

9-12 ELA Researching Solutions to Environmental Problems



Brooke Lewis-Slamkova
Apalachee High School Educator and [Maple Park Homestead](#) Farmer

Overview:

This lesson will challenge students to identify an environmental issue and provide possible solutions to the issue using research and persuasive writing. The lesson will begin with several clips from news sources about a variety of problems that could be solved using legumes. Though students are not given that information at the beginning, students are encouraged to seek as many viable solutions as possible. Teachers will then introduce the possibility of using legumes to decrease the use of fertilizers. Students will be guided through the writing process. They will use specific evidence cited correctly using MLA format.

(Time Needed: 4-6 class periods with option to do additional work outside of class.)

Standards:

- ELAGSE9-10RL1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
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- ELAGSE9-10RI8 Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.
- ELAGSE9-10RI10 By the end of grade 9, read and comprehend literary nonfiction in the grades 9-10 text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 10, read and comprehend literary nonfiction in the grades 9-10 text complexity band independently and proficiently.

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- ELAGSE9-10W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
 - a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.
 - b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level and concerns.
 - c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
 - d. Establish and maintain an appropriate style and objective tone.
 - e. Provide a concluding statement or section that follows from and supports the argument presented.

- ELAGSE9-10W2 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.
 - a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
 - b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic.
 - c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
 - d. Use precise language and domain-specific vocabulary to manage the complexity of the topic.
 - e. Establish and maintain an appropriate style and objective tone.
 - f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).

- ELAGSE9-10W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in Standards 1–3 above.)

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- ELAGSE9-10W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language Standards 1–3 up to and including grades 9–10.)
- ELAGSE9-10W6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.
- ELAGSE9-10W7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
- ELAGSE9-10W8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source, answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoid plagiarism and follow a standard format for citation.
- ELAGSE11-12RL1 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.
- ELAGSE11-12RI7 Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.
- ELAGSE11-12RI10 By the end of grade 11, read and comprehend literary nonfiction in the grades 11-CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literary nonfiction in the grades 11-CCR text complexity band independently and proficiently.

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- ELAGSE11-12W1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
 - a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.
 - b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.
 - c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.
 - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
 - e. Provide a concluding statement or section that follows from and supports the argument presented.
- ELAGSE11-12W4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in Standards 1–3 above.)
- ELAGSE11-12W5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language Standards 1–3 up to and including grades 11-12.)
- ELAGSE11-12W6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
- ELAGSE11-12W7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

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- ELAGSE11-12W8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
- ELAGSE11-12W9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
 - a. Apply grades 11–12 Reading standards to literature (e.g., “Demonstrate knowledge of eighteenth-, nineteenth- and early twentieth-century foundational works of American literature, including how two or more texts from the same period treat similar themes or topics”).
 - b. Apply grades 11–12 Reading standards to literary nonfiction (e.g., “Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents) and the premises, purposes, and arguments in works of public advocacy (e.g., The Federalist, presidential addresses]”).

Objectives:

- Students will research the Mississippi River Basin dead zone to identify the problem.
- Students will research possible causes and solutions to the problems.
- Students will include at least one use of legumes in their argument.
- Students will write one persuasive essay that utilizes cited research for the Mississippi River Basin issue.

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Materials:

- Dead Zone Powerpoint
- <https://www.nature.org/ourinitiatives/habitats/oceanscoasts/howwework/dead-zone-slides-how.xml>
- <http://captaingino.com/mississippi-river-meets-the-gulf-of-mexico-no-oxygen-no-life-the-gulf-of-mexicos-dead-zone/>
- <https://www.nature.org/ourinitiatives/regions/northamerica/areas/gulfofmexico/explore/gulf-of-mexico-dead-zone.xml>
- <https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/journeywithnature/gulf-hypoxia.xml>
- <http://news.stanford.edu/news/2010/february22/legumes-nitrogen-fertilizer-022610.html>
- Access to technology for research and essay submission.
- [Research Data Graphic Organizer](#)
- [MLA information](#)
- [Rubric](#)

Outline:

- Engage: Students will get introduced to the topic with the Dead Zone Powerpoint and websites listed in the materials section.
- Explore: Students will use the [Research Data Graphic Organizer](#) to explore causes and solutions.
- Explain: Teacher will lead group discussion using [Stanford article](#).
- Independent work: Students will write essay.
- Extend: Students may use essay in personal ways to make a difference.
- Evaluate: Using a [rubric](#), teacher will grade essays.

Lesson Plan:

- Engage:
 - Show students the first 3 resources in the materials section (Dead Zone Powerpoint, [Mississippi River Meets The Gulf of Mexico Dead Zone](#) and [The Floods' Lingering Effects](#). Ask students how they feel about the dead zone. How do they think this affects wildlife, humans, and the environment? Create a dialogue about this issue as a class. They can then pair up or work independently to brainstorm why they think it has happened and possible solutions.

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- Explore:
 - Using the [graphic organizer](#), students will research the topic of the Mississippi River Basin and identify primary causes and possible solutions. The graphic organizer is provided to help students organize their thoughts.
- Explain:
 - Students will share with the class or in small groups what they have found. Teacher will monitor the discussions and when someone discusses lessening the use of chemical fertilizers, teacher will stop discussion and share the [Stanford article](#) with the class. Together, the class will read and annotate text for key ideas. Teacher will discuss the importance of legumes as the one plant that makes nitrogen available to other plants and the idea of crop rotation. Students will then be instructed to write their persuasive essays with the idea that they will be shared with the school newspaper, class website, or as a presentation.
- Extend:
 - Students can extend their learning by using this information in their science fair project, capstone presentation, or submitting their essay to the local newspaper.
- Evaluate:
 - Use your own rubric or download from the materials list