior high years. Very seldom are the concepts of anatomy, structure, function and behavior looked at collectively to see how they relate to an organism's success in its environment.

This activity takes a more encompassing look at these factors as they pertain to the dispersal, reproduction, and successful establishment of aquatic invasive species over similar native species sharing the same habitats. Not all AIS appear to be harmful, but many are detrimental to native species because of rapid reproduction rates, ability to survive in adverse circumstances, and the lack of predatory pressures. The behavior and physical structures of AIS have an effect on all these facets.

Helpful Hints

- The grade level and purpose of this activity will determine its scope. Teachers may want to limit research to a specific pair of organisms for younger students, or may want to look at AIS as a whole to determine the reasons for their success. This activity can fulfill needs in the curricula for anatomy, animal behavior, adaptations, ecology, social studies, and geography.
- Preserved specimens may be available from science supply companies, or it may be possible to borrow them from local college biology departments, US Fish and Wildlife Services offices, state department of natural resources, environmental conservation departments, or Sea Grant offices.
- Suggested research sites for students can be found under the Resources heading below. Teachers may provide additional resources, if desired.

Procedure

1. Provide a definition of AIS, and have student groups examine preserved specimens or representations (e.g., photographs, line drawings, and anatomical representations) of various aquatic invasive and native species that occupy the same habitats.

2. After students select an AIS and a related native species to research, have them study those specimens or their representations closely. Explain that they will be conducting research to discover why the AIS can thrive in the habitats they were introduced to. The information researched for the aquatic invasive and native species should include: distribution, habitat needs (including needs for food, shelter, and reproduction), life cycles, and analysis of relationships among body structure, behavior, and function.

3. Students conduct research and organize their information on the Aquatic Invasive Species Research Guide worksheet. Then they synthesize the information into conclusions about AIS adaptations.

4. Students present their findings in an "Aquatic Invasive Species Advantage Forum" as representative experts on their researched species.

Wrap-Up

The *Aquatic Invasive Species Advantage* Forum and the Aquatic Invasive Species Research Guide allow sufficient means for evaluating student progress

Last Updated: 01/09/2026.

Extension

- Relate AIS adaptations to a local problem with such a species. Are there fishing lakes being affected by an AIS invasion? What are the far-reaching effects of this invasion? What is known about the adaptations of this species that will help people to understand and control its spread?

Resources

Websites:

Great Lakes Aquatic Nonindigenous Species Information System: https://www.glerl.noaa.gov/glansis/
U.S. Geological Survey, Biological Resources Division, Nonindigenous Aquatic Species (Gainesville, FL): http://nas.er.usgs.gov
US EPA, Aquatic Invasive Species: https://www.epa.gov/greatlakes/invasive-species-great-lakes-0
NOAA: https://research.noaa.gov/identifying-the-great-lakes-top-ten-most-impactful-aquatic-invaders/
Alliance for the Great Lakes: https://greatlakes.org/issues/keeping-invasive-species-out/
Great Lakes Fishery Commission: https://www.glfc.org/invasive-species.php
Great Lakes Now: https://www.greatlakesnow.org/2024/10/great-lakes-most-unwanted-top-10-invasive-species/
Be a Hero, Transport Zero: https://www.transportzero.org/aquatic.html
Aquatic Invaders in the Marketplace: https://takeaim.org/
Invasive Crayfish Collaborative: https://invasivecrayfish.org/

Kits:

Aquatic Invaders Attack Pack: an interactive kit containing preserved specimen of AIS, a classroom guide, fact sheets, and other resources. Available from Illinois-Indiana Sea Grant. Contact Janice Milanovich at janicem@illinois.edu or visit https://iiseagrant.org/education/loanable-kits/

Credits

Originally created for ESCAPE Compendium, Great Lakes Sea Grant Network
Created by: Marlene Schoeneck, Parkers Prairie High School, Parkers Prairie, MN
Modified by: Helen Domske, New York Sea Grant

Great Lakes RESTORATION

CENTER FOR GREAT LAKES LITERACY CGLL

Sea Grant ILLINOIS-INDIANA

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

Illinois Extension UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

PURDUE UNIVERSITY | Forestry and Natural Resources

This lesson has been reviewed for content and accessibility by the Center for Great Lakes Literacy.

Last Updated: 01/09/2026.

Ripple Effects | Why Do They Thrive?

Teacher Activity: Aquatic Invasive Species Advantage Forum Rubric

Name _____ **Date** _____ **Class Period** _____

Criteria	**Written content from student research (journal, notes, formal report, etc.)** (50 Points Possible)	**Oral presentation from Aquatic Invasive Species Advantage Forum.** (30 Points Possible)	**Grammar & Spelling.** (10 Points Possible)	**Timeliness** (10 Points Possible)
Exemplary	Developed conclusions fully. Good, logical organization. Used reliable sources. Referenced accurate and relevant facts/examples. (45–50 Points)	Elaborate, quoted sources, correctly answered questions. Referenced accurate and relevant facts/examples. Spoke clearly, did not read from notes. (27–30 points)	All grammar and spelling correct. (9–10 points)	Assignment handed in on time. (10 Points)
Proficient	Satisfactory development of conclusions. Decent organization. Used accurate and relevant facts/examples. (35–45 Points)	Less elaborate, correctly answered questions. Used accurate and relevant facts/examples. Spoke clearly, referred to notes. (21–26 points)	One or two grammar and spelling errors. (7–8 points)	One day late. (8 Points)
Developing	Showed weakness in development of conclusions. Showed some organization. Used some accurate and relevant facts/examples. (25–34 Points)	Less elaborate, answered questions. Used some accurate and relevant facts/examples. Spoke clearly, read directly from notes. (15–20 points)	Three or four grammar and spelling errors. (5–6 points)	Two days late. (6 Points)
Beginning	Minimally developed conclusions. Little or no organization. Little or no use of relevant facts/examples. (16–24 Points)	Simple, unable to answer questions. Used little or no relevant facts or examples. Unclear speech, referred to notes. (10–14 points)	More than four grammar and spelling errors. (3–4 points)	Three days late. (4 Points)
Unacceptable	Incomplete development of conclusions. Unclear ideas. Hard to understand. (0–15 Points)	Incomplete, unable to answer questions. Unclear speech, read notes. (0–9 points)	Very frequent grammar and spelling errors. (0–2 points)	More than three days late. (2 Points)
	Score: / 50	Score: / 30	Score: / 10	Score: / 10

Total Score:	/ 100

Last Updated: 01/09/2026.

Ripple Effects | Why Do They Thrive?

Student Activity: Invasive Species Research Guide 01

Name _____ **Date** _____ **Class Period** _____

Directions: Use this document to collect and organize your research before presenting at the AIS Advantage Forum.

1. **Aquatic Invasive Species** _____
2. **Native Species for Comparison:** _____
3. **Research Questions:**
   a. What are the key similarities and differences between your AIS and native species? (Consider anatomy, behavior, habitat needs, and life cycle.)
   b. How does the AIS affect the native species and its environment?
   c. What adaptations help the AIS survive, spread, and out-compete native species?

Species Profiles

Feature	Aquatic Invasive Species	Native Species
Habitat Needs		
Food Sources		
Shelter Requirements		
Reproductive Strategies		
Life Cycle Stages		
Physical Structures		
Behavioral Characteristics		

Last Updated: 01/09/2026.

4. **AIS Impact Analysis**
   a. Environmental Impact:_____
   b. Human or Economic Impact:_____
   c. Social or Cultural Impact (if applicable):_____

5. **AIS Adaptation Advantage**
   a. Key Adaptations:_____
   b. How These Help with Dispersal or Survival:_____
   c. Are There Any Known Control Methods?_____

6. **Visuals & Diagrams**
   a. Describe, sketch, or paste visuals that support your research (e.g., food web, life cycle diagram, habitat map, anatomical comparison). Be sure to include the source for credit.

Sources & Notes

Source	Type (Website, Book, Journal Article, etc.)	Key Notes/Questions

7. **Forum Prep: Summary Statement**
   a. You're now an expert on your AIS and will present your research. Write a short summary to help you prepare for your AIS Advantage Forum presentation. Answer the following questions in your summary:
      i. What makes this AIS so successful?
      ii. What are the key similarities and differences between your AIS and native species? (Consider anatomy, behavior, habitat needs, and life cycle.)
      iii. How does the AIS affect the native species and its environment?
      iv. What adaptations help the AIS survive, spread, and outcompete native species?

Last Updated: 01/09/2026.

Last Updated: 01/09/2026.