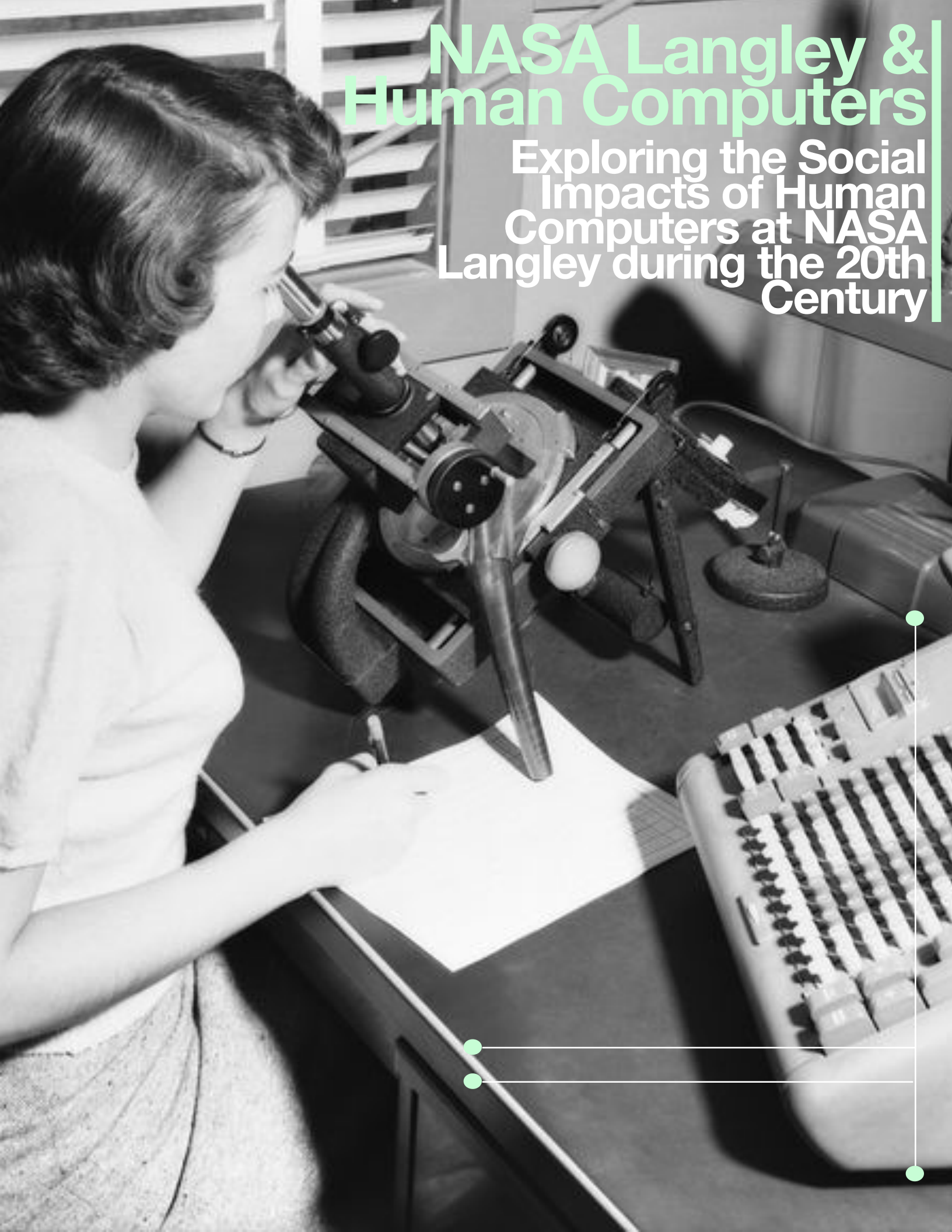# NASA Langley & Human Computers

Exploring the Social Impacts of Human Computers at NASA Langley during the 20th Century

Lesson Plan

Previous Knowledge & Materials Needed: Previous knowledge of key World War II events; Computer with internet access; "Charting the Story" graphic organizer (included below); "Interview Analysis" graphic organizer (included below); "Concluded Essay" assignment (included below); grading rubrics (included below)

Virginia Standards of Learning: <u>Standard VUS.12</u>: The student will demonstrate knowledge of the effects of World War II on the home front by: a) explaining how the United States mobilized its economic, human, and military resources. b) describing the contributions of women and minorities to the war effort. d) describing the role of media and communications in the war effort.

Essential Question: What impact did the employment of human computers at NASA Langley have on American society?

Objectives: This project is intended to be used in a high school social studies class. It is designed to familiarize students with the impact that the employment of human computers at NASA Langley had on American society during the twentieth century. Students will explore the information on the NASA Langley Research Center website to familiarize themselves with background information about human computers. Once a foundational understanding of content is developed, students will be asked to analyze an primary source interview of a person previously employed as a human computer at NASA Langley during the twentieth century. Graphic organizers will be used for background information investigation and primary source analysis. Teacher will demonstrate how to use graphic organizers by modeling how to accurately answer a question on each graphic organizer. Teacher will then facilitate a guided student practice to answer the second question and conclude demonstration by allowing students to finish project independently (Hunter, 1994). Students will conclude the project by writing a well-crafted persuasive essay. The essay will respond to a higher-level thinking question designed to encourage students to evaluate and synthesize information gathered in the previous activities of the lesson (Bloom, 1956).

Procedure:
1. Teacher will provide background information on the origins and key events of World War II
2. Teacher will familiarize students with the NASA Langley Research Center website involving human computers: http://crgis.ndc.nasa.gov/historic/Human_Computers
3. Teacher will hand out "Charting the Story: 'Back When Computers Wore Skirts'" graphic organizer, review the instructions, and ask questions for clarification
4. Teacher will model how to properly respond to first section of graphic organizer and ask questions for clarification
5. Teacher will facilitate a guided practice through a the second section of the graphic organizer and ask questions for clarification
6. Students will complete the remainder of the assignment individually
7. Teacher will hand out "Interview Analysis: 'Back When the Computers Wore Skirts'" graphic organizer, review the instructions, and ask questions for clarification
8. Teacher will model how to properly respond to first section of graphic organizer and ask questions for clarification
9. Teacher will facilitate a guided practice through a the second section of the graphic organizer and ask questions for clarification
10. Students will complete the remainder of the assignment individually
11. Students will conclude the project by writing a well-crafted persuasive essay.

Suggested Time Allotted: It is recommended that this project cover a period of 1-3 class sessions.

Evaluation/Assessment: Students will be formally evaluated by their performance on both graphic organizers and their essay response. Graphic organizers may be graded for content and completion according to teacher's individual discernment, and essays will be graded using the rubric included below.

Extended Learning Opportunities: For more information regarding the NASA Langley Research Center please visit the following link: http://crgis.ndc.nasa.gov/historic/Langley_Research_Center

Charting the Story: "Back When the Computers Wore Skirts"

Graphic organizer intended to be used with the article found at the following link:
http://crgis.ndc.nasa.gov/historic/Human_Computers

Timeline: List three significant events from the passage. Include the year(s) associated with each event.

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Social Impacts: Determine how each demographic listed below was affected by the employment of human computers?

- Women:

- African Americans:

- NASA Engineers:

Key Terms: Briefly summarize the significance of each term according to the passage.

- Human Computers

- Virginia Tucker

- NACA

- LMAL

- Civil Service Exam

- Segregation

- Bell Electric Computer

Interview Analysis: "Back When the Computers Wore Skirts"

Graphic organizer intended to be used with the recorded and/or transcribed interviews found at the following link:
http://crgis.ndc.nasa.gov/historic/Human_Computers#Films_and_Interviews

Examine

- Who is speaking?

- What topics is the informant discussing?

- What people, places, and dates does the informant mention?

- Does the informant reveal any emotions about these topics such as excitement, sadness, or happiness?

Think

- What kinds of words ands phrases does the informant use? Are any of these unusual?

- What was the informant's role in the events she describes?

- Do they tell you anything about the informant's character or history?

Question

- How was the informant affected by the events he or she describes?

- How could information obtained from other primary sources reinforce the informant's story?

- How does the informant and his or her unique story fit into the broader history you are studying?

- Does the informant mention any previously unknown aspects of the event that deserve further exploration?

Concluding Essay: "Back When the Computers Wore Skirts"

Directions: Using essay format, please respond to the question. Answer must contain cited evidence from the interview of a human computer employed by NASA Langley during the twentieth century.

Question: Using evidence based examples, how could you justify the following statement: the employment of human computers at NASA Langley during the mid-twentieth century had a positive impact on American society.

Essay Rubric

CATEGORY	4 - Above Standards	3 - Meets Standards	2 - Approaching Standards	1 - Below Standards	Score
Focus or Thesis Statement	The thesis statement names the topic of the essay and outlines the main points to be discussed.	The thesis statement names the topic of the essay.	The thesis statement outlines some or all of the main points to be discussed but does not name the topic.	The thesis statement does not name the topic AND does not preview what will be discussed.	
Support for Position	Includes 3 or more pieces of evidence (facts, statistics, examples, real-life experiences) that support the position statement. The writer anticipates the reader\'s concerns, biases or arguments and has provided at least 1 counter-argument.	Includes 3 or more pieces of evidence (facts, statistics, examples, real-life experiences) that support the position statement.	Includes 2 pieces of evidence (facts, statistics, examples, real-life experiences) that support the position statement.	Includes 1 or fewer pieces of evidence (facts, statistics, examples, real-life experiences).	
Evidence and Examples	All of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the author\'s position.	Most of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the author\'s position.	At least one of the pieces of evidence and examples is relevant and has an explanation that shows how that piece of evidence supports the author\'s position.	Evidence and examples are NOT relevant AND/OR are not explained.	
Transitions	A variety of thoughtful transitions are used. They clearly show how ideas are connected	Transitions show how ideas are connected, but there is little variety	Some transitions work well, but some connections between ideas are fuzzy.	The transitions between ideas are unclear OR nonexistent.	
Sentence Structure	All sentences are well-constructed with varied structure.	Most sentences are well-constructed and there is some varied sentence structure in the essay.	Most sentences are well constructed, but there is no variation is structure.	Most sentences are not well-constructed or varied.	
Grammar & Spelling	Author makes no errors in grammar or spelling that distract the reader from the content.	Author makes 1-2 errors in grammar or spelling that distract the reader from the content.	Author makes 3-4 errors in grammar or spelling that distract the reader from the content.	Author makes more than 4 errors in grammar or spelling that distract the reader from the content.	

References

Hunter, M. C. (1994). *Enhancing teaching*. New York: Macmillan College Pub. Co.

Bloom, B. S. (1956). *Taxonomy of educational objectives; the classification of educational goals,*. New York: Longmans, Green.

Langley Research Center. *NASA LaRC*. Retrieved July 23, 2014, from http://crgis.ndc.nasa.gov/historic/Langley_Research_Center