**Common Core Standards Annotated Teaching Sample for Grades 9-12**

**Article Title: *Genetic evidence clears Ben Franklin***

**Learning Objective**: The goal of this one to two day close reading is to give students the opportunity to **use text craft and structure** in figuring out **the key ideas** **and details** of this article. Reading and re-reading this informational article, students will mark closely how the writer connects **text structure and idea development** to concisely express the meaning of the article. Teaching students to recognize the ways a writer weaves together the mutually dependent elements of form and idea in the expression of meaning is another component of close reading and may be used with many other text exemplars.

**When combined with writing about the text, along with teacher feedback, close reading provides students a deeper knowledge of how important text craft and structure can be in the expression and comprehension of key ideas and details.**

**Reading Task***:* Students will silently read the address, first independently, and then following along with the text as the teacher reads aloud. The teacher will then lead students through a set of concise, text-dependent questions which will lead students back into the text to reread selected sections to understand the ideas in the text, and secondarily, to discovery how the text structure helps to introduce key ideas and meaning in each section.

**Vocabulary Task**: The meanings of words in this selection may be discovered from careful reading of the context in which they appear. This practice ensures vocabulary development and reading endurance. Read the end of the lesson for more ideas.

**Discussion Task***:* Students will discuss the articles in depth with their teacher and their classmates, performing activities that result in a close reading of the text. The goal is to foster student confidence when encountering complex text and to reinforce the skills they have acquired regarding how to **use text structure and vocabulary to build and extend their understanding and comprehension of a text.**

**Writing Task**: Students will analyze the Ben Franklin text in response to one of two prompts. Students may be afforded the opportunity to rewrite their explanation or revise their paraphrase after participating in classroom discussion, **allowing them to refashion their own texts using some of the techniques learned in the close reading and/or including some of the ideas discussed in class during the close reading.**

**Text Selection:** This selection, while brief, examines a writer’s effort to explain the problem of invasive tallow trees in the US, how scientists have learned distinctions among several species, and how this new knowledge presents new questions to be addressed due to the likelihood of future invasive species to the US.

**Outline of Lesson Plan**: This lesson can be taught in one or two days of instruction and reflection on the part of students and their teachers, with the possibility of adding an additional day devoted to peer review, extended research, and revision of the culminating writing assignment. **[The following CCS standards are the focus of this exemplar: LACC.910.RI.1-6; LACC.910.W.1, 4, and 5.]**

Genetic evidence clears Ben Franklin

 [*709 Words; 11.5 Flesch-Kincaid]*

(1) Invasive tree afflicting Gulf Coast was not brought to US by Ben Franklin.

(2) The DNA evidence is in, and Ben Franklin didn’t do it.

(3) Genetic tests on more than 1,000 Chinese tallow trees from the United States and China show the famed U.S. statesman did not import the tallow trees that are overrunning thousands of acres of U.S. coastal prairie from Florida to East Texas.

(4) “It’s widely known that Franklin introduced tallow trees to the U.S. in the late 1700s,” said Rice University biologist Evan Siemann, co-author the new study in this month’s American Journal of Botany. “Franklin was living in London, and he had tallow seeds shipped to associates in Georgia.”

(5) What Franklin couldn’t have known at the time was that tallow trees would overachieve in the New World. Today, the trees are classified as an invasive species. Like Asian carp in the Great Lakes and kudzu vines in the eastern U.S., the trees are spreading so fast that they’re destroying native habitats and causing economic damage.

(6) Each tallow tree can produce up to a half million seeds per year. That fertility is one reason Franklin and others were interested in them; each seed is covered by a waxy, white tallow that can be processed to make soap, candles and edible oil.

(7) Siemann, professor and chair of ecology and evolutionary biology at Rice, has spent more than 10 years compiling evidence on the differences between U.S. and Chinese tallow trees. For example, the insects that help keep tallow trees in check in Asia do not live in the U.S., and Siemann and his colleagues have found that the U.S. trees invest far less energy in producing chemicals that ward off insects. They’ve also found that U.S. trees grow about 30 percent faster than their Chinese kin.

(8) “This raises some interesting scientific questions,” Siemann said. “Are tallow trees in the U.S. undergoing evolutionary selection? Did those original plants brought from China have the traits to be successful or did they change after they arrived? Does it matter where they came from in China, or would any tallow tree do just as well in the U.S.?”

(9) In 2005, Siemann set out to gather genetic evidence that could help answer such questions. With funding from the National Science Foundation and the Department of Agriculture, he and study co-authors William Rogers, now at Texas A&M University, and Saara DeWalt, now at Clemson University, collected and froze leaves from more than 1,000 tallow trees at 51 sites in the U.S. and a dozen sites in China. The researchers conducted hundreds of genetic scans on the leaves, and they spent more than two years analyzing and correlating the results.

(10) There were a few surprises. First, the tallow trees that are running amok in most of the U.S. aren’t from the batch that Franklin imported. The descendants of Franklin’s trees are confined to a few thousand square miles of coastal plain in northern Georgia and southern South Carolina. All other U.S. tallow trees the team sampled were descended from seeds brought to the U.S. by federal biologists around 1905.

(11) “The genetic picture for Franklin’s trees is muddled; we may never know where they originated,” Siemann said. “But the genetic evidence for the other population — the one that’s problematic in the Gulf Coast — clearly points to it being descended from eastern China, probably in the area around Shanghai.”

(12) In controlled tests in China, the researchers found the U.S. trees even grew and spread faster than their Chinese forebears, despite the lack of chemical defenses to ward off insects.

(13) “They suffered twice the damage from insects that the natives did, but they grew so much faster that they still retained a competitive edge,” Siemann said.

(14) “In some ways, this raises even more questions, but it clearly shows that if you are going to explore control methods for an invasive species, you to need to use appropriate genetic material to make certain your tests are valid.”

(15) Siemann said that with many new species of plants and animals still being introduced from foreign environments into the U.S. each year, it is vitally important for scientists to better understand the circumstances that cause introduced species to cross the line and become dangerous invasive pests.

**Instructional Exemplar for *Generic evidence clears Ben Franklin***

**Summary of Activities**

Teacher introduces the passage and students read it independently;

Teacher then reads the passage out loud to the class and students follow along in the text;

Teacher asks the class a set of guiding questions and tasks about the passage in question;

Teacher assigns homework that asks students to write an analysis of the ideas or an analysis of text structure influencing idea development.

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| **Text under Discussion** | **Directions for Teachers/Guiding Questions For Students** |
| *Genetic* evidence clears Ben Franklin *Invasive* tree afflicting Gulf Coast was not brought to US by Ben Franklin.The DNA evidence is in, and Ben Franklin didn’t do it.Genetic tests on more than 1,000 Chinese *tallow* trees from the United States and China show the famed U.S. statesman did not import the tallow trees that are overrunning thousands of acres of U.S. coastal prairie from Florida to East Texas.“It’s widely known that Franklin introduced tallow trees to the U.S. in the late 1700s,” said Rice University biologist Evan Siemann, co-author the new study in this month’s American Journal of Botany. “Franklin was living in London, and he had tallow seeds shipped to associates in Georgia.”What Franklin couldn’t have known at the time was that tallow trees would overachieve in the New World. Today, the trees are classified as an invasive species. Like Asian carp in the Great Lakes and kudzu vines in the eastern U.S., the trees are spreading so fast that they’re destroying native habitats and causing economic damage.Each tallow tree can produce up to a half million seeds per year. That fertility is one reason Franklin and others were interested in them; each seed is covered by a waxy, white tallow that can be processed to make soap, candles and edible oil.Siemann, professor and chair of ecology and evolutionary biology at Rice, has spent more than 10 years compiling evidence on the differences between U.S. and Chinese tallow trees. For example, the insects that help keep tallow trees in check in Asia do not live in the U.S., and Siemann and his colleagues have found that the U.S. trees invest far less energy in producing chemicals that ward off insects. They’ve also found that U.S. trees grow about 30 percent faster than their Chinese kin.“This raises some interesting scientific questions,” Siemann said. “Are tallow trees in the U.S. undergoing evolutionary selection? Did those original plants brought from China have the traits to be successful or did they change after they arrived? Does it matter where they came from in China, or would any tallow tree do just as well in the U.S.?”In 2005, Siemann set out to gather genetic evidence that could help answer such questions. With funding from the National Science Foundation and the Department of Agriculture, he and study co-authors William Rogers, now at Texas A&M University, and Saara DeWalt, now at Clemson University, collected and froze leaves from more than 1,000 tallow trees at 51 sites in the U.S. and a dozen sites in China. The researchers conducted hundreds of genetic scans on the leaves, and they spent more than two years analyzing and correlating the results.There were a few surprises. First, the tallow trees that are running amok in most of the U.S. aren’t from the batch that Franklin imported. The descendants of Franklin’s trees are confined to a few thousand square miles of coastal plain in northern Georgia and southern South Carolina. All other U.S. tallow trees the team sampled were descended from seeds brought to the U.S. by federal biologists around 1905.“The genetic picture for Franklin’s trees is muddled; we may never know where they originated,” Siemann said. “But the genetic evidence for the other population — the one that’s problematic in the Gulf Coast — clearly points to it being descended from eastern China, probably in the area around Shanghai.”In controlled tests in China, the researchers found the U.S. trees even grew and spread faster than their Chinese forebears, despite the lack of chemical defenses to ward off insects.“They suffered twice the damage from insects that the natives did, but they grew so much faster that they still retained a competitive edge,” Siemann said.“In some ways, this raises even more questions, but it clearly shows that if you are going to explore control methods for an invasive species, you to need to use appropriate genetic material to make certain your tests are valid.”Siemann said that with many new species of plants and animals still being introduced from foreign environments into the U.S. each year, it is vitally important for scientists to better understand the circumstances that cause introduced species to cross the line and become dangerous invasive pests. | *heredity**Enveloping, persistent**Fatty substance* | 1. **Introduce the text and students read independently**

***Tallow*** *in the first sentence is perhaps an unknown word, but it will be defined in context later. Students should have some concept that Ben Franklin is an American historical figure.**No background context or instructional guidance at the outset of the lesson is needed before the students begin. Resist any urge to interrupt this first silent reading. Students need to rely on the text for their knowledge, not frontloaded background knowledge. As students read, they may make notational marks or highlight certain words or sections.* ***This is the beginning of close reading, when students navigate the text without the aid of prefatory material, extensive notes, or teacher explanations*.** 1. **Read the text aloud as students follow along, stopping at certain places for questioning and discussion.**

*Reading the text aloud, as students follow along, improves text fluency and also provides all your students access to this informational text. Additionally, accurate and skillful modeling of the reading provides students who may be dysfluent with hearing accurate pronunciations and syntactic patterns of English*.1. **The title (or heading, if reading a textbook) often is the first place we start in a close reading.**

**(Q1) Ask “How is the title ironic? Why does the writer use this title since it really does not even name the actual subject of the text”?** {The title is provocative, meant to motivate the students into reading the text. The reader’s curiosity is piqued.}  (**Q2) Ask “What is the actual topic of the text?”**  {What tallow trees became invasive in the US?} **(Q3) Ask “Where in the text does the reader find this out?”** *As part of a close reading, the teacher asks the students to cite specific evidence from the text to reinforce their answers -- in most texts the answer to this question is found in* ***its introductory paragraph(s).*** {Words, phrases, or sentences such as *Genetic tests*… prove “*Invasive tree afflicting Gulf Coast was not brought to US by Ben Franklin”.*}*After the title, the introduction**is the next area of focus for meaning because this is where the main topic of the article*  *is provided. Interestingly, in this particular reading selection, the introduction is unusual in craft and structure. You may want to address this atypical introductory technique after you have completed the entire close reading for comprehension of the ideas.*  **(Q4) What are some of the minor details about tallow trees that add interesting facts for the reader in this extended introduction?** { Students may cite “*the 1700s*,” the time Franklin imported his trees; tallow trees are invasive like kudzu is in the eastern U.S. and Asian Carp in the Great Lakes; each of his trees produce 500,000 seeds per year, etc.} *The purpose of pointing out minor details is to provide a comparison to the major ones introduced with the next question.* These *major ideas and details, (found* ***in the body of the article****) will be the center of the close reading and requires the most class time.* **(Q5) What major topic concerning the tallow trees does the article talk about?** {The results of recent genetic testing between tallow trees growing in China and tallow trees growing in the US.}*This answer may require some repeated close readings of the text from paragraph #4 to paragraph # 8. Citing specific lines or phrases, lead the students to figure out how the writer chooses to add historical information after naming the major idea/topic of the article. Then lead them to how the writer switches back to the present in paragraph #8 to present major details resulting from the genetic testing.*   **(Q6) What are the major findings of this scientific testing?**  { Asian insects that contain growth in Asia are not in US; US trees consume far less energy to ward off insects; US trees grow 30% faster than China’s tallow.}*This question is paramount to the close reading of the rest of this text. Its answers lead the reader into the cause-effect organizational structure of the rest of the article, helping the reader see how the results of one scientific investigation often lead to more questions needing investigations.* **(Q7) What questions do these findings bring up, and how does the writer describe the next steps in response to them?***Students are expected to cite the next set of questions in the article and explain two types of details: (1) the summary provided of the next research project, and (2) the results, along with different questions needing answering. Be sure to carefully lead the class’s close reading of this section for specific details to cite.* **(Q8) How does the writer use details to help convince the reader of the accuracy of the information?***Along with the use of logical reasoning, details such as naming specific facts, using citations by experts, and associating with renown institutions of learning, etc. influence a reader’s acceptance of information. Be sure to have the students return to the text for close reading to find and read aloud examples of these techniques.* **(Q9) What is the concluding thesis of this article?**  {… “...if you are going to explore control methods for an invasive species, you to need to use appropriate genetic material to make certain your tests are valid.”} *Most well-written articles will provide a conclusion which goes beyond the actual subject matter of the article to state some type of universal truth or practice.**(***Q10) How does the final paragraph make this idea important to Americans?** ***Possible Vocabulary Study****: If your students are in need of close reading for vocabulary, you will be pointing out words in the title and introductory paragraphs that imply the word* ***Invasive*** *is something not good for a country. Be sure to start with the title. Ask what the implication of the entire title is. You may also want to ask what the meaning of “clears” means here.**Closely read the first sentence of the article.* *Have students consider the root word of invasive and what it means. Then ask how the verb* ***afflicting*** *helps the reader understand that the word invasive has a negative connotation.* *Some phrases may also help the reader infer this (What Franklin couldn’t have known…* paragraph 5)…*(they’re destroying native habitats*…paragraph 5)*Other words to consider are …overrunning* (paragraph 3);… *overachieve* (paragraph 5); …*running amok* (paragraph 10)*The next important phrase/word to closely read and study may be e****volutionary selection*** in paragraph 8.  |

| **Time** | **Writing Assignment: Directions for Teachers and Students** |
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| **Homework**  | **For homework write a paragraph length explanation that answers one of the following prompts. Provide evidence from the text in your response to justify your analysis:*** Show how this writer uses cause and effect to organize the second half of the article. Be sure to cite specific examples from the text to support your ideas.
* Name and illustrate the types of evidence the writer uses that adds creditability to this research.

During the next class period the paragraph could be used in a peer to peer critique and/or revised.  |
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