

Historical Success Stories: Banneker, Blackwell, Drew, and Faraday

Grade Level or Special Area: Fourth Grade, Science

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Length of Unit: Four lessons (six days, approximately 60 minutes per lesson)

I. ABSTRACT

In this unit students will understand that people of all races and religions have made contributions to United States history. The students will acknowledge the contributions of scientists like Elizabeth Blackwell, Benjamin Banneker, Charles Drew, and Michael Faraday. With research activities the students will develop the ability to work well in groups as well as independently. Ultimately, the students will gain an understanding of the life events and historical successes of great scientists.

II. OVERVIEW

A. Concept Objectives

1. Students will understand the chronological organization of history and recognize how to organize events and people into major eras to identify and explain historical relationships. (*Colorado Model Content Standards for History Standard #1*)
2. Students will recognize how to use the processes and resources of historical inquiry. (*Colorado Model Content Standards for History Standard #2*)
3. Students will develop an understanding of how to write and speak for a variety of purposes and audiences. (*Colorado Model Content Standards for Reading and Writing Standard #2*)

B. Content from the *Core Knowledge Sequence*

1. Fourth Grade Science: Science Biographies (p.106)
 - a. Benjamin Banneker
 - b. Elizabeth Blackwell
 - c. Charles Drew
 - d. Michael Faraday

C. Skill Objectives

1. Students will gather historical data from multiple sources.
2. Students will take notes, outline, and identify main ideas in resource materials.
3. Students will research life events of a particular historical figure.
4. Students will use available technology to obtain historical information.
5. Students will create a timeline that shows people and events in sequence using years.
6. Students will write a biographical sketch retelling the life of a scientist using sequential comprehension skills.
7. Students will write and speak for audiences such as peers, parents, and teachers.
8. Students will answer questions about historical scientists.

III. BACKGROUND KNOWLEDGE

A. For Teachers

1. *What Your Fourth Grader Needs To Know*, by E.D. Hirsch Jr.
2. *What Would You Ask? Michael Faraday*, by Anita Ganeri
3. *Colonial Leaders: Benjamin Banneker: American Mathematician and Astronomer*, by Arthur M. Schlesinger Jr.

4. *Elizabeth Blackwell: The First Woman Doctor*, by Ira Peck
 5. *Charles Drew: Pioneer of Blood Plasma*, by Linda Trice
- B. For Students
1. Early Presidents and Politics (pg. 96, Fourth Grade, *Core Knowledge Sequence*)
 2. Circulatory System (pg. 104, Fourth Grade, *Core Knowledge Sequence*)
 3. Electricity (pg.105 Fourth Grade, *Core Knowledge Sequence*)

IV. RESOURCES

- A. Refer to Appendix B for a list of suggested resources (Lessons One-Two)

V. LESSONS

Lesson One: What Would You Ask? Research Activity (two days, 60 minutes each day)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students will recognize how to use the processes and resources of historical inquiry.
2. Lesson Content
 - a. Benjamin Banneker
 - b. Elizabeth Blackwell
 - c. Charles Drew
 - a. Michael Faraday
3. Skill Objective(s)
 - a. Students will use available technology to obtain historical information.
 - b. Students will research life events of a particular historical figure.
 - c. Students will take notes, outline, and identify main ideas in resource materials.
 - d. Students will gather historical data from multiple sources.
 - e. Students will answer questions about historical scientists.

B. *Materials*

1. Pens and pencils
2. Four copies of Appendix A per student
3. One clip board per student
4. One overhead projector
5. One transparency of Appendix C
6. One copy of Appendices D, E, F, and G for the teacher
7. One copy of Appendix C per student for grading purposes

C. *Key Vocabulary*

1. Plagiarism – the act of presenting someone else’s work as your own

D. *Procedures/Activities*

DAY ONE

1. Begin this lesson with a brief discussion on the processes and resources of historical inquiry.
2. Tell the students that they will be using available resources to obtain historical information about the lives of four famous scientists.
3. Tell the students that they will be using a variety of books and the Internet for this research activity.
4. **You should have already gathered a bunch of books and other resources of information on the four scientists for the students use.**
5. Refer to Appendix B for a great list of suggestions. I suggest at least four-five books on each scientist.

6. Now take the time to introduce the names of the four scientists.
7. Write the names of the four scientists on the board (Elizabeth Blackwell, Charles Drew, Benjamin Banneker, and Michael Faraday).
8. Tell the students that these four scientists are the focus for this activity.
9. Now distribute four copies of Appendix A to every student.
10. Have the students title each page with the name of one of the four scientists.
11. Take the time to read aloud the list of questions to your students.
12. They should notice that they will answer the same questions for each scientist.
13. Let them know that they will work in groups to determine the answers to their list of questions for each of the four scientists.
14. Tell them that their group work will take place in the library and the computer lab.
15. Make sure they are aware of the fact that this is a group activity and they will be graded on their participation and collaboration.
16. Grab the overhead projector and the transparency of Appendix C to share your expectations of their group work during this activity.
17. It is now time to break your class into groups. Be sure to think of the placement of your students.
18. You will need to break the class into five semi-equal groups.
19. **Be sure to have spoken with your librarian and computer lab tech prior to this lesson to reserve an area for your students.**
20. **You will need four tables in the library and at least five computers in the lab.**
21. Before you take the students to the library and computer lab, remind them of their necessary behavior in both locations.
22. Tell them that you will be roaming around to determine their group participation score.
23. Now that you have your five groups determined remind the students of their task.
24. Tell them that they must use the books and Internet to answer all of the questions on their sheets for all four scientists.
25. You may suggest the students bring their clipboards for something hard to write on.
26. Now quietly make your way to the library and computer lab to disperse them to their appropriate areas.
27. Tell the students they will have 20 minutes at each center.
28. Use some sort of signal that the children recognize to let them now it is time to move to the next center.
29. The rotation of the centers will be up to your discretion.
30. Tell the students that today each of the groups will make it to two of the centers.
31. **Make sure each of the four tables is covered with resources according to the scientist.**
 - a. **Table One – Elizabeth Blackwell**
 - b. **Table Two - Charles Drew**
 - c. **Table Three – Benjamin Banneker**
 - d. **Table Four – Michael Faraday**
32. Now send one group to each of the four tables and the computer lab.
33. While the students are working be sure to monitor their progress.
34. Make sure to keep the students on track. Use this time to complete their individual rubric on collaborative work skills.
35. At the end of the two 20-minute centers have the students attach their work to their clipboards for safekeeping.

36. Now tell them that tomorrow we will be finishing the other three centers.

DAY TWO

1. Today before you make your way to the library and computer lab, spend some time discussing what difficulties the students may be having.
2. Suggest that they can save time on their note taking by using short sentences and abbreviations.
3. Remind them to be careful not to twist facts or ideas into something that the author didn't say.
4. You may even want to introduce plagiarism as the act of presenting someone else's work as your own.
5. Tell them that to avoid this they can simply re-state the author's information in their own words.
6. Suggest that they evenly distribute the work amongst each other.
7. Perhaps two group members are in charge of answering numbers 1-3. And the others work on the rest of the questions. This may help them accomplish more in a small amount of time.
8. Now be sure to send the students to centers that they have not been to and continue the rotation.
9. At the end of today the students should have all of their answers completed. Be sure to collect all of their work.
10. Have the students check to see that their name has been written on their sheets and that the sheets have been stapled together.
11. **Alternative Suggestion: If the students have not finished their assignment you may do one of the following ideas:**
 - a. **Send the remainder home for homework**
 - b. **Add another day in the library**
12. Once you have collected all of their work you will use Appendices D, E, F and G to grade the validity of their answers.
13. Tell the children that they will get their work back soon because it will be used in our next lesson on writing a biographical sketch on each of the scientists.

E. *Assessment/Evaluation*

1. Appendix C: Rubric on Collaborative Work Skills
2. Appendix D: Elizabeth Blackwell Answer Key
3. Appendix E: Charles Drew Answer Key
4. Appendix F: Benjamin Banneker Answer Key
5. Appendix G: Michael Faraday Answer Key

Lesson Two: Biographical Sketch (two days, 60 minutes each day)

A. *Daily Objectives*

1. Concept Objective(s)
 - a. Students will develop an understanding of how to write and speak for a variety of purposes and audiences.
2. Lesson Content
 - a. Benjamin Banneker
 - b. Elizabeth Blackwell
 - c. Charles Drew
 - d. Michael Faraday
3. Skill Objective(s)
 - a. Students will write a biographical sketch retelling the life of a scientist using sequential comprehension skills.

B. *Materials*

1. One copy of Appendix H: Biographical Sketch Sample
2. One transparency of Appendix I: Rubric for Biographical Sketch
3. Overhead Projector
4. Two copies of Appendix J for every student
5. Pens or pencils

C. *Key Vocabulary*

1. Biographical sketch – a way to tell about a person’s life by focusing on one major event that defines who he or she is

D. *Procedures/Activities*

DAY ONE

1. Now that the students have their answers to the research questions, the students are ready to write a biographical sketch
2. Write the definition for a biographical sketch on the board.
 - a. Biographical sketch – a way to tell about a person’s life by focusing on one major event that defines who he or she is
3. Ask one of your students to read what you write.
4. Tell the students that they will be picking one of the four scientists that they have researched.
5. At this time hand back the students graded question sheets from yesterday.
6. Take about 15 minutes to review the answers for all four scientists.
7. Now tell them that they will use these sheets to write their biographical sketch.
8. Remind the students that they are only writing about one scientist.
9. **You may want to have a few books on each scientist available in the classroom for further research.**
10. At this time bring the students to the floor to listen to two samples of biographical sketches.
11. Refer to Appendix H and read the samples aloud to your students.
12. Tell the students to focus on what they think may be the one major event that defines who the subject is.
13. Remind the students that even though these biographical sketches focus on one aspect of the person’s life, they also try to include basic facts such as where he or she was born, how many children he or she had, and others.
14. Before you send the students on their way to start their own biographical sketch, pull out the overhead projector.
15. Use Appendix J and the students to score the sample biographical sketches.
16. This will allow the students to gain an understanding of what you expect their work to entail.
17. It is now time to allow the students to start their own biographical sketch on one of the four scientists.
18. Tell the students that they must complete a revised rough draft copy before tomorrow.
19. This will be homework if they do not complete the task in class.

DAY TWO

1. Today the students will switch their sketches with two other classmates for revision and suggestions.
2. Refer to Appendix J for a revision checklist that the students will complete for two other classmates.
3. The students can pick whom they wish to have revise their work.
4. Tell the students that these revision checklists as well as the rough draft and final copy will be necessary items to receive a grade on this activity.

5. After the students have had their sketch revised by two other students they may begin their final copy of the sketch.
 6. The final copy may be typed or handwritten.
 7. Make sure that every child turns in the rough draft, two revision checklists, and final copy stapled together.
 8. You will use Appendix I to assess the students on their biographical sketches.
- E. *Assessment/Evaluation*
1. Appendix I: Rubric on Biographical Sketch

Lesson Three: Timeline (one day, 45 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Students will understand the chronological organization of history and recognize how to organize events and people into major eras to identify and explain historical relationships.
 2. Lesson Content
 - a. Benjamin Banneker
 - b. Elizabeth Blackwell
 - c. Charles Drew
 - d. Michael Faraday
 3. Skill Objective(s)
 - a. Students will create a timeline that shows people and events in sequence using years.
- B. *Materials*
1. One copy of Appendix K per student
 2. Pens or pencils
 3. One pair of scissors per student
 4. One glue stick per student
 5. One piece of 11" x 14" construction paper per student (color does not matter)
 6. Markers, crayons, or colored pencils
 7. One ruler per student
 8. One copy of Appendix L per student (for grading purposes)
- C. *Key Vocabulary*
1. Timeline – a schedule of activities or events; a timetable or a representation of key events within a particular historical period
- D. *Procedures/Activities*
1. Start this lesson by asking your students a question.
 2. How do people keep track of things that happen on certain days or in certain years?
 3. Some students may say by taking pictures or writing in journals. But, the answer you are looking for is by using a timeline.
 4. Tell the students that putting events on a timeline allows a person to gain a sense of how much time goes by in between events. It also helps a person remember just when those important events happened.
 5. Tell the students that today they will be creating a timeline for the four scientists they have been studying about.
 6. Now distribute a copy of Appendix K to each student.
 7. Tell them that Appendix K is the list of assorted events that they will use to make their own timeline.
 8. Before the students begin their work share Appendix L with them to set your expectations.

9. Now they can begin by cutting the events into individual strips and placing them in chronological order.
 10. Remind them that the slips must be in order from earliest to latest on their timelines.
 11. Make sure they calculate the number of segments that the timeline will have so that they can be sure to fit all the events.
 12. Now distribute one piece of construction paper to every student.
 13. Tell them that they will only get one piece so use it wisely.
 14. Suggest that your students do this activity in pencil.
 15. Now the students are ready to draw a line on their sheet of construction paper and divide it into the number of equal segments that they figure they will need.
 16. The students will now glue the events chronologically onto the timeline.
 17. Use Appendix L to grade the student's timelines and then hang them around the classroom.
- E. *Assessment/Evaluation*
1. Appendix L: Timeline Checklist

Lesson Four: Oral Presentation (one day, approximately 60 minutes)

- A. *Daily Objectives*
1. Concept Objective(s)
 - a. Students will develop an understanding of how to write and speak for a variety of purposes and audiences.
 2. Lesson Content
 - a. Benjamin Banneker
 - b. Elizabeth Blackwell
 - c. Charles Drew
 - d. Michael Faraday
 3. Skill Objective(s)
 - a. Students will write and speak for audiences such as peers, parents, and teachers.
- B. *Materials*
1. One copy of Appendix N per student (for grading purposes)
 2. Overhead projector
 3. One transparency of Appendix N
- C. *Key Vocabulary*
- None
- D. *Procedures/Activities*
1. Many people are afraid of speaking for an audience. This activity will help your students conquer that fear.
 2. Tell the students that today they will use their biographical sketch that they have already written to prepare an oral presentation.
 3. Pull out the overhead projector and share Appendix N with the students. This appendix has the scoring guide for the oral presentation.
 4. Read this rubric together so that every student understands his or her requirements.
 5. Now give the children time in class to start memorizing their biographical sketches.
 6. The majority of this memorization will take place at home.
 7. Determine a deadline for their oral presentation and invite family and friends to attend the presentations.
 8. Before the actual presentation allow the students to practice in front of other

- classes.
9. Finally, during their presentation use Appendix N to score them.
- E. *Assessment/Evaluation*
1. Appendix N: Rubric for Oral Presentation

VI. CULMINATING ACTIVITY

- A. Students will create *Scientist Trading Cards* (for all four scientists) that will have an illustration of the scientist and facts about him or her. Refer to Appendix M for a sample Scientist Trading Card.

VII. HANDOUTS/WORKSHEETS

- A. Appendix A: What Would You Ask? Research Questions
 B. Appendix B: List of Suggested Resources
 C. Appendix C: Rubric on Collaborative Work Skills
 D. Appendix D: Answer Key: Elizabeth Blackwell
 E. Appendix E: Answer Key: Charles Drew
 F. Appendix F: Answer Key: Benjamin Banneker
 G. Appendix G: Answer Key: Michael Faraday
 H. Appendix H: Sample Biographical Sketch
 I. Appendix I: Rubric for Biographical Sketch
 J. Appendix J: Revision Checklist
 K. Appendix K: List of Assorted Timeline Events
 L. Appendix L: Timeline Checklist
 M. Appendix M: Sample Scientist Trading Card
 N. Appendix N: Oral Presentation Rubric

VIII. BIBLIOGRAPHY

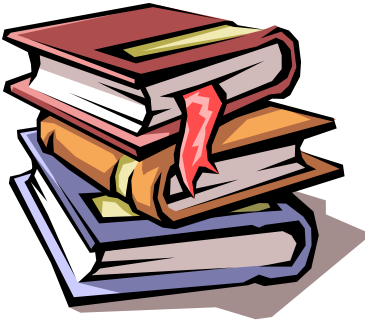
- A. Burby, Liza N., *Elizabeth Blackwell: The First Woman Doctor*. Power Kids Press, 1997. 0-8239-5022-0
 B. Conley, Kevin, *Benjamin Banneker: Scientist and Mathematician*. Chelsea House Publishers, 1989. 1-55546-573-0
 C. Ferris, Jeri, *What Are You Figuring Now? Story About Benjamin Banneker*. Carol Rhoda Books, 1988. 0-87614-331-1
 D. Ganeri, Anita, *What Would You Ask? Michael Faraday*. Thameside Press, 2000. 1-929298-77-3
 E. <http://www.judyblume.com/jb-bio.html>
 F. Kent, Deborah, *Our People: Elizabeth Blackwell: Physician and Health Educator*. The Child's World, 2004. 1-59296-002-2
 G. Maupin, Melissa, *Journey to Freedom: Benjamin Banneker*. The Child's World, 2000. 1-56766-618-3
 H. Peck, Ira, *Elizabeth Blackwell: The First Woman Doctor*. The Millbrook Press, 2000. 0-7613-1854-2
 I. Sabin, Francine, *Elizabeth Blackwell, The First Woman Doctor*. Troll Associates, 1982. 0-8937-5757-8
 J. Schlesinger, Arthur M. Jr., *Colonial Leaders: Benjamin Banneker: American Mathematician and Astronomer*. Chelsea House Publishers, 2000. 0-7910-5348-2
 K. Talmadge, Katherine S., *The Life of Charles Drew*. Twenty-First Century Books, 1992. 0-941477-65-7
 L. Trice, Linda, *Charles Drew: Pioneer of Blood Plasma*. McGraw Hill, 2000. 0-0713-5317-8
 M. www.teacher.scholastic.com/writewit/biograph/biography_sketch.htm



**WHAT WOULD YOU ASK?
RESEARCH QUESTIONS**
Scientist Name: _____

1. **Where were you born?**
2. **Did you go to school? If so, where?**
3. **How did you become a scientist?**
4. **What sort of work did you do?**
5. **What was your greatest discovery?**
6. **How are you remembered today?**

Appendix B



List of Suggested Resources

- Ferris, Jeri, *What Are You Figuring Now? Story About Benjamin Banneker*. Carol Rhoda Books, 1988. 0-87614-331-1
- Conley, Kevin, *Benjamin Banneker: Scientist and Mathematician*. Chelsea House Publishers, 1989. 1-55546-573-0
- Peck, Ira, *Elizabeth Blackwell: The First Woman Doctor*. The Millbrook Press, 2000. 0-7613-1854-2
- Schlesinger, Arthur M. Jr., *Colonial Leaders: Benjamin Banneker: American Mathematician and Astronomer*. Chelsea House Publishers, 2000. 0-7910-5348-2
- Ganeri, Anita, *What Would You Ask? Michael Faraday*. Thameside Press, 2000. 1-929298-77-3
- Trice, Linda, *Charles Drew: Pioneer of Blood Plasma*. McGraw Hill, 2000. 0-0713-5317-8
- Maupin, Melissa, *Journey to Freedom: Benjamin Banneker*. The Child's World, 2000. 1-56766-618-3
- Kent, Deborah, *Our People: Elizabeth Blackwell: Physician and Health Educator*. The Child's World, 2004. 1-59296-002-2
- Burby, Liza N., *Elizabeth Blackwell: The First Woman Doctor*. Power Kids Press, 1997. 0-8239-5022-0
- Talmadge, Katherine S., *The Life of Charles Drew*. Twenty-First Century Books, 1992. 0-941477-657
- Sabin, Francine, *Elizabeth Blackwell, The First Woman Doctor*. Troll Associates, 1982. 0-8937-5757-8

Appendix C
Rubric on Collaborative Work Skills

Category	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
Working With Others	Almost always listens to, shares with, and supports the efforts of others.	Usually listens to, shares with, and supports the efforts of others.	Often listens to, shares with, and supports the efforts of others.	Rarely listens to, shares with, and supports the efforts of others.
Attitude	Never is publicly critical of the work of others. Always has a positive attitude about the task.	Rarely is publicly critical of the work of others. Often has a positive attitude about the task.	Occasionally is publicly critical of the work of others. Usually has a positive attitude about the task.	Often is publicly critical of the work of others. Often has a negative attitude about the task.
Time Management	Routinely uses time well throughout the project to ensure things get done on time.	Usually uses time well throughout the project, but may have procrastinated on one thing.	Tends to procrastinate but always gets things done by the deadlines.	Rarely gets things done by the deadlines and the group has to adjust deadlines because of this persons inadequate time management.
Contributions	A definite leader who contributes a lot of effort.	A strong group member who tries hard.	A satisfactory group member who does what is required.	May refuse to participate.
Quality of Work	Provides work of the highest quality.	Provides high quality work.	Provides work that occasionally needs to be checked or redone to ensure quality.	Provides work that usually needs to be checked or redone to ensure quality.

Student Name: _____

Circle the Score:

Advanced
Proficient
Developing
Beginning

Appendix D

Answer Key

WHAT WOULD YOU ASK?

RESEARCH QUESTIONS

Scientist Name: Elizabeth Blackwell

Where were you born?

Elizabeth Blackwell was born in England on February 3, 1821.

Did you go to school? If so, where?

In her time, women were expected to marry and become mothers. But, Elizabeth wasn't like most women. She was able to study the same subjects as her brothers in school. Elizabeth also applied to all the best medical schools in the United States. She was finally accepted to Geneva Medical School as a joke. But, in the end she earned the respect of her teachers and other students and graduated as one of the best students in her class.

How did you become a scientist?

One day Elizabeth visited a friend who was very sick. The woman said that Elizabeth should become a doctor. At first Elizabeth thought this was funny. She knew that no woman had ever been allowed to go to medical school. But this challenge excited her. She was finally accepted into medical school and worked her way through as a teacher.

What sort of work did you do?

On January 23, 1849, Elizabeth became a doctor after graduating from Geneva Medical School. No hospital in the United States would let her work. So she went to Paris, France, where she became a nurse in a hospital. There she accidentally squirted a strong medicine into her eyes and lost sight in her left eye. She moved home to get better. And in 1852, she opened her own office in New York City. Five years later, she and her sister opened a hospital for Women and Children.

What was your greatest discovery?

Elizabeth Blackwell wanted other women to become doctors, too. In 1866, she opened a medical college for women in New York City. Later, she helped to open another college in England. Elizabeth had become the first female doctor and changed medicine forever.

How are you remembered today?

Without the struggles and determination of Elizabeth Blackwell we may not have ever had female doctors. The women in the medical field today thank Elizabeth for her dedication to women's rights. Many hospitals have been named after Elizabeth Blackwell.

Appendix E

Answer Key

WHAT WOULD YOU ASK?

RESEARCH QUESTIONS

Scientist Name: Charles Drew

Where were you born?

Charles Drew was born in Washington, D.C. on June 3, 1904.

Did you go to school? If so, where?

Charles Drew entered Amherst College in hopes of pursuing a career in the medical field as a doctor. He continued his studies at McGill University in Montreal, Canada. There he graduated second in a class of 137. Charles kept on educating himself and in 1940 received a Doctor of Science in Surgery degree from Columbia University. Despite, all of his education and determination Charles never made it as a doctor in the American Medical Association.

How did you become a scientist?

Charles never gave up. He continuously educated himself and fought to become part of the American Medical Association.

What sort of work did you do?

Drew was an instructor in pathology at Howard Johnson. He was also a medical supervisor of the Blood for Britain Program. He continued to excel in the medical field in a variety of ways, but never became a doctor.

What was your greatest discovery?

Drew's greatest discovery established blood-banking procedures for the Red Cross. He found blood plasma, unlike white blood cells, could be stored for long periods of time. He then used his discovery to collect blood for the Army and Navy during WWII.

How are you remembered today?

His greatest discovery was to develop blood-banking procedures that have since then saved countless lives. We owe Drew for blood-banking procedures used today.

Appendix F

Answer Key

WHAT WOULD YOU ASK?

RESEARCH QUESTIONS

Scientist Name: Benjamin Banneker

Where were you born?

Benjamin was born in Maryland on November 9, 1731. At this time, Maryland was still an English colony.

Did you go to school? If so, where?

Benjamin's family owned their own tobacco farm. The farm required a lot of hard work. Ben did not go to school as a young child. Instead, he helped with the crops and the animals on the farm. One day while Ben's grandmother taught him how to read she decided he needed to go to a real school. So, Ben attended a one-room school that had recently opened nearby. Ben was one of a few free black children who attended the school. Unfortunately, Ben's time in school was cut short due to the amount of work needed done on the farm. Ben continued his studies at home until the Ellicott's moved close by. Then he fired up his love for learning again.

How did you become a scientist?

Ben learned from his surroundings. He would borrow materials from friends and family and invent items necessary for his life and the lives of his family and friends. The Ellicott family significantly influenced him and their influence fired up his love for learning again.

What sort of work did you do?

Ben decided to make a clock. He borrowed a watch to take apart, in order to learn all about the complex inner workings of a timepiece. He carved each piece carefully by hand. And in 1753 Ben finished his masterpiece. But he did not stop there. He also studied astronomy and calculated when the sun would rise and set each day. He surveyed the new national capital and published his own almanac.

What was your greatest discovery?

Benjamin's greatest achievement was the success of his first almanac. He made so much money that he quit growing tobacco. He no longer had to work all day. But, eventually more and more people created their own almanacs and his success relied on his wooden clock, ephemeris, and surveying of the nations capital.

How are you remembered today?

For much of Benjamin's life, not many people had heard of him. But, in his later years he became quite well - known. He is remembered today with a postage stamp in recognition of his important accomplishments.

Appendix G

Answer Key

WHAT WOULD YOU ASK?

RESEARCH QUESTIONS

Scientist Name: Michael Faraday

Where were you born?

Michael was born in Surrey, England on September 22, 1791. The city is now part of London.

Did you go to school? If so, where?

Michael did not go to school for very long. In fact, he left school when he was 13 years old.

How did you become a scientist?

Faraday was given some tickets to a science lecture. It is there that he found his true passion and was introduced to Sir Humphry Davy. Michael's persistence allowed him to become a lab assistant to this famous scientist.

What sort of work did you do?

Michael spent hours reading books and studying scientific journals in the Royal Institution's library. He also continued to help Sir Humphry with his famous invention of the safety lamp for miners. But before long, Michael began work on his own chemistry experiments. His experiments led him to discover a new chemical called benzene. He also made an early type of stainless steel. But, eventually Michael turned to the subject of electricity.

What was your greatest discovery?

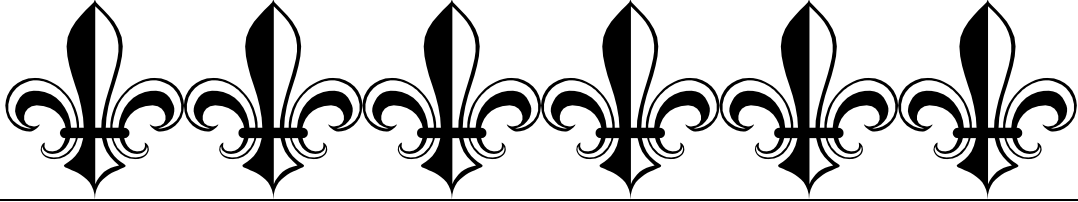
Michael invented the first electric motor. He also invented the transformer, a device that changes the voltage of electricity from high to low, or vice versa. But, he is most known for his invention of the first dynamo. This machine turned movement into electricity. Inside the dynamo, a wire is moved in a magnetic field and this makes an electric current flow in the wire.

How are you remembered today?

Every time you turn on the light or switch on the television, you can thank Michael Faraday for making that possible.

Appendix H

Sample Biographical Sketch



SAMPLE ONE: 9-YEAR-OLD STUDENT

Benjamin Banneker

Benjamin Banneker was a famous African American inventor. This inventor was also a teacher, mathematician, and a surveyor. He also helped draw plans for the city of Washington D.C. in 1791.

Benjamin was an astronomer and taught himself astronomy and shared his work about the stars.

The first clock he invented was the grandfather clock. In 1753, he made a clock built entirely from wood. Everything was carved by hand. Today we enjoy clocks in every room of our house.

Benjamin Banneker was born near Baltimore, Maryland. His grandmother taught him to read and write. He also wrote almanacs.

SAMPLE TWO: 10-YEAR-OLD STUDENT

Abraham Lincoln

On February 12, 1809, Abraham Lincoln was born in Kentucky on a cornhusk mattress. Abraham helped his father and family move to Indiana when he was 7-years old. When his mother died in 1818 his new stepmother urged him to satisfy his appetite for reading everything and anything whenever he could.

Abraham grew till he was 21 when his father moved his family to Illinois. He ran for state legislature several years later. He lost his first race but won the next three. Abraham got married a little later and had four baby boys.

In the Civil War Lincoln chose General Ulysses S. Grant to lead upon the troops. At the end of the war an angry southerner shot Abraham.

Appendix I
Rubric for Biographical Sketch

Student's Name: _____

Category	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
Introduction	The first sentence is a "grabber" or catchy beginning.	The first sentence has a weak "grabber."	A catchy beginning was attempted but was confusing rather than catchy.	No attempt was made to catch the reader's attention in the first sentence.
Sequencing	Details are placed in a logical order and the way they are presented effectively keeps the interest of the reader.	Details are placed in a logical order, but the way in which they are presented makes the writing less interesting.	Some details are not in a logical order, and this distracts the reader.	Many details are not in a logical order. There is little sense that the writing is organized.
Transitions	A variety of thoughtful transitions are used. They clearly show how ideas are connected.	Transitions clearly show how ideas are connected, but there is little variety.	Some transitions work well; but connections between other ideas are fuzzy.	The transitions between ideas are unclear or nonexistent.
Conclusion	The conclusion is strong and leaves the reader with a feeling that they understand what that reader is "getting at."	The conclusion is recognizable and ties up almost all the loose ends.	The conclusion is recognizable, but does not tie up several loose ends.	There is no clear conclusion, the paper just ends.
Neatness	The final draft is readable, clean, neat and attractive.	The final draft is readable, neat and attractive. It may have one or two erasures.	The final draft is readable and somewhat attractive. It looks like parts of it might have been done in a hurry.	The final draft is not neat or attractive. It looks like the student just wanted to get it done and didn't care what it looked like.
Writing Process	A lot of time and effort has been devoted to the writing process.	A sufficient amount of time and effort has been devoted.	Some time and effort has been devoted.	Little time and effort has been devoted.

Appendix J

Revision Checklist for the Biographical Sketch

NAME OF GRADER: _____

NAME OF AUTHOR: _____

<u>Category</u>	<u>Yes</u>	<u>No</u>	<u>Comments</u>
There are no spelling errors.			
There are no punctuation errors.			
All facts presented are accurate.			
The paper has a title.			
The author's name is on the paper.			
The verbs are used properly.			
The paper stays on topic.			
The paper is easy to read.			

Score = Total Number of Boxes Checked With YES
Divided by Eight (the total number of categories)

Score: ____ / 8

List of Assorted Timeline Events

- 1791 Michael Faraday is born in Surrey, near London.
- 1816 Faraday gives his first lecture at the Royal Institution and publishes his first scientific paper.
- 1820 Faraday stops working for Davy and starts his own research. He quickly gains a reputation as a brilliant chemist.
- 1832 Faraday proves that electricity is always the same whatever its source.
- 1867 Faraday dies on August 25. He is buried in London.
- 1731 Benjamin Banneker is born near Baltimore in the British colony of Maryland on November 9.
- 1791 Benjamin helps survey the new national capital.
- 1792 Benjamin's first almanac is published.
- 1806 Benjamin Banneker dies at home on October 9.
- 1821 Elizabeth Blackwell is born in England on February 3.
- 1849 Elizabeth becomes the first female doctor.

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- 1866 Elizabeth opens a medical college for women in New York.
- 1910 Elizabeth dies.
- 1904 Charles Drew is born in Washington, D.C. on June 3.
- 1920 The National Medical Association convinces all-white Harlem Hospital to begin hiring black doctors.
- 1933 Drew receives his M.D. graduating second in a class of 137 at McGill's University in Montreal, Canada.
- 1941 Drew is appointed assistant director of the Red Cross blood banks.
- 1947 The American Medical Association celebrates its 100th Anniversary. Yet continues to refuse to admit Charles Drew and most black doctors.
- 1950 Charles Drew dies on April 1.

Appendix L

Timeline Checklist

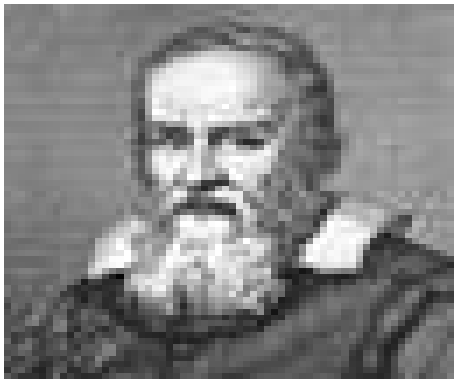


Category	Yes	No	Comments
Readability: The timeline is easy to read.			
Dates: All the dates are chronologically placed on the timeline.			
Title: The timeline has a title that relates to the topics.			
Creativity: The timeline contains creative details that contribute to the reader's enjoyment.			
Neatness: The timeline is neat and attractive.			

Score = Total Number of Boxes Checked With YES
Divided by Five (the total number of categories)
Student's Name: _____
Score: ____ / 5

Appendix M

Sample Scientist Trading Card



Galileo

- *Italian physicist and astronomer*
- *Made major discoveries about celestial objects in our solar system*
- *Believed that the earth revolved around the sun*
- *Born 1564 and died 1642*



Appendix N

Oral Presentation Rubric

Category	Advanced (4)	Proficient (3)	Developing (2)	Beginning (1)
<u>Preparedness</u>	Student obviously rehearsed.	Student might have needed a couple more rehearsals.	Student lacked rehearsal.	Student is not at all prepared to present.
<u>Listens to Other Presentations</u>	Student listens intently.	Student listens intently but is easily distracted.	Student sometimes does not appear to be listening.	Student is not listening at all.
<u>Speaks Clearly</u>	Speaks clearly and distinctly all the time and mispronounces no words.	Speaks clearly and distinctly all the time, but mispronounces one word.	Speaks clearly and distinctly most of the time and mispronounces no more than one word.	Speaker often mumbles and cannot be understood and mispronounces more than one word.
<u>Content</u>	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.

Student Name: _____

Circle the Score:

Advanced Proficient Developing Beginning