

Silent Spring: A Fable For Tomorrow?



by Amy Klein

Students will read excerpts from the book Silent Spring by Rachel Carson and research the risks and benefits of DDT. Students will then pretend that they are living in 1962 when the book was published, and write a letter to their senator arguing whether or not the government should ban DDT based on the evidence presented in Carson's book and their own research.

Designed for an AP environmental course, this module would be taught in conjunction with a unit on pesticides and toxicology. It engages what may be the single most seminal text for the environmental movement and assesses the quality of the evidence used in its arguments.

This module is paced to take roughly eleven hours of classroom time, or thirteen fifty-minutes periods. It was created by Amy Klein Wesselman (working with Michelle Buroker, Renee Boss, and Susan Weston) in the Summer 2013 Science Design Jam and is shared with special thanks to the Kentucky Education Association for the use of their Lexington facilities.

GRADES

DISCIPLINE

COURSE

PACING

10 - 12

△ Science

AP

(-) N/A

Environmental Science

Section 1: What Task?

Teaching Task

Task Template A4 - Argumentation

Based on the evidence that was available in 1962, should the U.S. government have banned the use of DDT? After reading excerpts from the book "Silent Spring" by Rachel Carson, write a letter to your senator in which you argue whether Carson's work justifies a federal ban. Support your position with evidence from the text/s. Be sure to acknowledge competing views.

Standards

Custom Standards

Advanced Placement Environmental Science, apstudent.collegeboard.org/apcourse/ap-environmentalscience/course-details

4. Humans alter natural systems. • Humans have had an impact on the environment for millions of years. • Technology and population growth have enabled humans to increase both the rate and scale of their impact on the environment.

Advanced Placement Environmental Science, apstudent.collegeboard.org/apcourse/ap-environmentalscience/course-details

5. Environmental problems have a cultural and social context. • Understanding the role of cultural, social, and economic factors is vital to the development of solutions.

Next Generation Science Standards

HS-LS2-3

Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

HS-LS2-5

Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

HS-LS2-6 Focus

Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

HS-LS2-7

Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and

biodiversity.

HS-LS2-8

Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

RST.11-12.1

Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

RST.11-12.2

Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

RST.11-12.3

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

RST.11-12.7

Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

RST.11-12.8

Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

RST.11-12.9

Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

RST.11-12.10

By the end of grade 12, read and comprehend science/technical texts in the grades 11—CCR text complexity band independently and proficiently.

WHST.11-12.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHST.11-12.5

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.

WHST.11-12.7

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.

WHST.11-12.9

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

WHST.11-12.10

Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

WHST.11-12.1.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 the claim(s), counterclaims, reasons, and evidence.

WHST.11-12.1.b

Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases.

WHST.11-12.1.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.

WHST.11-12.1.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.

WHST.11-12.1.e

Provide a concluding statement or section that follows from or supports the argument presented.

WHST.11-12.1

Focus

Write arguments focused on discipline-specific content.

Texts

Silent Spring, by Rachel Carson (1962)
Reading Chapters 1-3, 11, and a quick skim of case studies in chapters 4-9

% American Experience "Rachel Carson's Silent Spring" (5 minute segment)

Sample 1 Rx for Survival, "Eradicating Malaria with DDT" (4 minute segment)

Student Work Rubric - Argumentation Task - Grades 9-12

	Emerging	Approaches Expectations	Meets Expectations	Advanced
	1	2	3	4
Controlling Idea	Makes a general claim with an unclear focus.	Establishes a clear claim that addresses the prompt, with an uneven focus.	Establishes and maintains a clear, specific, and credible claim that addresses all aspects of the prompt.	Establishes and maintains a precise, substantive claim that addresses all aspects of the prompt. Acknowledges limitations and/or the complexity of the issue or topic.
Selection & Citation of Evidence	Includes minimal details from sources. Sources are used without citation.	Includes details, examples, and/or quotations from sources that are relevant to the claim. Inconsistently cites sources.	Includes details, examples, and/or quotations from sources that support the claim and supporting ideas. Consistently cites sources with minor formatting errors.	Includes well-chosen details, examples, and/or quotations from sources that fully support the claim and supporting ideas. Consistently cites sources using appropriate format.
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.	Explains ideas and source material to support the argument, with some incomplete reasoning or explanations.	Accurately explains ideas and source material and how they support the argument.	Thoroughly and accurately explains ideas and source material, using logical reasoning to support and develop the argument.
Organization	Lacks an evident structure. Makes unclear connections among claims, reasons, and/or evidence.	Groups ideas and uses transitions to develop the argument, with some lapses in coherence or organization.	Groups and sequences ideas to develop a cohesive argument. Uses transitions to clarify the relationships among claim(s), reasons, and evidence.	Groups and sequences ideas in a logical progression in which ideas build to create a unified whole. Uses varied transitions to clarify the precise relationships among claim(s), reasons, and evidence.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.	Errors in standard English conventions sometimes interfere with the clarity of the writing. Uses language and tone that are sometimes inappropriate for the audience and purpose.	Consistently applies standard English conventions; minor errors, while noticeable, do not interfere with the clarity of the writing. Uses language and tone appropriate to the audience and purpose.	Consistently applies standard English conventions, with few errors. Demonstrates varied syntax and precise word choice. Consistently uses language and tone appropriate to the audience and purpose.
Content Understanding (Generic)	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.	Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.	Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

Background for Students

Rachel Carson is widely credited with starting the environmental movement when she published her book Silent Spring in 1962. In the main part of the book, Carson discusses pesticides and the effect that is has on all sorts of life. She came to the conclusion that pesticides, namely DDT, were harming birds, fish and animals, polluting our waterways as well as contaminating the entire world's food supply. Before Silent Spring was published, the overuse of pesticides was not important in the minds of most US Citizens but she highlighted frightening consequences that were difficult to ignore. Despite this, the chemical industry that made these pesticides as well as the general public disputed Carson and her work claiming that it was not supported by scientific evidence. Was Carson's work an example of alarmists in the environmental movement, or was the government correct in banning the use of DDT?

Extension

Not provided

Section 2: What Skills?

Preparing for the Task

TASK ENGAGEMENT: Ability to identify compelling features of an issue in the discipline **SCORING EXPECTATIONS**: Ability to understand and explain what will count as a strong response to the teaching task prompt.

Reading Process

SUMMARIZING: Ability to summarize complex concepts, processes, or information by paraphrasing them in simpler but still accurate terms. (RST.2)

EXTRACTING EVIDENCE: Ability to draw evidence from informational texts to support analysis, reflection, and research. (WHST.9)

INTEGRATING INFORMATION: Ability to integrate and evaluate multiple sources of information presented in diverse formats and media in order to address a question or solve a problem. RST.7 **EXTRACTING EVIDENCE**: Ability to draw evidence from informational texts to support analysis, reflection, and research. (WHST.9)

Transition to Writing

CONNECTING IDEAS: Ability to begin linking what has been learned in reading to what will be shared in writing.

Writing Process

INTRODUCING CLAIM: Ability to introduce precise, knowledgeable claim and establish the significance of the claim. (WHST.1a)

ORGANIZING REASONS & EVIDENCE: Ability to create an organization that logically sequences the claim, counterclaims, reasons, and evidence. (WHST.1b)

SUPPORTING CLAIM: Ability to develop claim and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out strengths and limitations of both claim and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. (WHST.1b)

CONCLUDING: Ability to provide a concluding statement or section that follows from or supports the argument presented (WHST.1e)

REWRITING: Ability to develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (WHST.5)

Section 3: What Instruction?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES	
Preparin	Preparing for the Task				
50 mins	TASK ENGAGEMENT: Ability to identify compelling features of an issue in the discipline	QUICK WRITE After reading chapter 1, A Fable for Tomorrow, answer the Reading Guide questions (attached)	None	 Students will independently read the first chapter of Silent Spring and answer the quick write questions. Students will then work in pairs to share their answers and add any new insights gained from their collaboration. Students will then share out their ideas in class discussion. Students will then work in groups of 4 to answer the 3rd quick write question. Groups will share their thoughts in a whole class discussion. (Possible answers:climate change, human population growth, energy crisis, genetically modified foods, etc.) 	
	Additional Attachments: Reading Guide: A Fable For Tomorrow				
30 mins	SCORING EXPECTATIONS: Ability to understand and explain what will count as a strong response to the teaching task prompt.	T-CHART After reading the background information and teaching task, complete a T-Chart in which you list what you already know about the subjects of Rachel Carson, pesticides and DDT, as well as what you need to know in order to successfully complete the task.	None	 Teacher will present students with the background information and teaching task. Students will read both and complete the T-Chart. Students will share their answers in whole group discussion as the teacher writes responses on the board. Teacher will answer questions and clarify timetable for the task. 	
Reading	Reading Process				
50 mins	SUMMARIZING: Ability to summarize complex concepts, processes, or information by paraphrasing them in simpler but still accurate terms. (RST.2)	MARGIN NOTES Annotate your copy of the "Elixirs of Death" chapter.	Work meets expectations if: Margin notes with credible responses.	 Before students read chapter 3 of Silent Spring titled "Elixirs of Death," teacher will model the strategy of margin notes on the document camera. Students will work with a partner to summarize the first 3 pages. Partners will share out their notes in whole class discussion: students should add new information/insights to their notes. Students will work independently on the next 3 pages and again share out in class discussion. Any new insights gained should be added to their margin notes. The students will complete margin notes for the rest of the chapter for homework. They will share out in the next class period as teacher clarifies any questions or misunderstandings. 	
50 mins	SUMMARIZING:	MINI-POSTER AND	Work meets	Students will work in groups of 3-4 to analyze the	

	Ability to summarize complex concepts, processes, or information by paraphrasing them in simpler but still accurate terms. (RST.2)	NOTES Questions for each group: 1. Explain the negative impacts of DDT/pesticides presented in the chapter you have been assigned. 2. Describe anything that you find particularly interesting, tragic, infuriating, etc. or one or more that personally resonates with you (because of where you live or a kind of organism you are passionate about)?	expectations if mini posters contain credible information (Individual student notes will not be scored.)	 case studies presented in chapters 4-9 of Silent Spring. Students will be assigned a chapter at random. They will skim the chapter using the guiding questions provided to gather important information. Next, they will make a mini poster of the information they find and present their finding to the class in a 5 minute presentation. Other groups will take notes as information is being presented.
50 mins	EXTRACTING EVIDENCE: Ability to draw evidence from informational texts to support analysis, reflection, and research. (WHST.9)	READING GUIDE Answer the probing questions in the Reading Guide handout (attached)	Work meets expectations if: Reading guides are completed with credible answers.	 Students should come into class having read the 2nd half of chapter 11 of Silent Spring on their own with the guiding questions answered. Students will work with a partner to compare their answers, adding any new information to their own answers. Students will then share out in whole group discussion.
	Additional Attachments:	oing Questions		
50 mins	INTEGRATING INFORMATION: Ability to integrate and evaluate multiple sources of information presented in diverse formats and media in order to address a question or solve a problem. RST.7	VIEWING GUIDE. As you watch the video, find and write down answers to the viewing guide questions.	Work meets expectations if: Answers questions with credible response.	 Students will watch the two videos, taking notes as on the Viewing Guide (attached), Students will then discuss their answers in whole class discussion. Hopefully this will generate discussion about the risks and benefits of the use of DDT.
	Additional Attachments:			
	■ Viewing Guide: Ident	tifying Additional Informatio	n	
30 mins	EXTRACTING EVIDENCE: Ability to draw evidence from informational texts to support analysis, reflection, and research. (WHST.9)	T-CHART Now that you have read about Rachel Carson and DDT, fill out a T-Chart in which you list the risks on one side and the benefits on the other.	Work meets expectations if: T-Chart is completed with credible answers.	Students will first work independently on this minitask and the next one, then share responses to both in class discussion.
20 mins	EXTRACTING EVIDENCE: Ability to	GRAPHIC ORGANIZER Complete a 2nd graphic	Work Meets Expectation if:	Graphic Organizer • Students will then work in groups of 3-4 to share

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	draw evidence from informational texts to support analysis, reflection, and research. (WHST.9)
Transitio	on to Writing
50 mins	CONNECTING IDEAS: Ability to begin linking what has been learned in reading to what will be shared in writing.
Writing	Process
50 mins	INTRODUCING CLAIM: Ability to introduce precise, knowledgeable claim and establish the significance of the claim. (WHST.1a)

organizer that has several claims presented by Rachel Carson. For each claim, give at least 1 piece of evidence for that claim. Be prepared to share your answers.

Graphic organizer is complete with credible answers.

- their responses and add any new information/insights to their lists.
- · Groups will then share out in whole class discussion.

QUICK WRITE

In a quick write, write about what you know now that you've read about Rachel Carson and the use of DDT.

None

Review professional or other samples of writing type and structure. Students will deconstruct and evaluate an argumentative piece about DDT using the rubric to guide critique.

- Demonstrate pattern of development (from most important to least important)
- Note the difference between an explanation and an argument.
- Evaluate effectiveness- Do you get the information and explanation you expect? Why?
- Discuss the process for writing the essay.

OPENING PARAGRAPH

Write an opening paragraph that includes a controlling idea and sequences the key points you plan to make in your composition, using the Opening Paragraph Practice handout

Scoring Guide: work meets expectations if:

- Writes a concise summary statement or draft opening.
- Provides direct answer to main prompt requirements.
- Establishes a controlling idea.
- Identifies key points that support development of argument.

- Before students write their opening paragraph, review qualities of a strong claim as a class: must be an argument, include simple defense of the argument and include categories that lead reader to organize essay.
- In pairs, students will edit sample claim statements provided by the teacher. As a class, go over thesis statements, asking volunteers to identify the strong and weak characteristics of each statement.
- Review the qualities of a strong opening paragraph: HOTT: hook, overview, thesis, transition.
- In pairs, students share their opening paragraph and claim statement. Volunteers share theirs with the class for critique.

Additional Attachments:

Paragraph Practice

50 mins

REASONS & EVIDENCE: Ability to create an organization that logically sequences the claim, counterclaims, reasons, and evidence. (WHST.1b)

ORGANIZING

OUTLINE

After observing a model outliner, create an outline based on your notes and reading in which you state your claim, sequence your points, and note your supporting evidence.

Work meets expectations if:

- Creates an outline or organizer.
- Supports controlling idea. Uses evidence from texts read earlier.
- In whole group instruction, model a sample outline (option included in handout)
- Students independently write an outline using the template (included in handout)
- In small groups, students share how they will organize their essays

	Additional Attachments:			
	Essay Outline Handouts			
30 mins	SUPPORTING CLAIM: Ability to develop claim and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out strengths and limitations of both claim and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. (WHST.1b)	GRAPHIC ORGANIZER Use the graphic organizer to identify your major points and the evidence to support each one.	Work meets expectations if it: Identifies major points Supports each point with sound evidence Considers and addresses important counterclaims.	 In whole group instruction, model how to fill out the graphic organizer Students independently use the graphic organizer to make claims and give evidence for the claims that they will use in their letter. In small groups, students share their graphic organizers.
50 mins	SUPPORTING CLAIM: Ability to develop claim and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out strengths and limitations of both claim and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. (WHST.1b)	BODY PARAGRAPHS Working from your outline, develop paragraphs that state each of your points and that support each one with evidence.	Work meets expectations if it: Makes a clear sequence of points Gives compelling evidence from texts for each claim.	
50 mins	concluding: Ability to provide a concluding statement or section that follows from or supports the argument presented (WHST.1e)	CLOSING PARAGRAPH Write a closing paragraph that includes a controlling idea and sequences the key points you plan to make in your composition	Work meets expectations if the conclusion stresses the importance of the thesis statement, gives the letter a sense of completeness, and leaves a final impression on the reader.	 First, teacher will go over an example of a good conclusion paragraph in whole group instruction, asking students for qualities that make it a strong conclusion. Teacher will then present strategies for writing a concluding paragraph. Students will independently write a concluding paragraph. Students will trade paragraphs with a partner to receive feedback.
50 mins	REWRITING: Ability to develop and strengthen writing as needed by	ROUGH DRAFT Revise draft to have sound spelling,	Work meets expectations if:	Create stations where students can get guidance on certain aspects of the essay; introduction, claim, evidence/analysis, and conclusion. Assign a strong

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planning, revising, editing, rewriting, or trying a new approach. (WHST.5)	capitalization, punctuation, and grammar. Adjust formatting as needed to provide clear, appealing text.	 Provides complete draft with all parts. Supports the opening in the later sections with evidence and citations. Improves earlier edition. 	student-writer at each station to help guide discussion and provide peer review. Teacher spends time at each station assisting students.
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Instructional Resources

No resources specified

Section 4: What Results?

Student Work Samples

No resources specified

Teacher Reflection

For the current teaching task, the issue is simply whether Carson makes her case. For a larger unit on pesticides, it would be important to read a later contrary piece arguing that DDT can still play a valuable role, such as Tina Rosenberg, "What the World Needs Now is DDT," in the *New York Times Magazine*, April 11, 2004, www.nytimes.com/2004/04/11/magazine/what-the-world-needs-now-is-ddt.html? pagewanted=all&src=pm