

From Banneker to Faraday-Innovative People in Science

Grade Level or Special Area: 4th Grade

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Length of Unit: 10 lessons (10 days of 45 minutes each)

I. ABSTRACT

This unit is intended to help teachers with teaching the Science Biographies for 4th grade. Incorporated into the unit are authentic literature pieces and writing instruction. This unit would be utilized well in the weeks preceding CSAP, as it reviews many key skills needed by 4th grade students.

II. OVERVIEW

A. Concept Objectives

1. Understand the relationship between science and human activity and how it can change the world.
2. Understand that people of varied backgrounds have made contributions to science throughout history.
3. Understand how to research and write for a purpose.

B. Content from the *Core Knowledge Sequence*

1. 4th Grade Language Arts
 - a. Writing, Grammar, and Usage (pg. 87)
 - i. Writing and Research
 - a) Produce a variety of types of writing-including, stories, reports, summaries, descriptions, poems, letters-with a coherent structure or story line.
 - b) Know how to gather information from different sources (such as encyclopedia, magazines, interviews, observations, atlas, on-line), and write short reports presenting the information in his her own words, with attention to the following:
 - i) understanding the purpose and audience of the writing documenting sources in a rudimentary bibliography
 - c) Organize material in paragraphs and understand
 - i) how to use a topic sentence
 - ii) how to develop a paragraph with examples and details
 - iii) that each new paragraph is indented
 - ii. Grammar and Usage
 - a) Understand what a complete sentence is and
 - i) identify subject and predicate in single-clause sentences
 - ii) distinguish complete sentences from fragments
 - iii) identify and correct run-on sentences
 - b) Identify subject and verb in a sentence and understand that they must agree
 - c) Identify and use different sentence types: declarative, interrogative, imperative, exclamatory
 - d) Know the following parts of speech and how they are used: nouns, pronouns, verbs (action verbs and auxiliary

verbs), adjectives (including articles), adverbs, conjunctions (*and, but, or*), interjections

- e) Know how to use the following punctuation:
 - i) end punctuation: period, question mark, or exclamation point
 - ii) comma: between day and year when writing a date, between city and state in an address, in a series, after *yes* and *no*, before conjunctions that combine sentences, inside quotation marks in dialogue
 - iii) apostrophe: in contractions, in singular and plural possessive nouns
 - iv) quotation marks: in dialogue, for titles of poems, songs, short stories, magazine articles
- f) Understand what synonyms and antonyms are, and provide synonyms or antonyms for given words
- g) Use underlining or italics for titles of books

2. 4th Grade Science: Science Biographies (pg. 106)

- a. Benjamin Banneker
- b. Elizabeth Blackwell
- c. Charles Drew
- d. Michael Faraday

C. Skill Objectives

1. Students will listen to story for facts about topic (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for Language Arts 4).
2. Students will complete a K-W-L chart, confirming or correcting information in the K area during and after reading.
3. Students will identify achievements made by Elizabeth Blackwell and why they were extraordinary for that time period (adapted from Colorado Standards and Grade Level Expectations (CSGLE) for History 4.1 and Science 5).
4. Students will list chronologically the important events and dates in Elizabeth Blackwell's life (adapted from CSGLE for Language Arts 2, 3, 4, 5).
5. Students will create sentences from vocabulary words from the story, showing understanding of the words.
6. Students will create questions based on information from the story and answer those questions.
7. Students will complete an analysis of the main character in the story, Benjamin Banneker, using a two-column note graphic organizer.
8. Students will take notes based on class discussion of material.
9. Students will identify facts from an article that answer Who?, What?, When? and Where?.
10. Students will determine relevant information from text to highlight.
11. Students will use highlighted information to compile a summary paragraph.
12. Students will create and answer questions about the main character and topic of a story.
13. Students will predict and check vocabulary words from the story, thinking critically about what part of the story the word might relate to.
14. Students will review a five paragraph model of writing (as taught in *Step Up to Writing* or a similar program).
15. Students will participate in a class review of the previous lessons, focusing on the achievements and challenges of each person.

16. Students will decide on a research topic from the people being learned about.
17. Students will understand how to research for a purpose.
18. Students will read and understand a variety of materials (adapted from CSGLE for Language Arts 1).
19. Students write and speak for a variety of purposes (adapted from CSGLE for Language Arts 2).
20. Students will apply thinking skills to their reading, writing, speaking, listening and viewing (adapted from CSGLE for Language Arts 4).
21. Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources (adapted from CSGLE 5).
22. Students will draw information from multiple sources, including encyclopedias, biographies, and the Internet.
23. Students will summarize information from sources, putting facts into their own words.
24. Students will determine appropriate information for a research paper.
25. Students will fill out the Bibliography draft.
26. Students will make an outline of their five paragraph paper.
27. Students will draft a five paragraph paper.
28. Students will use the grading rubric to self-assess for correct punctuation, capitalization, grammar, and spelling.
29. Students will correctly change mistakes in their writing.
30. Students will identify punctuation, capitalization, grammar, and spelling mistakes in their writing.
31. Students will revise their work as needed, paying attention to topic sentence, main ideas, details, and the conclusion.
32. Students will write a final research paper with a minimum of errors.
33. Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling (adapted from CSGLE Language Arts 3).

III. BACKGROUND KNOWLEDGE

- A. For Teachers
 1. Sabin, Francene, *Elizabeth Blackwell: The First Woman Doctor*
 2. Haber, Louis, *Black Pioneers of Science and Invention*
 3. Lomask, Milton, *Great Lives: Invention and Technology*
- B. For Students
 1. 4th Grade Language Arts: Writing, Grammar, and Usage (p. 87)
 - a. Grammar and Usage
 - i. Know how the following prefixes and suffixes affect word meaning:
 - a) Prefixes:
 - i) *im, in* (as in impossible, incorrect)
 - ii) *non* (as in nonfiction, nonviolent)
 - iii) *mis* (as in misbehave, misspell)
 - iv) *en* (as in enable, endanger)
 - v) *pre* (as in prehistoric, pregame)
 - b) Suffixes:
 - i) *ily, y* (as in easily, speedily, tricky)
 - ii) *ful* (as in thoughtful, wonderful)
 - iii) *able, ible* (as in washable, flexible)
 - iv) *ment* (as in agreement, amazement)

- ii. Review correct usage of problematic homophones:
 - a) their, there, they're
 - b) your, you're
 - c) its, it's
 - d) here, hear
 - e) to, too, two
- 2. 4th Grade Science: The Human Body (p. 104)
 - a. The Circulatory System
- 3. 4th Grade Science: Electricity (p. 105)
- 4. 4th Grade American History and Geography: Early Presidents and Politics (p. 96)

IV. RESOURCES

- A. Book-*Elizabeth Blackwell: The First Woman Doctor*, Francene Sabin (Lessons One, Five and Six)
- B. Book-*The First Woman Doctor*, Rachel Baker (Lessons Five and Six)
- C. Book-*Elizabeth Blackwell, Girl Doctor*, Joanne Landers Henry (Lessons Five and Six)
- D. Book-*What Are You Figuring Now? A Story About Benjamin Banneker*, Jeri Ferris (Lessons Two, Five and Six)
- E. Book-*Dear Benjamin Banneker*, Andrea Davis Pinkney (Lessons Two, Five and Six)
- F. Book-*Benjamin Banneker, American Mathematician and Astronomer*, Bonnie Hinman (Lessons Five and Six)
- G. Book-*Benjamin Banneker, Genius of Early America*, Lillie Patterson (Lessons Five and Six)
- H. Book-*Charles Drew, Doctor*, Garnet Nelson Jackson (Lessons Five and Six)

V. LESSONS

Lesson One: Elizabeth Blackwell (45 minutes)

- A. *Daily Objectives*
 - 1. Concept Objective(s)
 - a. Understand the relationship between science and human activity and how it can change the world.
 - b. Understand that people of varied backgrounds have made contributions to science throughout history.
 - 2. Lesson Content
 - a. 4th Grade Science: Science Biographies (pg. 106)
 - i. Elizabeth Blackwell
 - 3. Skill Objective(s)
 - a. Students will listen to story for facts about topic.
 - b. Students will complete a K-W-L chart, confirming or correcting information in the K area during and after reading.
 - c. Students will identify achievements made by Elizabeth Blackwell and why they were extraordinary for that time period.
 - d. Students will list chronologically the important events and dates in Elizabeth Blackwell's life.
 - e. Students will take notes based on class discussion of material.
- B. *Materials*
 - 1. Chalk board, overhead, or marker board
 - 2. Chalk, Vis a vis, or dry erase marker
 - 3. *Elizabeth Blackwell: The First Woman Doctor*, by Francene Sabin
 - 4. Student Science notebook (spiral notebook) or folder
 - 5. One copy of Appendix A: K-W-L chart (as an overhead or poster)

6. One pencil for each student
 7. Pages 189-191 in the 4th Grade *Text Resources*
- C. *Key Vocabulary*
1. An *injustice* is something that is cruel or unfair.
 2. *Gloomy* means depressed or unhappy.
 3. A *governess* was a person whose job it was to take care of a child during the day.
 4. An *investment* is something you put your money into that should get you money back.
 5. *Cholera* was a disease that affected many people in the 1800's.
 6. The *Allegheny Mountains* are part of the Appalachian Mountains.
 7. *Discourage* means to not encourage someone to do something.
 8. To *mock* is to make fun of or talk rudely to.
- D. *Procedures/Activities*
1. Before introducing the lesson, have a K-W-L chart ready, either on the overhead, marker board or chalk board.
 2. Introduce the lesson by asking students: "Who knows who the first woman doctor was?"
 3. Give students time to generate answers. Give students appropriate feedback for their answers. After three-five answers, tell students you are going to read them a short book about the first woman doctor, Dr. Elizabeth Blackwell.
 4. Tell students that before you read the book, you want to know if they know about Elizabeth Blackwell or if they have some questions about the first woman doctor. Record any student responses about what they already know (even if you know it is incorrect) in the K (What I **Know**) column. Encourage students to ask questions such as, "What challenges did she face?"
 5. Record students' questions in the W (What I **Want** to Know) column on the chart. Tell students you will be reading to see if you can find the answers to the questions, or to clear up any incorrect information. Explain to students that you will fill out the L (What I **Learned**) column as a class after reading and discussing the book.
 6. Before reading, pre-teach the above vocabulary words. Use the sentences given above, but also ask students to orally create sentences that use the words. Be sure to correct any mistaken uses.
 7. Read *Elizabeth Blackwell: The First Woman Doctor* to the class, stopping occasionally to answer or correct information on the K-W-L chart. This helps reinforce good pacing and confirming or disproving predictions.
 8. While stopping, ask students to summarize the book so far, making sure the main details and supporting facts are present.
 9. Also occasionally stop to ask students about the vocabulary words in the book (above). There are other words in the story students might be confused with but that are not relevant to the content of the story. Use context clues to figure out those words.
 10. After reading the book, refer to the K-W-L chart to see if there are any unanswered questions. Fill in answers where applicable. Discuss how to find the answers to the unanswered questions (i.e., other books, Internet). Giving some facts from the 4th Grade *Text Resources* might answer some questions, but will also give students a better understanding of her other accomplishments.
 11. Break students into small groups (three-five students). Instruct them to open their Science Notebook (Folder) to the next clean page. Tell them they are going to work as a group to list some of the important things that happened in Elizabeth Blackwell's life. Tell students to make a summary paragraph as a group. Tell

them to include three important events that happened and why they were important in her life.

12. After students have written a summary, hand out one copy of Appendix B to each student. If you have any special education or English language learners, give them one copy of Appendix C. For Gifted and Talented students, give them one copy of Appendix B, but have the years removed from the events.

E. *Assessment/Evaluation*

1. Filling in the L column of the K-W-L chart (observation) as part of a discussion.
2. Working in a small group to write the list of achievements of Elizabeth Blackwell's life (observation).
3. Filling in a time line (Appendix B) with events from Elizabeth Blackwell's life (pencil and paper). Grade using answer key (Appendix D).

Lesson Two: Benjamin Banneker (45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand the relationship between science and human activity and how it can change the world.
 - b. Understand that people of varied backgrounds have made contributions to science throughout history.
2. Lesson Content
 - a. 4th Grade Science: Science Biographies (pg. 106)
 - i. Benjamin Banneker
3. Skill Objective(s)
 - a. Students will create sentences from vocabulary words from the story, showing understanding of the words.
 - b. Students will listen to story for facts about topic.
 - c. Students will create questions based on information from the story and answer those questions.
 - d. Students will complete an analysis of the main character in the story, Benjamin Banneker using a two-column note graphic organizer.

B. *Materials*

1. One copy of *What Are You Figuring Now? A Story About Benjamin Banneker*, by Jeri Ferris
2. Overhead or marker/chalk board
3. Vis a vis marker, dry erase marker, or chalk
4. Student Science notebook (spiral notebook) or folder
5. One pencil for each student
6. One copy of *Dear Benjamin Banneker*, by Andrea Davis Pinkney
7. One copy of Appendix E for overhead or as a chart

C. *Key Vocabulary*

1. *Yield* means to give forth.
2. When something is *grueling*, it is very hard to do.
3. An *almanac* gives you information about the weather and when to plant seeds.
4. *Determined* means to set your mind on completing something.
5. *Bleak* can mean a small chance or a negative outlook.

D. *Procedures/Activities*

1. Write the math problem on page 63 of *What Are You Figuring Now? A Story About Benjamin Banneker*, by Jeri Ferris on the board or overhead. This will serve as a warm-up for the topic at hand. Give the students a few minutes to work it out, either by themselves or in a small group. Discuss the problem with

- them, and take answers. Work the problem out on the board, or if you received correct answers, have students work it out. Once the correct answer is achieved, have students go back to their seats for the lesson.
2. Tell students that the man who wrote the problem was named Benjamin Banneker. Give the students a brief background of Banneker, drawing from the 4th Grade *Text Resources* as well as *What Your Fourth Grader Needs to Know, Revised Edition*. Relate this new information back to the math problem, pointing out that Banneker was interested in many things, not just math or technology.
 3. Tell students that in addition to working with math, Benjamin Banneker was very influential in the design of Washington, D.C. Along with those skills, Banneker created an almanac, when no other black man had.
 4. Introduce the vocabulary words to the students. Encourage them to orally make authentic sentences for them to show their understanding of the words. (This is a good reinforcer of oral language development for ELL students.)
 5. Read the book *Dear Benjamin Banneker*, by Andrea Davis Pinkney to the students. Ask them to listen for some of the other accomplishments of Banneker as you read (this sets a purpose for reading the book).
 6. As you are reading, occasionally stop and ask students to write a question about Banneker in their Science Notebook. Tell them to listen carefully during the next section for their answer. Tell them they will write the answer during the next pause. (You might want to pre-read the selection to find good stopping points so it doesn't interrupt the flow of the book.)
 7. After finishing the book, ask students to share some of their questions from the book. Be sure to get answers for the questions as well. If an answer is incorrect, ask others if they had a similar question. Ask for their answer as well. If no one has a correct answer, be sure to explicitly correct them.
 8. Ask students to think about the math problem from the beginning of the lesson. Remind students about Banneker's other interests. Tell them you are going to read a passage from another book, *What Are You Figuring Now? A Story About Benjamin Banneker*, by Jeri Ferris, to tell them about some of those interests. Read Chapter 5 (pages 40-46). Remind students about Banneker's letter to Jefferson from the other book.
 9. Using a two-column note chart (Appendix E), use information from the students to write categories of Banneker's accomplishments on the left and the specific achievements to the right. You will need to refer to the background information in the 4th Grade *Text Resources* and *What Your Fourth Grader Needs to Know, Revised Edition*.
 10. After completing the chart, have students copy it into their Science Notebook. Tell them they will need the information they already have about Elizabeth Blackwell and Benjamin Banneker.
- E. *Assessment/Evaluation*
1. Students will accurately use vocabulary words in sentences verifying the meaning of the word (observation).
 2. Students will complete a two-column note organizer following directions given to categorize facts about Banneker (pencil and paper).

Lesson Three: Charles Drew (45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 1. Understand the relationship between science and human activity and how it can change the world.

2. Understand that people of varied backgrounds have made contributions to science throughout history.
2. Lesson Content
 - a. 4th Grade Science: Science Biographies (pg. 106)
 - i. Charles Drew
 3. Skill Objective(s)
 - a. Students will listen to story for facts about topic.
 - b. Students will identify facts from an article that answer Who?, What?, When? and Where?.
 - c. Students will determine relevant information from text to highlight.
 - d. Students will use highlighted information to compile a summary paragraph.
- B. *Materials*
1. One copy for each pair of students of Charles Drew (page 192-193) from 4th *Grade Text Resources*
 2. One highlighter for each pair of students
 3. One transparency of Charles Drew (page 192-193) from 4th *Grade Text Resources*
 4. Overhead projector
 5. Vis a vis marker/overhead highlighter
 6. Student Science Notebook
 7. One pencil for each student
- C. *Key Vocabulary*
1. *Tuberculosis* is a disease that affects the human lungs.
 2. *Deteriorate* means to fall apart or not be in good shape anymore.
 3. *Segregated* refers to separating people; usually used in a negative way.
 4. A *scholarship* is money from a college to study or play a sport.
 5. A *transfusion* is giving blood to someone through an I.V. (may need to explain I.V.).
 6. To *resign* is to quit.
- D. *Procedures/Activities*
1. Begin this lesson by telling students that you will be practicing highlighting with a non-fiction text. Partner students according to standard procedure.
 2. Once students are partnered, hand out one highlighter and one copy of the above-mentioned text to each pair. (If you want to reuse the texts, give each pair of students a transparency, paper clip, and Vis a Vis marker instead.)
 3. Tell students that there may be some unfamiliar words in the text, but that you will discuss them when you come to them in the text. This is a good opportunity to use context clues, as many of the above words have clues in the article.
 4. Place your copy of the text on the overhead. Tell the class to follow along as you read on the overhead. Tell them they should be looking for important information to highlight, such as **Who?, What? (what happened), When?, Where?** information. (How (how was the conflict solved) and why (why was the piece written) are harder to answer; discuss as a class at the end of the article.) Begin the modeling lesson by reading the first paragraph to the class.
 5. When finished with the paragraph, ask the class what information they found that was important. This is a good opportunity to discuss important information and non-essential information. After discussing, determine together what should be highlighted for importance. Remind students that entire sentences or paragraphs are not highlighted; only words or phrases are highlighted. Highlight together, modeling on the overhead.

6. Continue with steps 4 and 5, having students practice their oral reading fluency by reading aloud. (If you are not comfortable with having students do a “cold read”, give them 5-10 minutes to quietly read the piece with their partner first.) Make sure to discuss the above vocabulary words after the student is finished reading the paragraph. Also be sure to briefly summarize the piece so far at each paragraph end; this will help with understanding of the entire work, as well as with step #7.
 7. When the entire article is completed, briefly discuss the entire article, clearing up any misconceptions or questions. Tell students that they will now use the information from the text to write a brief summary paragraph about Charles Drew. They may stay with their partner to use as a resource, but each student is writing his/her own paragraph. Remind students that summaries have a “**who?**” and a “**did what?**” along with detail sentences, and should only be about three-five sentences long. Tell students their summaries will be written in their Science Notebook.
 8. Give the students 7-10 minutes to write their summaries. Ask the class if anyone would like to share their summary. Be sure to correct any incorrect information.
 9. Tell students that there is one more person you will be studying before a final project and to keep in mind what they have learned so far about the people they have studied.
- E. *Assessment/Evaluation*
1. ELL/Special Education student modification with step #7: keep students together as partners and allow them to write one paragraph.
 2. Use the rubric for Paragraph, Report and Essay Writing from the *Step Up to Writing* manual, pages 7-22 and 7-23 (Auman, 2003).

Lesson Four: Michael Faraday (45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand the relationship between science and human activity and how it can change the world.
 - b. Understand that people of varied backgrounds have made contributions to science throughout history.
 2. Lesson Content
 - a. 4th Grade Science: Science Biographies (pg. 106)
 - i. Michael Faraday
 3. Skill Objective(s)
 - a. Students will listen to story for facts about topic.
 - b. Students will predict and check vocabulary words from the story, thinking critically about what part of the story the word might relate to.
 - c. Students will create and answer questions about the main character and topic of story.
- B. *Materials*
1. One copy of *What Would You Ask Michael Faraday?* by Anita Ganeri
 2. Student Science Notebooks
 3. One pencil per student
 4. Marker/ chalk board or overhead
 5. Chalk, dry erase marker, or Vis a vis marker
- C. *Key Vocabulary*
1. A *pioneer* is someone who leads the way for others to follow.
 2. *Sacked* is a British term for being fired from a job.

3. *Generate* means to create or make something.
 4. *Wages* are money earned for performing a job.
 5. An *apprentice* is someone who is learning a skill from someone else at a job.
 6. When an object is *electromagnetic*, it is made magnetic from electricity.
- D. *Procedures/Activities*
1. Ask students to think about the many ways we use electricity every day. Have them list them in their Science Notebook. Ask students to share; use these examples to write on the board/overhead.
 2. Ask them to think of how different our lives would be without electricity. Tell them that it was because of Michael Faraday that we are able to use electricity as much as we do. Tell them you are going to read a book about Michael Faraday and his discoveries.
 3. Tell students the title of the book. Tell them that since they know the title and what Michael Faraday worked with, they can think of some questions to ask him. Tell students to come up with three questions for Michael Faraday they would like answered and to write them in their Science Notebooks.
 4. After a few minutes, have students put down their pencils and get ready to listen to the story. Tell them you want them to listen to the story for their answers and vocabulary words.
 5. Read the story, pausing every so often to give students a chance to write down answers.
 6. After reading the story, ask students to share some of their questions for Michael Faraday and if they were answered. Discuss with the class some of the important events in Michael Faraday's life. Lead the discussion around to how important he was to our society. Ask students what of theirs they like the most that relies on Michael Faraday's discoveries.
 7. To end the lesson, ask students to read through their questions and answers for Michael Faraday in their Science Notebooks. Tell them they can add any other important information (i.e., where he was born, what he spent his life working on) that will help them remember Michael Faraday.
- E. *Assessment/Evaluation*
1. ELL/Special Education modification for step #3: have these students pair up with someone near them or help guide them to some reasonable questions (i.e., When was he born?) while the others are working quietly.

Lesson Five: Writing a Report: Choosing a Topic (45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand the relationship between science and human activity and how it can change the world.
 - b. Understand that people of varied backgrounds have made contributions to science throughout history.
 - c. Understand how to research and write for a purpose.
 2. Lesson Content
 - a. 4th Grade Language Arts: Writing, Grammar, and Usage (pg. 87)
 - i. Writing and Research
 - a) Produce a variety of types of writing-including, stories, reports, summaries, descriptions, poems, letters-with a coherent structure or story line.
 - b. 4th Grade Science: Science Biographies (pg. 106)
 - i. Benjamin Banneker

- ii. Elizabeth Blackwell
 - iii. Charles Drew
 - iv. Michael Faraday
- 3. Skill Objective(s)
 - a. Students will review a five paragraph model of writing (as taught in *Step Up to Writing*, or a similar program).
 - b. Students will participate in a class review of the previous lessons, focusing on the achievements and challenges of each person.
 - c. Students will decide on a research topic from the people being learned about.
- B. *Materials*
 - 1. Overhead, marker/chalk board
 - 2. Vis a vis, dry erase marker, or chalk
 - 3. Student Science Notebooks
 - 4. One pencil per student
 - 5. All books previously used during lessons
- C. *Key Vocabulary*
 - 1. A *five paragraph research paper* is a paper written in the following format: introduction (1st paragraph), body (three middle paragraphs), conclusion (5th paragraph).
- D. *Procedures/Activities*
 - 1. Tell students that they will begin a research paper today on one of the people you've been learning about. Tell them that first, you will review the format for writing a five paragraph research paper.
 - 2. Ask students to recall what the first paragraph of a report is. Students should answer with "introduction." Remind them that the introduction paragraph lets their reader know what they will be writing about. Ask students what an introduction paragraph has. Students should answer with "topic sentence." (You may need to review the types of topic sentences-occasion/position, power statements, however statements, and, but, or statements, preposition statements, infinitive statements, a list statement, attention getting, rhetorical question, semicolon sentence, using a quotation-if your students are not strong writers yet.)
 - 3. After reviewing the introduction, talk about the three body paragraphs. You might tell students that since they are writing a research paper, they will have three important achievements or events in their topic's life. Each paragraph will need to be about one of those achievements or events.
 - 4. After reviewing the body, ask students what comes last in a paper (conclusion). Ask if anyone knows what the conclusion paragraph does (wraps up the paper by re-stating the information in the introduction paragraph).
 - 5. Ask if there are any questions about how to write a research paper. Answer any according to your guidelines for writing.
 - 6. Tell students they will now review their notes about the people you've been studying. When they've had a sufficient time to look over them, ask them to share some facts about the people. Make a chart on the board or overhead (like Appendix F) to list some of the facts about each person.
 - 7. Students should use information in their notes to fill the chart with facts.
 - 8. Review again why each person was so influential and important. Also, review what challenges each of them faced.
 - 9. Tell students that you want them to use all the information presented to them to choose who they want to write their research paper on. Give them 5-10 minutes

to do this. Tell them to come tell you who they've chosen when they are ready. Record this information for later grading and group presentation purposes.

- E. *Assessment/Evaluation*
1. Students will participate and give information from their notes to complete a class chart on each person (oral).

Lesson Six: Writing a Report: Researching Your Topic (45 minutes)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Understand how to research and write for a purpose.
2. Lesson Content
 - a. 4th Grade Language Arts: Writing, Grammar, and Usage (pg. 87)
 - i. Know how to gather information from different sources (such as encyclopedia, magazines, interviews, observations, atlas, on-line), and write short reports presenting the information in his/her own words, with attention to the following:
 - a) understanding the purpose and audience of the writing
 - b) documenting sources in a rudimentary bibliography
3. Skill Objective(s)
 - a. Students will understand how to research for a purpose.
 - b. Students will read and understand a variety of materials.
 - c. Students write and speak for a variety of purposes.
 - d. Students will apply thinking skills to their reading, writing, speaking, listening and viewing.
 - e. Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources.
 - f. Students will draw information from multiple sources, including encyclopedias, biographies, and the Internet.
 - g. Students will summarize information from sources, putting facts into their own words.
 - h. Students will determine appropriate information for a research paper.
 - i. Students will fill out the Bibliography draft.

B. *Materials*

1. One pencil per student
2. Student Science Notebooks
3. One set of encyclopedias
4. Trade books (listed in Resources)
5. Computers with Internet access
6. One copy of Appendix G for each student
7. One transparency of Appendix G
8. Overhead machine
9. Vis a vis marker

C. *Key Vocabulary*

1. A *bibliography* is a list of your sources for research.

D. *Procedures/Activities*

1. Start the lesson by telling students that you will be going to the library for the class period. Explain to them that you will be researching the person they selected in the last class period. Remind them that they already have some information, but it's good to have more than one source of information for a topic.

2. Before going to the library, review how to fill out a bibliography. Use a transparency of Appendix G to show them how. Use a book as an example to show students where to locate the information required. (You may also want to do this with the Internet.)
 3. After the demonstration, answer any questions that may still be present. Tell students they must have three sources of information, not counting their notes. Hand out one copy of the Bibliography Draft (Appendix G) to each student.
 4. Take students to the library, helping those that need guidance looking up the appropriate material. (If your school does not have computers in the library, ask a parent volunteer or aide to take those that want to use the Internet to that area.)
 5. During this library time, check in with students about what information they are putting in their notes. If a student is focusing on irrelevant information (ex: how many pets he had), steer them back to more important information (ex: what they did for society).
 6. When the class period is over, collect the Science Notebooks from everyone. Review them later on. Also, collect the bibliographies to check for accuracy.
- E. *Assessment/Evaluation*
1. ELL/Special Education modification: shorten the amount of sources required for these students.
 2. Check students' Bibliographies for the specified amount of sources, as well as how they filled out the blanks (pencil and paper).

Lesson Seven: Writing a Report: Drafting a Report (45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand how to research and write for a purpose.
 2. Lesson Content
 - a. 4th Grade Language Arts: Writing, Grammar, and Usage (pg. 87):
Writing and Research
 - i. Organize material in paragraphs and understand
 - a) how to use a topic sentence
 - b) how to develop a paragraph with examples and details that each new paragraph is indented
 3. Skill Objective(s)
 - a. Students will make an outline of their five paragraph paper.
 - b. Students will draft a five paragraph paper.
- B. *Materials*
1. Student Writing Notebooks (or whatever system you use)
 2. One pencil per student
 3. Student Science Notebooks
 4. One transparency of Outline Draft (Appendix H)
 5. One copy per student of Outline Draft
 6. Vis a vis machine
 7. Overhead projector
- C. *Key Vocabulary*
1. An *outline* is a format used to organize thoughts for writing a paper.
- D. *Procedures/Activities*
1. Open the lesson by asking students what they can do that is helpful to help organize their thoughts before beginning to write (outline). Tell students that they will create an outline today for their paper.

2. Instruct students to help you fill out an example outline. Use the transparency of Appendix H with the overhead projector. Ask for students to give you a topic (or have one ready) to use for the example. Be sure to use a topic they will know a lot about without having to research.
 3. Using the example topic, fill out the outline. Be sure students are giving you the information to use. Remind students that this is the time to put in details to support your facts.
 4. Once the outline is completed, answer any questions the class may have.
 5. Once questions are answered, hand out one copy of the Outline Draft to each student. Give students about 10-15 minutes to fill it out.
 6. At the end of 10-15 minutes, tell students that they will now transfer the information on their outline to their Writing Notebook. They will now use the standard way of writing a paper (i.e., indenting).
 7. Use the rest of the time for drafting the paper.
- E. *Assessment/Evaluation*
1. Use Appendix I (Working Behavior Rubric) to give students a participation grade.

Lesson Eight: Writing a Report: Revising and Editing (45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand how to research and write for a purpose.
 2. Lesson Content
 - a. 4th Grade Language Arts: Writing, Grammar, and Usage (pg. 87)
 - i. Writing and Research
 - a) Organize material in paragraphs and understand
 - i) how to use a topic sentence
 - ii) how to develop a paragraph with examples and details
 - iii) that each new paragraph is indented
 - ii. Grammar and Usage
 - a) Understand what a complete sentence is and
 - iv) identify subject and predicate in single-clause sentences
 - v) distinguish complete sentences from fragments
 - vi) identify and correct run-on sentences
 - b) Identify subject and verb in a sentence and understand that they must agree
 - c) Identify and use different sentence types: declarative, interrogative, imperative, exclamatory
 - d) Know the following parts of speech and how they are used: nouns, pronouns, verbs (action verbs and auxiliary verbs), adjectives (including articles), adverbs, conjunctions (*and, but, or*), interjections
 - e) Know how to use the following punctuation:
 - i) end punctuation: period, question mark, or exclamation point
 - ii) comma: between day and year when writing a date, between city and state in an address, in a series, after *yes* and *no*, before conjunctions that

Lesson Nine: Writing a Report: Drafting a Final Report (45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand how to research and write for a purpose.
 2. Lesson Content
 - a. 4th Grade Language Arts: Writing, Grammar, and Usage (pg. 87)
 - i. Writing and Research
 - a) Produce a variety of types of writing-including, stories, reports, summaries, descriptions, poems, letters-with a coherent structure or story line.
 3. Skill Objective(s)
 - a. Students will write a final research paper with a minimum of errors.
- B. *Materials*
1. Student Writing Notebooks
 2. One pencil per student
- C. *Key Vocabulary*
- None
- D. *Procedures/Activities*
1. Tell students they will write their final paper today using the corrections from the previous lesson. Tell them to keep in mind what you are looking for in their papers (this should coincide with whatever rubric you are using).
 2. Give the rest of the class period to write.
- E. *Assessment/Evaluation*
1. Make a copy of each student's paper and use the rubric mentioned in Lesson Eight to score students' papers.

Lesson Ten: Writing a Report: Publishing (45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Understand how to research and write for a purpose.
 2. Lesson Content
 - a. Benjamin Banneker
 - b. Elizabeth Blackwell
 - c. Charles Drew
 - d. Michael Faraday
 3. Skill Objective(s)
 - a. Students write and speak for a variety of purposes and audiences.
 - b. Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.
- B. *Materials*
1. Students' final draft of research paper
 2. One copy of Presentation Rubric (Appendix J) for each student
- C. *Key Vocabulary*
- None
- D. *Procedures/Activities*
1. Review good listening procedures (no talking, pay attention, hand to self, etc.) with the class. Invite any student who wishes to share their report to come to the front of the classroom (or an Author's Chair). If no student wishes to share randomly select using name sticks (or some other selection method).
 2. While the student is sharing, use the Presentation Rubric to score their public speaking abilities.

3. Once each student is finished sharing, thank him/her and select another student. (You will probably not get through the entire class. You can either have them read this to you some other time, or pick up with the students who didn't share on the next assignment that is read aloud.)
- E. *Assessment/Evaluation*
1. Use the Presentation Rubric for each student who shares.

VI. CULMINATING ACTIVITY (45 minutes)

- A. This will be done in two parts. Two separate class periods are recommended.
1. Part 1: Place students into groups using your standard procedure (make sure groups are heterogeneous based on the report). Tell students they will be making part of the final test as well as making a game. Tell them that each group will focus on one person that has been studied. Each group must come up with five factual questions for each person that will be in the final exam. Also explain they will work together to create a game or puzzle for that person. The activity can be a crossword puzzle, a word search, a game board, etc. Give groups time to complete both tasks.
 2. Part 2: Give the final unit exam (Appendix K) to all students (questions 1-15 are based on types of questions students may have given you). A modified test is included for ELL/Special Education students (Appendix L) and for Gifted Talented students (Appendix M). Appendix N is the answer key.

VII. HANDOUTS/WORKSHEETS

- A. Appendix A: Elizabeth Blackwell: The First Woman Doctor
 B. Appendix B: Elizabeth Blackwell: The First Woman Doctor
 C. Appendix C: Elizabeth Blackwell: The First Woman Doctor (modified)
 D. Appendix D: Elizabeth Blackwell: The First Woman Doctor (answer key)
 E. Appendix E: Benjamin Banneker
 F. Appendix F: Choosing a Topic
 G. Appendix G: Bibliography Draft
 H. Appendix H: Paper Outline
 I. Appendix I: Working Behavior Rubric
 J. Appendix J: Presentation Rubric
 K. Appendix K: Final Unit Exam
 L. Appendix L: Final Unit Exam (modified for ELL/SpEd)
 M. Appendix M: Final Unit Exam (modified for G/T)
 N. Appendix N: Final Unit Exam Answer Key

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Appendix A

Elizabeth Blackwell: The First Woman Doctor

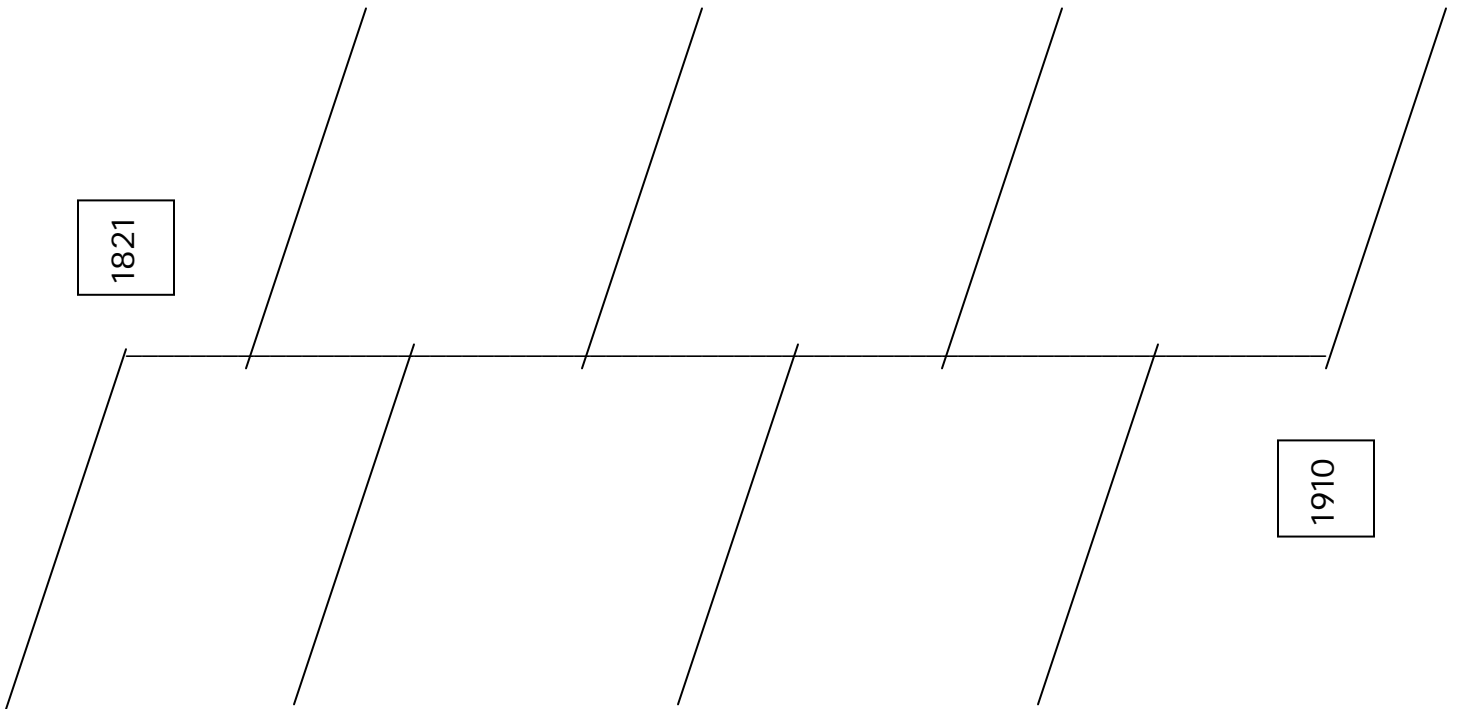
K (What I already know about the topic)	W (What I want to know about the topic)	L (What I learned about the topic)

Appendix B

Elizabeth Blackwell: The First Woman Doctor

Name _____ Date _____

Directions: Place the events on the time line in the correct order they happened.



Events

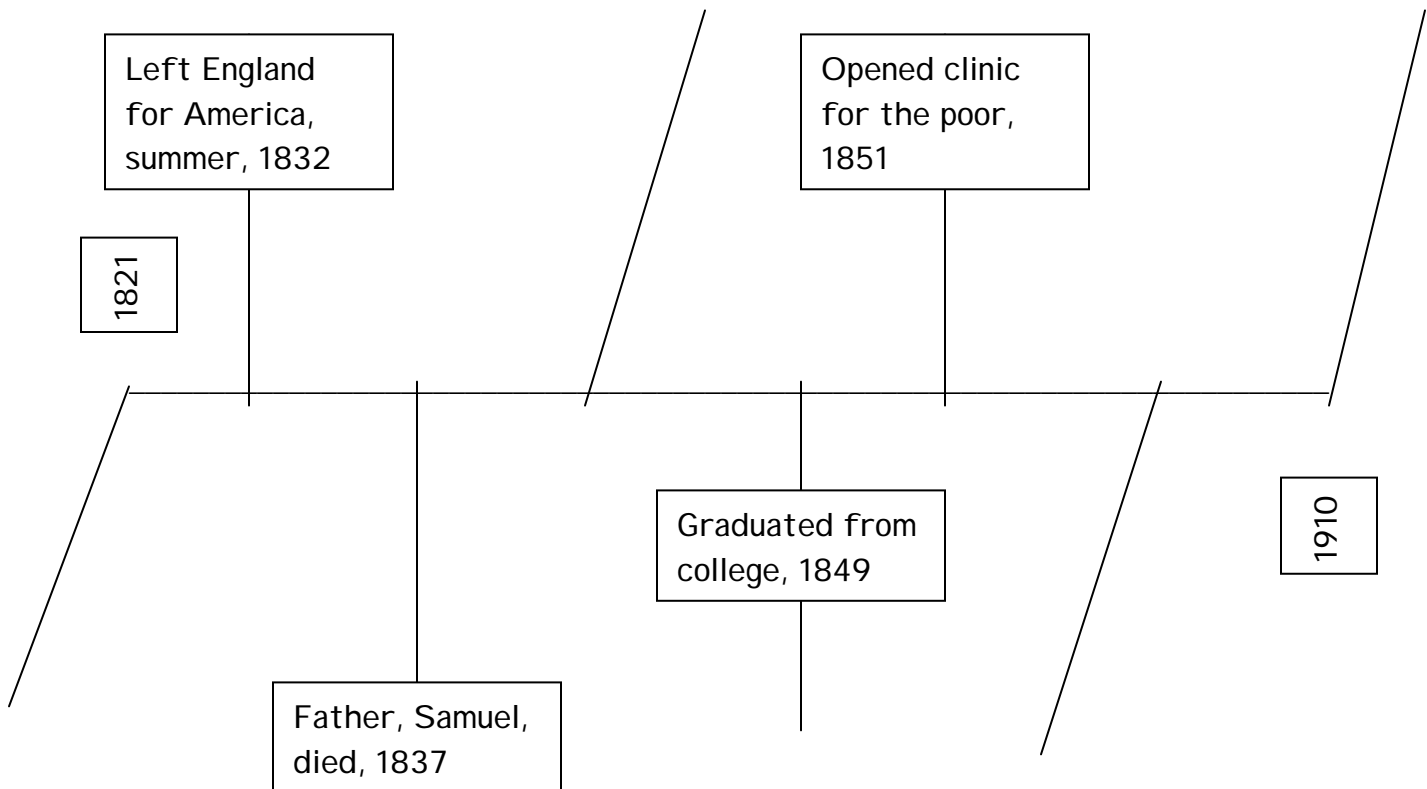
- Born in England, February 3
- Opened the Women’s Medical College in New York City, NY, 1868
- Father, Samuel, died, 1837
- Died in England
- Left England for America, summer, 1832
- Opened clinic for the poor, 1851
- Graduated from college, 1849
- Accepted to Geneva Medical College, 1847

Appendix C

Elizabeth Blackwell: The First Woman Doctor

Name _____ Date _____

Directions: Place the events on the time line in the correct order they happened.



Events

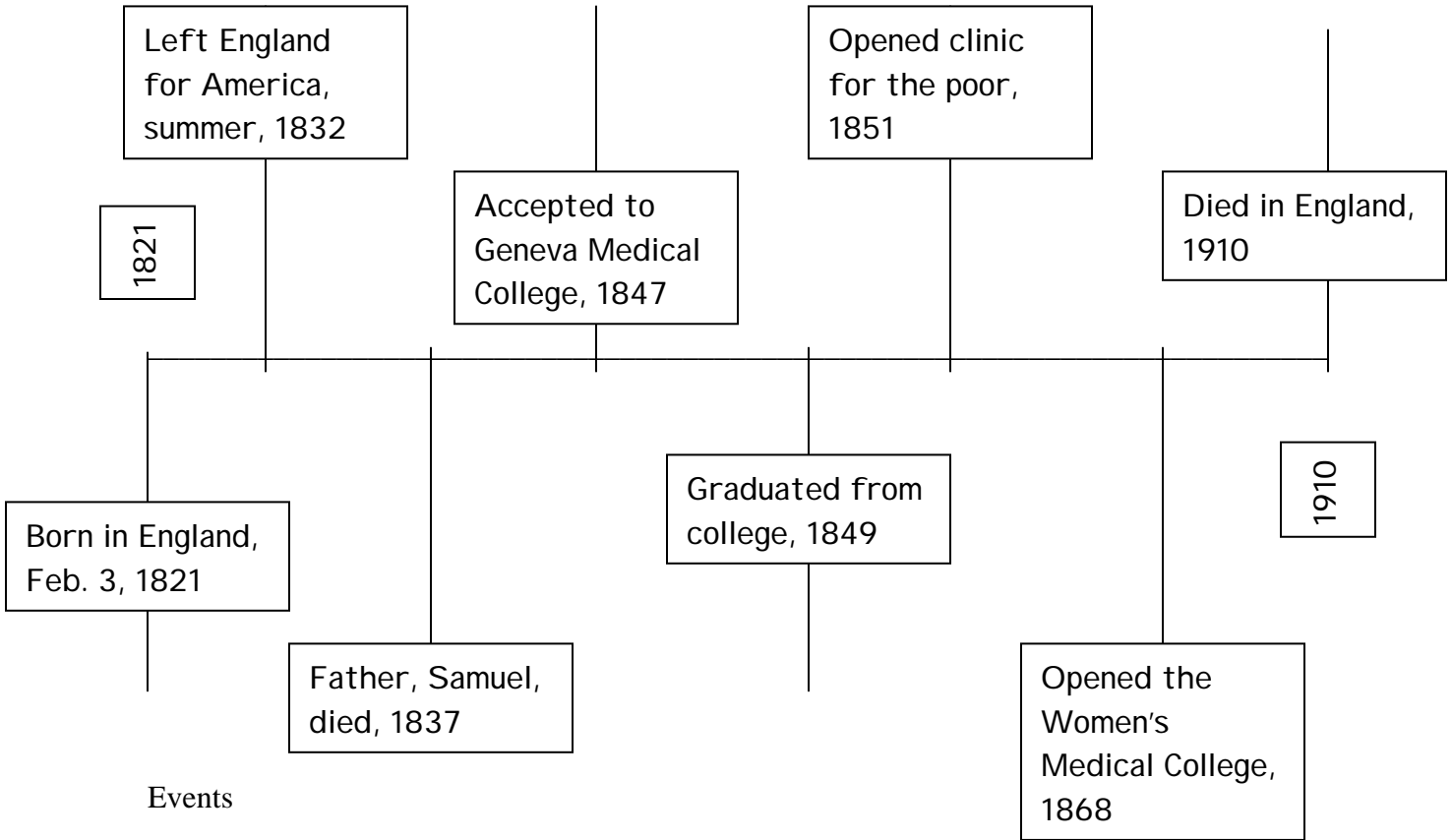
- Born in England, February 3
- Opened the Women's Medical College in New York City, NY, 1868
- Father, Samuel, died, 1837
- Died in England
- Left England for America, summer, 1832
- Opened clinic for the poor, 1851
- Graduated from college, 1849
- Accepted to Geneva Medical College, 1847

Appendix D

Elizabeth Blackwell: The First Woman Doctor

Name _____ Key _____ Date _____

Directions: Place the events on the time line in the correct order they happened.



Events

- Born in England, February 3
- Opened the Women's Medical College in New York City, NY, 1868
- Father, Samuel, died, 1837
- Died in England
- Left England for America, summer, 1832
- Opened clinic for the poor, 1851
- Graduated from college, 1849
- Accepted to Geneva Medical College, 1847

Appendix E

Benjamin Banneker

Surveyor

*Made a clock from scratch
*Calculated weather patterns for an almanac

Farmer

Appendix F

Choosing a Topic

Elizabeth Blackwell

Benjamin Banneker

Charles Drew

Michael Faraday

Appendix G

Bibliography Draft

Fill in the information with each source you use, including the Internet.

Books

Author (Last name, First initial). *Title*. Pages used. Year published.

1. _____ . _____ . Pgs _____ . _____ .

2. _____ . _____ . Pgs _____ . _____ .

V. _____ .
_____ . Pgs _____ .
_____ .

Internet

Author (Last name, First initial). "Title". Website address, year.

VI. _____ .
" _____ " .

_____ , _____ .

Appendix H
Outline Draft

(Introduction-topic sentence)

I. _____

(Body-1st achievement or challenge)

II. _____

(Body-2nd achievement or challenge)

III. _____

(Body-3rd achievement or challenge)

IV. _____

(Conclusion-rewrite topic sentence)

V. _____

Appendix I

Working Behavior Rubric

Student Name _____ Date _____

Criteria					Points
	4	3	2	1	
Level of Engagement in Class	Student contributes to class by offering ideas and asking questions more than once per class.	Student contributes to class by offering ideas and asking questions once per class.	Student rarely contributes to class by offering ideas and asking questions.	Student never contributes to class by offering ideas and asking questions.	
Behavior	Student almost never displays disruptive behavior during class.	Student rarely displays disruptive behavior during class.	Student occasionally displays disruptive behavior during class.	Student always displays disruptive behavior during class.	
				Total →	/8

Appendix J

Presentation Rubric

Student Name _____ Date _____

Criteria					Points
	4	3	2	1	
Organization	Student presents information in logical, interesting sequence which audience can follow.	Student presents information in logical sequence which audience can follow.	Audience has difficulty following presentation because student jumps around.	Audience cannot understand presentation because there is no sequence of information.	
Content Knowledge	Student demonstrates full knowledge (more than required) with explanations and elaboration.	Student seems comfortable with information, but does not elaborate.	Student is uneasy with information and is able to only answer basic questions.	Student does not have an understanding of information; student cannot answer questions about subject.	
Mechanics	Presentation has no grammatical errors.	Presentation has no more than two grammatical errors.	Presentation has three to five grammatical errors.	Presentation has more than five grammatical errors.	
Delivery	Student used a clear voice and correct, precise pronunciation of terms.	Student's voice is clear; student pronounces most words correctly.	Audience has a difficult time hearing presenter. Student incorrectly pronounces words.	Student mumbles, incorrectly pronounces words, and speaks too quietly for audience to hear.	
				Total→	/16

Final Exam-From Banneker to Faraday-Innovative People in Science

Name _____ Date _____

Section I-Knowledge

Directions: Match the fact to the person it belongs to.

- a. Became the first woman doctor in the world
- b. Discovered how to separate blood from plasma
- c. Invented a clock at age 20
- d. Born in England in 1821
- e. Born in Washington, D.C. in 1904
- f. Saved many lives during World War II with his discovery
- g. Born in London in 1791
- h. Discovered benzene
- i. Worked as a farmer most of his life
- j. First black man to create an almanac
- k. Opened a medical college in 1868
- l. Created the first generator

Charles Drew	_____	Elizabeth Blackwell	_____
	_____		_____
	_____		_____

Michael Faraday	_____	Benjamin Banneker	_____
	_____		_____
	_____		_____

Directions: Choose three words to make sentences. Your sentence must show the reader what the word means. No definitions! (Extra credit: Make sentences for all of the words.)

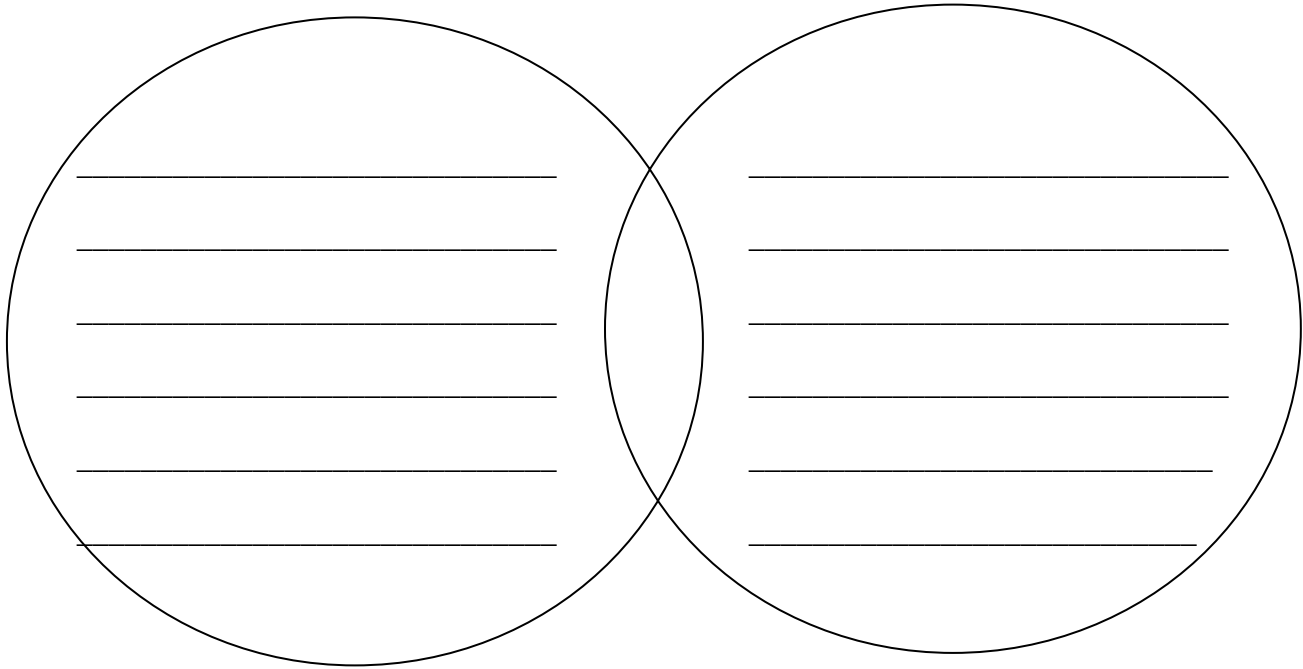
pioneer outline grueling rubric gloomy mock

- 1.
- 2.
- 3.

Appendix K, page 2

Section II: Comprehension and Analysis

Choose two of the people we studied to complete the Venn Diagram below. Use your information in the circle sections to write a short comparative paragraph. **(You may use your notes to check for information.)**



Four horizontal lines for writing a short comparative paragraph.

Section III: Application

Illustrate an object that requires Michael Faraday's discovery.

Appendix K, page 3

Section IV: Synthesis

Write a short paragraph describing what our world might be like today if Elizabeth Blackwell had not been the first woman doctor or if Charles Drew had not learned about blood transfusions. (Choose one to write about.)

Section V: Evaluation

Which person made the greatest contribution? Why do you think that?

Final Exam-From Banneker to Faraday-Innovative People in Science

Name _____ Date _____

Section I-Knowledge

Directions: Match the fact to the person it belongs to.

- a. Became the first woman doctor in the world
- b. Discovered how to separate blood from plasma
- c. Invented a clock at age 20
- d. Born in England in 1821
- e. Born in Washington, D.C. in 1904
- f. Born in London in 1791
- g. Discovered benzene
- h. First black man to create an almanac

Charles Drew _____ Elizabeth Blackwell _____

Michael Faraday _____ Benjamin Banneker _____

Directions: Choose two words to make sentences. Your sentence must show the reader what the word means. No definitions! (Extra credit: Make sentences for all of the words.)

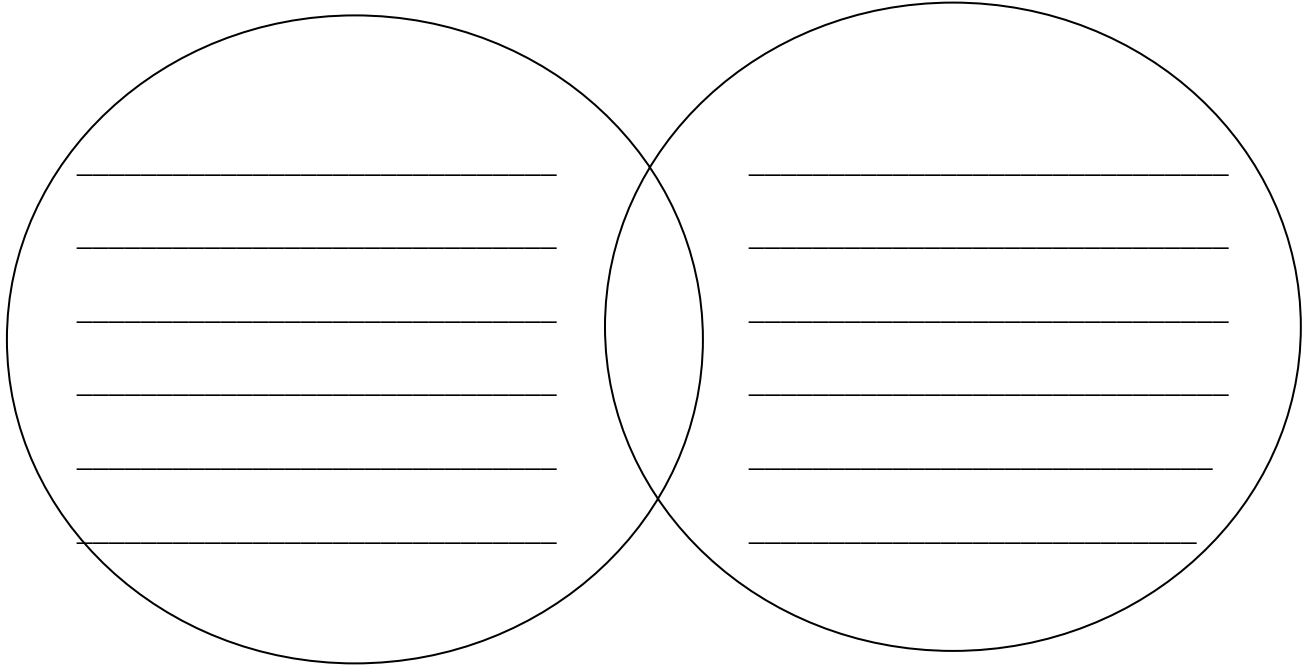
pioneer outline rubric gloomy mock

- 1.
- 2.

Appendix L, page 2

Section II: Comprehension and Analysis

Choose two of the people we studied to complete the Venn Diagram below. Use your information in the circle sections to write a short comparative paragraph. **(You may use your notes to check for information.)**



Section III: Application

Illustrate an object that requires Michael Faraday's discovery.

Appendix L, page 3

Section IV: Synthesis

Write a short paragraph describing what our world might be like today if Elizabeth Blackwell had not been the first woman doctor or if Charles Drew had not learned about blood transfusions. (Choose one to write about.)

Section V: Evaluation

Which person made the greatest contribution? Why do you think that?

Final Exam-From Banneker to Faraday-Innovative People in Science

Name _____ Date _____

Section I-Knowledge

Directions: Match the fact to the person it belongs to.

- a. Became the first woman doctor in the world
- b. Discovered how to separate blood from plasma
- c. Invented a clock at age 20
- d. Born in England in 1821
- e. Born in Washington, D.C. in 1904
- f. Saved many lives during World War II with his discovery
- g. Born in London in 1791
- h. Discovered benzene
- i. Worked as a farmer most of his life
- j. First black man to create an almanac
- k. Opened a medical college in 1868
- l. Created the first generator
- m. Grew up in a large family with many brothers and sisters
- n. Was a great athlete in high school and college
- o. Was born free on a tobacco plantation
- p. Was offered the honor of knighthood

Charles Drew _____ Elizabeth Blackwell _____

Michael Faraday _____ Benjamin Banneker _____

Appendix M, page 2

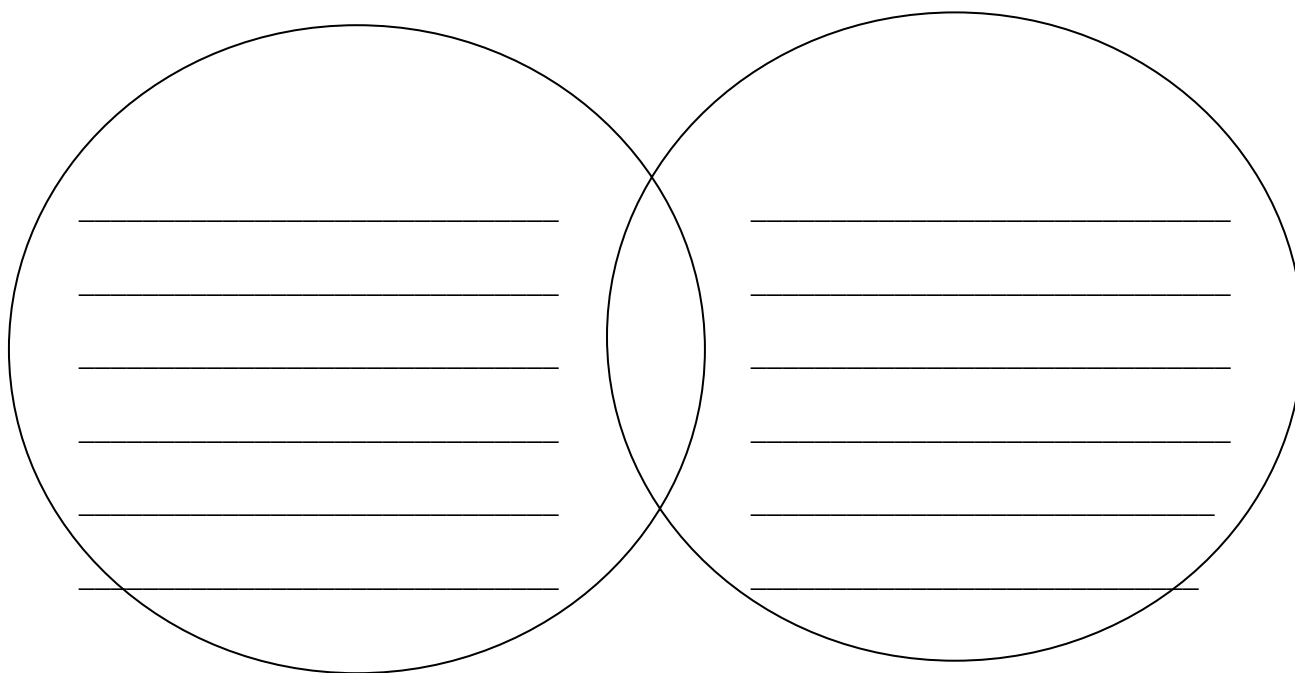
Directions: Choose five words to make sentences. Your sentence must show the reader what the word means. No definitions!

pioneer outline grueling rubric gloomy mock

- 1.
- 2.
- 3.
- 4.
- 5.

Section II: Comprehension and Analysis

Choose two of the people we studied to complete the Venn Diagram below. Use your information in the circle sections to write a short comparative paragraph. **(You may use your notes to check for information.)**



Appendix M, page 3

Section III: Application

Illustrate an object that requires Michael Faraday's discovery.

Section IV: Synthesis

Write a short paragraph describing what our world might be like today if Elizabeth Blackwell had not been the first woman doctor or if Charles Drew had not learned about blood transfusions. (Choose one to write about.)

Section V: Evaluation

Which person made the greatest contribution? Why do you think that?

Appendix N, page 2

Section II: Comprehension and Analysis

Choose two of the people we studied to complete the Venn Diagram below. Use your information in the circle sections to write a short comparative paragraph. **(You may use your notes to check for information.)**

Answers will vary. Basic facts about each person and their accomplishments should be included (where/when they were born, what they did for society, etc.)

Section III: Application

Illustrate an object that requires Michael Faraday's discovery.

Answers will vary. A device that uses an electrical motor is a correct answer.

Section IV: Synthesis

Write a short paragraph describing what our world might be like today if Elizabeth Blackwell had not been the first woman doctor or if Charles Drew had not learned about blood transfusions. (Choose one to write about.)

Answers will vary. Things would be different if Elizabeth Blackwell hadn't been the first doctor because it may have taken women much longer to be able to be a doctor. We may not have as many women doctors today, etc.

If Charles Drew had not learned about blood transfusions, people may not be able to be saved when they are hurt or need blood. It may have taken longer for this discovery to be made, and our technology would be behind, etc.

Section V: Evaluation

Which person made the greatest contribution? Why do you think that?

Answers will vary.