

Researching Invasive Species

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Lesson Overview

Students will be introduced to what invasive species are, and how they can negatively affect the Great Lakes and Michigan's ecosystems. Students will have the opportunity to choose an invasive species to research, create a model for, write a research report for, and present their report to the class. Some invasive species being researched are on display at the Belle Isle Aquarium and could be visited as an individual or class.

Target Grade/Subject: 5th grade Science and ELA

Time: 3 - 4 weeks (15-20 45-min. class periods)

Sources Consulted

Belle Isle Conservancy: Educating about Invasive Species. (n.d.). Retrieved March 09, 2018, from <http://detroitaquarium.weebly.com/educating-about-invasive-species.html>

Michigan Department of Environmental Quality
<https://www.youtube.com/watch?v=ylgysZ5Hho8>

Michigan Invasive Species (Michigan.gov)
http://www.michigan.gov/invasives/0,5664,7-324-68002_71240---,00.html

Learning Objectives

Students will be able to:

- Identify why invasive species are harmful to Michigan's water and land ecosystems.
- Gather useful information from multiple sources.
- Create a model of their invasive species.
- Present knowledgeably to their peers.
- Write a research paper (4-paragraphs) that includes: (i) an introduction describing their selected invasive species, (ii) one paragraph with information cited from their sources about why their invasive species is harmful, (iii) one paragraph about ways to eradicate their invasive species (also citing their sources) or why it cannot be eradicated, and (iv) a conclusion paragraph with their recommendations on what to do.

Michigan Science and ELA Standards Addressed

Michigan Science Standards:

5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS2-1MI Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact in Michigan and the Great Lakes basin.

5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

ELA Common Core Standards:

W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

W.5.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade specific expectations for writing types are defined in standards 1–3 above.)

SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

R.I.5.6 Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent.

R.I.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

R.I.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

List Materials & Quantities Needed

30 Chromebooks/computer lab/iPads for research (1 per student)

Modeling materials: clay, recycled materials (cardboard, string, foil, paper, tubes, etc.) 30 notebooks (1 per student)

30 pencils (1 per student)

60 notecards (2 per student)

New Vocabulary

Invasive Species: 1) non-native (or alien) to the ecosystem under consideration and. 2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Ecosystem: a biological community of interacting organisms and their physical environment.

(in general use) a complex network or interconnected system.

Model: a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original.

Eradicate: destroy completely; put an end to.

Focus Question

Why is your invasive species harmful to Michigan?

How can Michigan eradicate your invasive species?

Classroom Activities - Lessons are based on what fifth grade students should be able to accomplish in a 45 minute class period

Lesson 1 - Begin by visiting the Belle Isle Conservancy website to give an overview of invasive species

(<http://detroitaquarium.weebly.com/educating-about-invasive-species.html>). Next, students will view

"Invasive Species - The Basics" independently on an electronic device (<https://www.youtube.com/watch?v=yJgysZ5Hho8>). Students will take notes and then begin to research different types of invasive species in Michigan by visiting http://www.michigan.gov/invasives/0,5664,7-32468002_71240--,00.html. They will make a list of five that they are interested in looking into further.

Some examples are:

Plants: parrot feather (*Myriophyllum aquaticum*); yellow floating heart (*Nymphoides peltata*); European frog-bit (*Hydrocharis morsus-ranae*; especially serious due to recent new observations); Brazilian elodea (*Egeria densa*; especially important in a teaching context, for which information about alternative species for teaching may help stop accidental release); hydrilla (*Hydrilla verticillata*); water chestnut (*Trapa natans*); water hyacinth (*Eichhornia crassipes*); water lettuce (*Pistia stratiotes*; this and hyacinth currently allowable but reportable if observed outside of cultivation); water soldier (*Stratiotes aloides*), invasive phragmites (*Phragmites australis*), and Eurasian watermilfoil (*Myriophyllum spicatum*).

Animals: Asian carps (silver, big head, and others); northern snakehead (*Channa argus*); red swamp crayfish (*Procambarus clarkii*); New Zealand mudsnail (*Potamopyrgus jenkinsi*); rudd (*Scardinius erythrophthalmus*); and tench (*Tinca tinca*)."

Lesson 2 - Students will narrow down their list of five invasive species to one that another member of the class has not chosen. Students will begin to research their invasive species. They will begin with an image to draw in their notebook in order to later create a model.

Lesson 3 - 5 Students will continue to research using reputable websites, watch videos and take notes to prepare for their research report.

Lesson 6 - Students will begin to draft a four paragraph research paper that includes: (i) an introduction describing their selected invasive species, (ii) one paragraph with information cited from their sources about why their invasive species is harmful, (iii) one paragraph about ways to eradicate their invasive species (also citing their sources) or why it cannot be eradicated, and (iv) a conclusion paragraph with their recommendations on what to do.

Lesson 7 - 8 Create rough draft

Lesson 9 - Revise research paper with a partner and self-edit. Student will then begin to type their final copy of their research paper.

Lesson 10 - Finish typing final product into word document (possibly google classroom)

Lesson 11 - Students will begin to create a model of their invasive species using the drawing from lesson 2.

Lesson 12 - 13 Students create their model, paying attention to details including what ecosystem the invasive specie is disrupting.

Lesson 14 - Students prepare for their presentation using notecards. Students will highlight the main points from their paper in their presentation (2 minutes max). Students will use notecards in order to present instead of reading their entire paper.

Lesson 15 - Students practice presenting with their revising partner from earlier in the unit.

Lesson 16 - 17 Students will present their findings to their peers.

Lesson 18 - Students will vote on which invasive species they feel is the most harmful to Michigan and why using a paragraph of writing.

Assessment of Student Learning

Teacher will use the attached rubrics in order to evaluate the students’ performance on the unit (based on the objectives).

Research Paper Rubric

Name: _____

CATEGORY	4	3	2	1
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Sources	All sources (information and graphics) are accurately documented in the desired format.	All sources (information and graphics) are accurately documented, but a few are not in the desired format.	All sources (information and graphics) are accurately documented, but many are not in the desired format.	Some sources are not accurately documented.
Organization	Information is very organized with wellconstructed paragraphs and subheadings.	Information is organized with well-constructed paragraphs.	Information is organized, but paragraphs are not wellconstructed.	The information appears to be disorganized. 8)
Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors	A few grammatical spelling, or punctuation errors.	Many grammatical, spelling, or punctuation error

CATEGORY	4	3	2	1
Accurate Information	The model includes all aspects of the invasive species as well as additional information.	All aspects of the invasive species are included in the model.	All but 1 of the aspects of the invasive species are included in the model.	Several required elements were missing.
Labels	All items of importance in the model are clearly labeled with labels that can be read from at least 3 ft. away.	Almost all items of importance in the model are clearly labeled with labels that can be read from at least 3 ft. away.	Several items of importance in the model are clearly labeled with labels that can be read from at least 3 ft. away.	Labels are too small to view OR no important items were labeled.
Attractiveness	The model is exceptionally attractive in terms of design, layout, and neatness.	The model is attractive in terms of design, layout and neatness.	The model is acceptably attractive though it may be a bit messy.	The model is distractingly messy or very poorly designed. It is not attractive.
Use of Class Time	Used time well during each class period. Focused on getting the project done. Never distracted others.	Used time well during each class period. Usually focused on getting the project done and never distracted others.	Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others.	Did not use class time to focus on the project OR often distracted others.

CATEGORY	4	3	2	1
Preparedness	Student is completely prepared and has obviously rehearsed.	Student seems pretty prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking.	Student does not seem at all prepared to present.
Listens to Other Presentations	Listens intently. Does not make distracting noises or movements.	Listens intently but has one distracting noise or movement.	Sometimes does not appear to be listening but is not distracting.	Sometimes does not appear to be listening and has distracting noises or movements.
Stays on Topic	Stays on topic all (100%) of the time.	Stays on topic most (99-90%) of the time.	Stays on topic some (89%-75%) of the time.	It was hard to tell what the topic was.
Speaks Clearly	Speaks clearly and distinctly all (100-95%) the time, and mispronounces no words.	Speaks clearly and distinctly all (100-95%) the time, but mispronounces one word.	Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word.	Often mumbles or can not be understood OR mispronounces more than one word.
Content	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
Pace	Speaks at an understandable pace.	Speeds up or slows down 1 or 2 times.	Speeds up or slows down 3 or more times.	Rushes or drags out entire speech.

We would greatly appreciate your feedback using this lesson plan! Please visit <https://www.biaquariumstem.org/survey.html> to complete a short survey about your experience.