



Lesson Plan: Evaluating Informational Text (Invasive Plant Species)

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Appropriate for Grades: 11-12

Duration: 2-3 hours

Distance traveled by foot: 2.5-3 Miles (Total) (1 Mile Variation)

Standards (Includes focus standards, only):

NAAEE Standards:

Strand 1.1 (Questioning, Analysis, and Interpretation Skills) **A-Questioning**—Learners are able to develop, modify, clarify, and explain questions that guide environmental investigations of various types. They understand factors that influence the questions they pose. **C- Collecting information**—Learners are able to locate and collect reliable information for environmental investigations of many types. They know how to use sophisticated technology to collect information, including computer programs that access, gather, store, and display data.

Strand 3.1 (Skills for Understanding and Addressing Environmental Issues): **A - Identifying and investigating issues**—Learners apply their research and analytical skills to investigate environmental issues ranging from local issues to those that are regional or global in scope.; **B -Sorting out the consequences of issues**—Learners are able to evaluate the consequences of specific environmental changes, conditions, and issues for human and ecological systems.

Common Core State Standards:

LA.11-12.CCSS.ELA-Literacy.RI.11-12.1

Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.

LA.11-12.CCSS.ELA-Literacy.RI.11-12.6

Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.

LA.11-12.CCSS.ELA-Literacy.W.11-12.2

Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

LA.11-12.CCSS.ELA-Literacy.W.11-12.9

Draw evidence from literary or informational texts to support analysis, reflection, and research.

AP Standards: (Aligned with Common Core State Standards for English/Language Arts)

Objectives: Students will be able to actively read complex informational text, evaluate arguments written about a contemporary issue (invasive plant species), and observe environments in various states of reclamation at Duke Farms. Students will be able to:

- read critically and discuss several articles on the topic of invasive species
- analyze the authors' purposes using study guides
- interpret and develop arguments in small and large groups
- evaluate the reliability of sources by identifying rhetoric and other information
- observe and draw inferences about the ramifications of invasive species in a living laboratory (Duke Farms).

Background:

Today's students must understand that global issues are complex and multi-faceted, and that sources of information about the issues are complex and multi-faceted as well. In the time spent in the classroom preparing for this field trip, during the Duke Farms visit, and throughout activities after the

visit, students will work deeply with groups of articles/other informational text sources on the topic of invasive plant species to identify, compare, and contrast the authors' main ideas/conclusions, purposes, tone/style, and writing techniques/structure. Students will support their own opinions about the issue with evidence from the texts they read. The articles and study materials included are not intended to provide a comprehensive survey of sources, but are designed to offer sources that demonstrate a variety of text complexity, viewpoints, and purposes and to complement a student's Duke Farms experience. Sources are included (identified as "Challenge Source") that will challenge the AP and more advanced student; these sources will also be valuable for the student who is still developing advanced skills if the sources are presented in manageable "chunks". Teachers should compile student packets based on their own discretion as to time limitations, student experience and skill level, etc. It is preferable to cover less more deeply so students better enjoy and gain more from their experiences of both the text analysis and of Duke Farms.

Key Vocabulary:

Stewardship, Invasive (Plant) Species, Native Species, Reclamation, Lesser Celandine, Mugwort, Wisteria; Text, Informational Text, Non-fiction, Rhetoric, Tone, Structure, Style, Bias, Opposing Viewpoints, Inference, Explicit

Materials:

- Clipboard with pen/pencil
- Duke Farms Map (available at front desk in Orientation Center)
- Copies of the map route (1 per student group)
- Teacher-compiled packets (chosen from the appendix below or teacher's own preference).
- "Sit-upon" recommended for sitting on the ground. ([Click here](#) for instructions on how to make a sit-upon. This can be a wonderful pre-field trip activity; sit-upons can be decorated with the student's name, images from nature, etc. Even older students enjoy this activity.)
- A backpack holding a bag lunch and water; layers of clothing depending upon the weather. Backpacks are recommended so students' hands are free for clipboards. (Remind students that this is a carry-in/carry-out park.)

Pre-visit activities:

Review with your students the mission and layout of Duke Farms. Review with students the objectives of the field trip; each student should have a copy of these objectives in his/her packet. Have students pre-read the articles/sources you will include in your packet and review with your students any vocabulary they will need in order to understand the articles/sources. Pre-assign groups of three to five students to maximize participation and engagement for each student. Before the visit to Duke Farms, students should have completed the study guides on the assigned article(s). (NOTE: It is important for teachers to determine their own goals/objectives when deciding which and how many articles/sources to assign to students.)

Suggested Groupings of Sources:

GROUP A

Invasive Plant Management at Duke Farms

1. "Duke Farms Invasive Plant Management Plan: August 2008" (Challenge Source)
http://www.dukefarms.org/Documents/Images/Stewardship/Research/Final_Invasive_Plan_August_2008.pdf
2. "Duke Farms and Rutgers: Perfect Together"
<http://urwebsrv.rutgers.edu/magazine/archive1013/departments/fall-2012/on-the-banks/duke-farms-and-rutgers-perfect-together>

GROUP B

Invasive Plant Management in New Jersey

1. "Frequently Asked Questions—New Jersey Invasive Species Strike Team"
<http://njisst.org/faq.htm>
2. "Critical Plant Invasives and Their Removal"
<http://www.dukefarms.org/en/Stewardship/Stewardship-on-a-Smaller-Scale1/Invasive-Plants-NEW/>
3. "Guide to Controlling Non-Native Invasive Plant Species on New Jersey's Natural Lands"
<http://www.njaudubon.org/Portals/10/IBBA/PDF/NJAS%20Invasive%20Plant%20Species%20booklet%20proof6.pdf>

GROUP C

General Information

1. "The Impact of Invasive Species"
<http://www.pbs.org/wgbh/nova/nature/impact-invasive-species.html>
2. "Causes and Consequences of Invasive Plants in Wetlands: Opportunities, Opportunists, and Outcomes"
http://www.globalrestorationnetwork.org/uploads/files/LiteratureAttachments/60_causes-and-consequences-of-invasive-plants-in-wetlands.pdf
3. "The 10 Purest Places on Earth"
http://www.nbcnews.com/id/42721506/ns/technology_and_science-science/t/purest-places-earth/#.U_DXUix0zIU

GROUP D

A Different Perspective: Are invasive species always detrimental?

1. "Hey, You Calling Me an Invasive Species?" (Challenge Article)
http://www.nytimes.com/2013/09/08/opinion/sunday/hey-you-calling-me-an-invasive-species.html?_r=0
2. "Controversial 'Alien' Plant Species Are Fighting Toxic Waste At Liberty State Park"
http://gothamist.com/2014/05/08/toxic_waste-killing_plants.php
3. "Rutgers Researchers Study Pollution in Liberty State Park"
http://www.nj.com/newark/index.ssf/2009/01/rutgers_researchers_study_poll.html

GROUP E

Opposing Viewpoints: Dismantling Duke Farms' indoor gardens

1. Duke Farms Website—"Greenhouses"
<http://www.dukefarms.org/en/About-Us/History/Architecture/Greenhouses/>
2. "Doris Duke's Storied Gardens Are No More"
<http://online.wsj.com/news/articles/SB121192910041724297>
3. "End of an Era: Bloggers Debate the Dismantling of Duke Gardens"
http://blog.nj.com/jerseyblogs/2008/05/end_of_an_era_bloggers_debate.html
4. "Transformation Includes Sacrifice"
<http://www.nytimes.com/2008/05/08/garden/08garden.html>

GROUP F

Images of Some Invasive Plant Species That Remain a Problem at Duke Farms

1. Lesser Celandine
https://www.google.com/search?q=image+lesser+celandine&source=lnms&tbn=isch&sa=X&ei=3Fv0U7LeG5S3yASHpoKgCw&ved=0CAYQ_AUoAQ&biw=1098&bih=546
2. Mugwort
https://www.google.com/search?q=image+lesser+celandine&source=lnms&tbn=isch&sa=X&ei=3Fv0U7LeG5S3yASHpoKgCw&ved=0CAYQ_AUoAQ&biw=1098&bih=546#q=image+mugwort&tbn=isch
3. Wisteria
https://www.google.com/search?q=image+lesser+celandine&source=lnms&tbn=isch&sa=X&ei=3Fv0U7LeG5S3yASHpoKgCw&ved=0CAYQ_AUoAQ&biw=1098&bih=546#q=image+wisteria&tbn=isch

FIELD TRIP PROCEDURE

Introduction (5 minutes):

Assemble all students in the Farm Barn Orientation Center. Here you can obtain Duke Farms maps. Please use this time to have students use the restroom as facilities are limited once you head out into the field. Explain to students that they are at Duke Farms, a property dedicated to protecting and creating habitats for native plants and animals. Please remind your students that Duke Farms was created for the animals, and that you are visitors to the animals' homes.

Today the students will visit several locations on the grounds: Orientation Center Classroom, Habitat Lane-Dukes Brook path, Duke Reservoir, Old Foundation Way, Oak Woods-Dragonfly Pond-Research Woods area. Discuss with students the primary objectives of the lesson and ask them to keep those objectives in mind. Explain to students that they will hear a brief introduction from a Duke Farms Education or Stewardship staff member about the history of Duke Farms and the ongoing issue of reclamation of the land from invasive species. Explain that at each field location, students will use their resources to identify the invasive species in various locations around the property. Students can be challenged to draw inferences about the presence of these plants amidst native species. Students will then return to the Orientation Center Classroom do a culminating activity using their reading notes (previously completed), their notes from the earlier presentation from the Duke Farms Education or Stewardship staff member, and their own field observation notes to develop their own evaluations of the articles/sources they have read. These study guides will be used to prepare a final formal or informal group presentation (note: teachers may also assign individual presentations) back in the classroom.

Activity (2.5 to 3 hours, including hiking time, depending on groupings):

1. Students will gather in the Classroom and prepare to take notes on the presentation given by the Duke Farms Education or Stewardship staff member. Inform students that they will be responsible for sharing and using these notes in post-field trip activities. (30 minutes)
2. Teachers may first ask for some quick feedback on what students learned/noted before heading out into the field. Students should visit the lavatory as the hike will take 1½ to 2 hours.
3. Students move to Habitat Lane and along Dukes Brook to observe the occurrence of Lesser Celandine. Encourage students to refer to their notes for images and descriptions of the plant. (Note: Teachers may want to consult previously with a Duke Farms Education or Stewardship staff member as to specific locations of invasive plant species.)
4. Students will hike along Habitat Lane to the Blue Boy Statue and turn right onto West Lane (almost a mile from the Orientation Center; time will vary depending upon how much time students take to observe along the way, 30-45 minutes).
5. To the west of West Lane/West way, especially around Duke Reservoir, students will have the opportunity to observe many invasive plant species. Have them refer to their notes from the orientation presentation (Duke Farms Education or Stewardship staff member) to see what they can observe in this living laboratory.
6. Students will turn right at the north end of Duke Reservoir/Vista Lake (a bit more than ¼ mile from Blue Boy Statue) onto Old Foundation Way. Groups have the option of enjoying Mermaid Pool and Great Falls Viewing Area along the way.
7. Students will view the enormous Old Foundation to observe how nature is reclaiming this manmade structure.

8. Travel along Old Foundation Way to Orchid Range Way to its terminus on Railroad Way where groups will turn left towards Research Woods, Oak Woods, and Dragonfly Pond. (The Dragonfly Pond destination entails almost a mile of walking from the point at which groups turned onto Old Foundation Way. Hiking times will vary based on how much time groups take to stop and observe.)
9. Students should observe the following:
 - a. That most of the meadow areas have been reclaimed (are now populated by native plant species rather than overrun with invasive species).
 - b. That parts of Oak Woods, Research Woods, and Dragonfly Pond have been reclaimed.
 - c. That the invasive Wisteria vine and Mugwort (refer students to their packets and notes to help with identification) can still be found in a corner of Research Woods. (Refer students to their orientation notes for specifics about the location of these plants. Challenge them to be good detectives!)
10. Students will then follow the mapped route back along Railroad Way to Central Way to return to the Farm Barn Orientation Center for the conclusion activity. This walk covers almost one mile and should take 20-30 minutes—students may want to view the statue garden in the ruins of the Hay Barn foundation.
11. **NOTE: Teachers should keep an eye on the time! The property is engaging and extensive, and with so much to see, the above-outlined tour can take two or more hours. Unfortunately, student enthusiasm may need to be corralled in order to make it back to the Orientation Center on time.**
12. **CONCLUSION:** Students will come back together again in their small groups (either in the Orientation Center classroom or back in their own classrooms if time is tight) to complete the Post-Hike Response Sheet (Page 11, Appendix). (30 minutes)
13. **VARIATION:** Groups with limited time may wish to go directly to the Research Woods area from the Habitat Lane/Dukes Brook location by making a right from Habitat Lane onto Railroad Lane. This hike would take under an hour. Teachers may also want to investigate the use of the tram.

Possible Assessments (should be tailored to student experience/skill level):

1. Students may write an explication paper on any of the articles/sources to demonstrate their comprehension and to pose questions raised by the article/source.
2. Students may do further research to find written sources on the topic of invasive species in their own communities.
3. Students may write a comparison/contrast paper based on two or more texts.
4. Students may prepare a visual project (Powerpoint, Prezi, other...) in which they compare two or more of the texts read and/or their notes/observations from their Duke Farms experience – SmartPhone photos could come alive here!
5. Students may collaborate with local garden clubs and government officials to volunteer in community education/reclamation efforts.

6. Students may design a debate/discussion about the definitions of and ramifications of invasive species.
7. Students may prepare a position paper to present arguments on this or other environmental issues.

Resources: (See links under “Pre-visit Activities” above.)

****DISCLAIMER****

Duke Farms serves as a habitat for native plants and animals. Care should be taken when exploring the grounds. Hazards such as open waterways, roadways with bicycles, vehicles and pedestrians, poison ivy and stinging and biting insects are present on the property. Adults are responsible for the minors in their care. Precaution should be taken to avoid prolonged exposure to the sun as well as to biting and stinging insects. Participants should bring water; there are water bottle filling stations in the Farm Barn. Participants should familiarize themselves with potential hazards and prepare accordingly. This is a carry-in, carry-out facility so all garbage created during your program should be taken back with you to your school.

APPENDIX: CLOSE READING OF INFORMATIONAL TEXT -- STUDY GUIDE

Name/Date: _____

BEFORE READING

1. Write out the title of the source (article or report title) using proper punctuation (underline or quotation marks). Teachers may opt to give a mini-lesson on creating an MLA (Modern Language Association) or CSE (Council of Science Editors) citation.

2. Copy the author's (authors') name(s) and credentials:

3. Write down the source for the article (newspaper, magazine, website [note its sponsor/publisher], etc.). Use proper punctuation (underline/quotation marks):

4. What is the date of publication/update? _____

5. Finally, make some inferences below about the credibility of this source. Is it reliable? Will the information be valid? Below is a partial list of factors one should keep in mind when determining credibility (adapted from <https://owl.english.purdue.edu/owl/resource/588/02/>):

- a. What are the credentials and affiliations of the author(s)? Is the source used/reviewed by peers of the author?
- b. How recent is the source? (This is more important in technical fields of study.)
- c. For what purpose(s) did the author(s) write the piece?
- d. What type(s) of source(s) are the most appropriate for the research question or the area of interest?

6. What do you already know or think you know about the topic of this source? Do not be afraid to be "wrong" here. Part of the purpose of asking yourself this question is to get your brain ready to learn new information, so any connections you can make to what you already think will help you increase your learning.

PREPARING TO READ

1. Skim the title and the first and last paragraphs of the piece. In a few phrases or a brief sentence, make a guess as to what the piece is about. (Spend only a minute or so doing this.)

2. Skim the entire piece to determine the tone in which it is written. Describe the tone (see Attachment, p. 10 for some adjectives that describe tone) and write down a few adjectives below. BRIEFLY, explain your choices, referring to the text in your explanation.

3. Notice some of the “messages” you are giving yourself about reading this piece. These are your “biases” and it will be helpful to you as a learner to notice your own biases. Write down several of your first reactions to the piece (i.e. “This is too long...too hard or boring for me to read...I’ll never understand it...I will feel/look stupid...This is too elementary....too fanatical....too technical...”). If you are already well-versed in the topic, you may have more refined reactions such as, “The information seems different from/the same as information from other sources..., etc.”). **Do not let your biases interfere with learning. Be open-minded; you can learn something—no one can learn everything. Believe that if you educate yourself, you can help change the world!**

4. Finally, make an inference about the author’s purpose (Circle one or more—explain your choice based on the text):

INFORM

ENTERTAIN

PERSUADE

ARGUE

DURING READING (STUDENTS MUST ANNOTATE THE TEXT AS THEY READ. Students may highlight and make marginal notes [comments/questions] on a print copy of the source. Students with access to technology might opt to create electronic documents on which they can digitally highlight and record marginal comments.) (DO YOUR WORK ON SEPARATE PAPER.)

Topic(s): Identify the main topic(s).

Main Ideas: Highlight main ideas as you read, then summarize each of the most important ideas in your own words.

Tone/Style: Use the lists of tone descriptions (found on next page...follow the link to the website!) to determine the tone.

- a. Write down one, two, or three descriptions, then SUPPORT your analysis by copying direct quotes from the text to “prove” your point. Be sure to put direct quotes in quotation marks!
- b. **Pay particular attention to how the author’s choice of tone helps to reveal his/her bias.** Describe the author’s point-of-view (bias) then write down examples from the text to support your opinion.

Form/Structure of Article/Source:

- a. What form did the author choose?
(Conventional prose...Textbook style with headings, charts, photographs... Question/Answer...other?)
- B. What structure?
(Description...problem/solution...time/order chronological...comparison/contrast... cause/effect...other?)

Directions: Circle choices for form and structure, then in a sentence or two, give your opinion on how effective the form structure is in helping you understand the author’s message.

Author’s Purpose: Remember that you made some guesses before you read about what the author’s purpose was in writing this piece? What do you think now?

INFORM

ENTERTAIN

PERSUADE

ARGUE

Is your analysis after you read different from the inference you made before you read?

Why? Why not?

WORDS TO DESCRIBE TONE

I. This link provides wonderful suggestions for words to describe tone.

<https://english101-martin.wikispaces.com/Author's+Tone+Words>

II. This list provides other terms with only some crossover with the list linked above.

absurd	earnest	objective
afraid	ecstatic	optimistic
agitated	encouraging	outraged
aggravated	enthusiastic	outspoken
ambivalent	excited	paranoid
amused	facetious	passive
angry	formal	persuasive
apathetic	frenetic	pessimistic
apologetic	friendly	playful
appreciative	frustrated	pleading
arrogant	ghoulish	pleasant
artificial	grim	proud
authoritative	happy	questioning
bemused	hard	reverent
bitter	harsh	ridiculous
brash	hating/hateful	righteous
calm	haughty	romantic
caustic	hollow	sad
cheerful	humble	sarcastic
cheery	humorous	satiric
coarse	hurt	scholarly
comic	impassioned	scornful
compassionate	indignant	seductive
condemning	inquisitive	serious
condescending	instructive	sharp
confused	intense	snooty
consoling	ironic	solemn
content	irreverent	soothing
contradictory	joyous/joyful	straightforward
critical	lighthearted	superficial
cynical	loud	surprised
dejected	loving	sweet
depressed	malicious	sympathetic
desperate	manipulative	tragic
detached	melancholic	uninterested
disappointed	miserable	upset
disgusted	mocking	vibrant
disinterested	nervous	vindictive
distressed	nostalgic	whimsical
dreamy	numb	wistful

Adapted from
<http://faculty.valencia.cc.fl.us>

POST-HIKE RESPONSE SHEET

Objective: The primary purpose of this lesson and field trip has been to practice your close reading skills, though certainly you have learned something about the issues surrounding invasive plant species!

Task:

- I. Working with your group-mates, review the following:
 - a. the objectives for the field trip (copied below)
 - b. the articles/sources and the study guides you prepared before the field trip
 - c. your notes from the orientation presentation
 - d. your field notes

- II. Then write an outline of notes you will use to present to the class a 5-10 minute speech about how successful you have been in accomplishing each of the objectives below. Organize your topics to best appeal to your audience.

Field Trip Objectives

Students will be able to actively read complex informational text, evaluate arguments written about a contemporary issue (invasive plant species), and observe environments in various states of reclamation at Duke Farms. Students will be able to:

- read critically and discuss several articles on the topic of invasive species
- analyze the authors' purposes using study guides
- interpret and develop arguments in small and large groups
- evaluate the reliability of sources by identifying rhetoric and other information
- observe and draw inferences about the ramifications of invasive species in a living laboratory (Duke Farms).