Module 9 • African American History

Brief Overview

This module provides an informational exploration of historical African American scientists. Through inquiry-based research and hands-on explorations, students will gain an appreciation for the work of these individuals, their contributions they have made as citizens, and the improvements they've made in our lives. Students will identify examples of famous African American scientists while exploring the lives of these individuals and the achievements that brought them recognition. In addition, students will participate in scientific investigations that mirror the work done by these scientists. Finally, students will participate in discussions with local African American scientists currently working in the science field (when available).

Note: It is encouraged to incorporate field trips and speaker opportunities throughout the module.

Variation:
Choosing Your Own Scientist:
Using the list provided, briefly describe each scientist and encourage the students to work together and choose a scientist to research. The scientist chosen can be substituted in place of the lessons already developed (i.e. George Washington Carver and Shirley Ann Jackson). Allow the students to use the resources provided as well as school computer labs to gain information about their scientist in order to complete the activities listed (if necessary, the "Scientific Investigation" (Lesson 3) may be omitted for this variation). This variation would be ideal for students who are capable of working independently and/or with small groups. Blank activity sheets are available.

George Washington Carver

Shirley Jackson

PAGE

Choose Your Own Scientist

Time

10 - 12 sessions

Desired Outcomes

At the end of this module, students will:

- Identify an example of an African American scientist.
- Recall the key events and achievement(s) made by this scientist.
- Explain the work of the scientist as it relates to improving the lives of others.
- Relate the life and achievements of this scientist to their own lives and aspirations.

What You'll Need

For Each Student

□ Pencil

Shirley Jackson

□ "Using Your Marbles" student investigation sheet
□ "A Day in the Life of Shirley Jackson" reflection sheet

For Each Group

□ Drawing paper
□ Crayons/Markers

George Washington Carver

□ Trowel
□ Small flowerpot with saucers
□ Water
□ Bean seeds
□ Tall stakes
□ Tape or Label (for labeling flower pot)
□ **Soils:** Sandy soil, Soil with clay, Soil containing only compost, Miracle Grow potting soil

Shirley Jackson

□ A table (any flat surface) on which to work and make observations.
□ A marble
□ Modeling clay

□ A piece of foam board
□ Markers (black, blue, green)

For Whole Class

Geoge Washington Carver
□ Book: "A Weed Is a Flower: The Life of George Washington Carver" by Aliki

Shirley Jackson
□ Book: "Great Black Heroes: Five Brilliant Scientists" (level 4; Grades 2-3) (Hello Reader) (Paperback) by Lynda Jones

ALL Scientists
□ Chart Paper
□ Yarn (10 – 12 feet) of any color
□ Clothespins (optional)
□ Masking tape
□ Ruler
□ Paper (graph paper optional)
□ Computers (optional)
□ Adjectives Chart (from previous lesson)
□ Chart Paper (Write the Title: "I Can Be Just Like _____")
□ Crayons/Markers

For mural:
□ Crayons, markers, or paints (depending on availability and choice)
□ Drawing/sketch paper
□ Butcher paper (either one long piece or a few smaller ones, depending on how you would like the students to work)

For poetry/rap:
□ Pencils
□ Journals

Worksheets and Handouts

George Washington Carver
□ *K-W-L Chart for George Washington Carver*
□ A *Day in the Life of George Washington Carver*
□ "*Excuse Me, Mr. Carver?"*
□ *"I Can Be Just Like George Washington Carver"*
□ *"If you had to describe George Washington Carver…"*

Shirley Jackson
□ *K-W-L Chart for Shirley Jackson*
□ A *Day in the Life of Shirley Jackson*

- "*Excuse Me, Dr. Jackson?"*
- *"I Can Be Just Like Shirley Jackson"*
- *"If you had to describe Shirley Jackson…"*

Choose Your Own Scientist

- *K-W-L Chart for scientist*
- A *Day in the Life of* _____
- "*Excuse Me,* _____*?"*
- *"I Can Be Just Like* _____*"*
- *"If you had to describe* _____*…"*

People Power

Contact Pearline Tyson at the Parks and People Foundation to arrange field trips, as well as schedule local African Americans working in the science field to come to speak at your school.

New Vocabulary

George Washington Carver

Agriculture
The science of farming.

Biography
A written account of another person's life.

Botanist
A scientist who studies plants.

Botany
The science of plants; the branch of biology that deals with plants.

Character trait
A word that describes a person.

Humanitarian
A person engaged in promoting human welfare.

Hypothesis
A prediction.

Shirley Jackson

Appoint
To name officially.

Atom
A particle that makes up all matter (matter is generalized as anything that takes up space).

Biography
A written account of another person's life.

Electron
A tiny particle that is part of an atom.

Hypothesis
A prediction.

Induct
To admit as a member.

Physicist
A scientist that deals with matter and energy and their interactions.

Theory
A guess.

Valedictorian
The student who has the highest rank in the graduating class.

Careers

Students will learn about different occupations in science-related fields.

- George Washington Carver: Botanist
- Shirley Jackson: Physicist
- Other careers will be explored through speaker opportunities

Preparing the Lessons

Leaders will:

- REVIEW ALL NEEDED MATERIALS IN ADVANCE TO PLANNING THE LESSON!
- Review the lesson sequences and the lesson preparation directions.
- Review the "Background for Teachers" and useful websites prior to facilitating the lessons.
- Identify potential parent or school adult volunteers.

- Identify possibilities for a culminating activity and arrange for any field trips or classroom visitors.
- Gather additional resources for learning about different African American Scientists (i.e. library books, videos, internet resources)

Literary Resources (include information on above individuals):

Great Black Heroes: Five Brilliant Scientists (level 4; Grades 2-3) (Hello Reader) (Paperback) by Lynda Jones

Black Pioneers of Science and Invention (Paperback) by Louis Haber (Author)

African American Inventors (Black Stars) (Hardcover) by Otha Richard Sullivan

Black Stars: African American Women Scientists and Inventors (Hardcover) by Otha Richard Sullivan

Strong Force: The Story of Physicist Shirley Ann Jackson (Women's Adventures in Science) (Paperback) by Diane O'Connell

A Weed Is a Flower: The Life of George Washington Carver (Paperback) by Aliki

A Man for All Seasons: The Life of George Washington Carver (Hardcover) by Stephen Krensky (Author), Wil Clay (Illustrator)

Benjamin Banneker: Pioneering Scientist (Paperback) by Ginger Wadsworth

Benjamin Banneker: Scientist (Beginning Biographies) (Paperback) by Garnet Jackson

Benjamin Banneker: Astronomer and Mathematician (Fact Finders Biographies: Great African Americans) (Paperback) by Lassieur (Author), Allison (Author)

Charles Drew: Pioneer in Medicine (Fact Finders: Biographies) (Paperback) by Salas (Author), Laura Purdie (Author)

Charles Drew: Doctor Who Got the World Pumped Up to Donate Blood (Getting to Know the World's Greatest Inventors and Scientists) (Paperback) by Mike Venezia

More Online Resources for African American Scientists:

The Faces of Science: African Americans in the Sciences
https://webfiles.uci.edu/mcbrown/display/faces.html

African American Inventors:

http://www.black-inventor.com/

http://encarta.msn.com/media_521505870_761574196_-1_1/african_american_scientists.html

http://www.math.buffalo.edu/mad/special/50blacks2004.html

Examples of Influential African American Scientists:

Name	Life Dates	Research Area	Notable Achievements	Resources
Benjamin Banneker (from Baltimore area)	1731-1806	Mathematics, Astronomy, Abolition of Slavery	Developed almanacs based on astronomic calculations	Online Biography: http://www.notablebiographies.com/Ba-Be/Banneker-Benjamin.html See textbooks listed at bottom of page.
George Washington Carver	1864-1943	Biochemistry, plant physiology	Recipient of Spingarn Medal of the National Association for the Advancement of Colored People (NAACP) in 1923; appointed to the U.S. Department of Agriculture in 1935; awarded Franklin Roosevelt Medal for distinguished research in agricultural chemistry in 1937; named International Federation of Architects, Engineers, Chemists, and Technicians Man of the Year in 1940; posthumously funded the George Washington Carver Research Foundation.	Online Biography: http://www.lib.iastate.edu/spcl/gwc/bio.html See textbooks listed at bottom of page.
Ernest Everett Just	1883-1941	Marine biology	Awarded the first NAACP Spingarn Medal in 1915 for his work in biology.	Online Biography: http://www.bookrags.com/biography/ernest-everett-just-wsd/ See textbooks listed at bottom of page
Percy L. Julian	1899-1975	Organic chemistry	Pioneered the synthesis of cortisone to make it affordable for unwealthy people in pain; elected to the National Academy of Sciences in 1960; received 19 honorary degrees.	Online Biography: http://www.blackinventor.com/pages/percyjulian.html See textbooks listed at bottom of page
Charles Drew, M.D.	1904-1950	Medicine	Created effective blood banks during WWII First Black Surgeon to serve as examiner on American Board of Surgery	Online Biography: http://www.blackinventor.com/pages/charlesdrew.html See textbooks listed at bottom of page

Women:				
Roger Arliner Young	1899-1964	Zoology	First African American woman to earn a PhD in Zoology (after overcoming educational challenges)	Online Biography: http://www.sdsc.edu/ScienceWomen/young.html See textbooks listed at bottom of page
Dr. Rebecca Leigh Crumpler	1831-1895	Medicine	First African American woman to earn an M.D. degree Treated freed slaves in Richmond, VA after the Civil War	Online Biography: http://www.nlm.nih.gov/changingthefaceofmedicine/physicians/biography_73.html See textbooks listed at bottom of page
Shirley Jackson	1946-	Theoretical physics	Appointed head of the Nuclear Regulatory Commission by President Clinton in 1995. Currently serves as the 18th President of Rensselaer Polytechnic Institute, Troy, N.Y., and Hartford, Conn., the oldest technological university in the United States	Home Page: http://rpi.edu/president/index.html See textbooks listed at bottom of page
Angela D. Ferguson	1925-	Physiology	Pioneer of health work with African American children, particularly sickle-cell anemia cases.	See textbooks listed at bottom of page

Sources: http://encarta.msn.com/media_521505870_761574196_-1_1/african_american_scientists.html

Module 9 • Lesson 1 • Who Was George Washington Carver?

Background for Teachers:

Biography of George Washington Carver (Source: EnchantedLearning.com):

George Washington Carver (1865?-1943) was an American scientist, educator, humanitarian, and former slave. Carver developed hundreds of products from peanuts, sweet potatoes, pecans, and soybeans; his discoveries greatly improved the agricultural output and the health of Southern farmers. Before his discoveries, the main crop in the South was cotton. The products that Carver invented included a rubber substitute, adhesives, foodstuffs, dyes, pigments, and many other products.

George was born in Missouri and was a sickly child. He was orphaned when he was young, and was brought up by Moses and Susan Carver on their farm. He began school at age 12 and later attended Simpson College in Indianola, Iowa, where he was the first black student. He transferred to Iowa Agricultural College to study science, earning a Bachelor of Science degree (in 1894) and a Master of Science degree in bacterial botany and agriculture (in 1896). He then became the first black faculty member at that college.

Booker T. Washington convinced Carver to teach at the Tuskegee Normal and Industrial Institute for Negroes (now called Tuskegee University) in Alabama, where Carver went on to head the agricultural department for nearly 50 years. Carver donated his life savings to a fund designed to encourage agricultural research.

George Washington Carver Timeline
(Source: http://www.eiu.edu/~heroes04/environ/gwcinfopage.html

1864- George Washington Carver is born a slave in Missouri, and he is kidnapped by men.

1871- George begins keeping his own garden and is known as the "Plant Doctor".

1877- George moves to a new city and leaves his family so he can attend school offered to African Americans. He earned money by doing other people's laundry and cleaning their houses.

1890- Carver enrolls at Simpson College and opens a laundry mat to earn money. He thought about becoming an artist.

1894- Carver earns his Bachelor's degree in Agriculture at Iowa Agricultural College.

1896- Carver is asked by Booker T. Washington to be a teacher at the Tuskegee Institute in Alabama.

1906- George begins teaching rural people about using different crops each year to make the soil better. He said that sweet potatoes and peanuts were good plants to grow.

1916- George is named the Fellow of Royal Society for the Arts for his contribution of agricultural research.

1923- George received the Springarm Medal for Distinguished Service to Science.

1939- George received the Roosevelt Medal for Distinguished Service to Science.

1941- The George Washington Carver Museum is opened at the Tuskegee Institute.

1943- George Washington Carver died at the age of 78. His birthplace is established as a national monument.

2009- People around the world continue to enjoy peanuts and the discoveries made by George Washington Carver!

Useful websites:

http://www.history.com/genericContent.do?id=61676

Action Synopsis

Students will gain knowledge on the life and achievements of George Washington Carver, an African American scientist and inventor. They will read a biography of the scientist, highlighting struggles and achievements as an African American scientist. Finally, students will analyze the scientist by sequencing major events in his/her life by developing a detailed timeline.

Time

2 sessions

Desired Outcomes

Students will:

Session 1

- Identify an example of an African American scientist (i.e. George Washington Carver).
- Recall the achievement(s) made by this scientist.

Session 2

- Describe key events in the life George Washington Carver.
- Sequence key events in the life of the scientist.

Note: Depending on the class size, more than one timeline can be created and hung in different areas of the school.

What You'll Need

For Each Student

□ Pencil
□ K-W-L chart

For Each Group

Session 2
□ Drawing paper
□ Crayons/Markers

For Whole Class

Session 1
□ Book: "A Weed Is a Flower: The Life of George Washington Carver" by Aliki
□ Chart Paper

Session 2
□ Book: "A Weed Is a Flower: The Life of George Washington Carver" by Aliki
□ Yarn (10 – 12 feet) of any color
□ Clothespins (20 – 25; used to clip timeline drawings to the line of yarn) – tape may be used instead of clothespins
□ Masking tape
□ Computer or other books if needed

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 2.
- Gather all materials needed for the day's activity.
- Read the book "A Weed Is a Flower" (32 pages) and identify opportunities to take a break from the reading to discuss or get a drink of water. If necessary, you may have to shorten the reading based on the needs of your class/group.
- (Session 2) Review Timeline in "Background for Teachers" and select several (8 – 10) key events to use for timeline.
- (Session 2) Write a description of each event at the top/bottom of a sheet of drawing paper including the DATE (will be used when students illustrate the event)
- Select a location in the classroom or hallway where the completed timeline can be displayed.

New Vocabulary

Biography
A written account of another person's life.

Agriculture
The science of farming.

Botany
The science of plants; the branch of biology that deals with plants.

Humanitarian
A person engaged in promoting human welfare.

Assessments

Pre-Assessment: Students will begin a K-W-L chart ("What I KNOW, What I WANT to Know, What I've LEARNED"

Lesson Sequence

1. Inform the students that they will be doing activities to learn about George Washington Carver. Distribute the K-W-L worksheet titled "George Washington Carver" and direct them to write OR draw the following:

   "K" – What they know about George Washington Carver.
   "W" – What they want to find out about George Washington Carver.

   Allow several minutes for this activity. (10 minutes)

   Collect these sheets, OR have students place them in their folders.

2. Once students have completed the Journal activity, gather students on the floor and present the book, "A Weed Is a Flower: The Life of George Washington Carver" by Aliki. Read the title aloud to the students.

   Ask the students:

   "Based on the title, do you think this is a book we would read to find out information?" (Answer: Yes)

   "What kinds of information do you think we will find out?" (Allow for various student answers)

"Is this book going to be about a person or something else?" "Who/what?" Allow for student answers.

Inform the students that they are going to hear a biography about a man named George Washington Carver. Briefly describe the meaning of the term biography and who G.W. Carver was.

(5 – 10 minutes)

3. Read the book to the students, taking breaks as needed.

Some ideas for breaking up the story:
- discuss particular illustrations to see what information they give to the story
- if something in the story can relate to students' lives, ask the kids if they've ever had the same feeling, experience, etc.
- have students play "George Says" modifying the game "Simon Says"

(20 – 30 minutes)

4. Once you have read the book to the students, have each student think of and share one word to describe George Washington Carver. Using the chart paper (tape to the chalk board) and markers, write the title "George Washington Carver Adjectives" at the top of the paper.

Have each student 1) take turns to share their word, 2) explain why they felt that word describes G.W. Carver, and 3) write their word on the chart.

Session 2

1. Distribute the K-W-L worksheet titled "George Washington Carver" and direct them to write OR draw the following:

"L" – What they have learned about George Washington Carver, based on the previous activity.
"W" – What they want to find out about George Washington Carver.

Allow several minutes for this activity. If you feel that it would help the students, display the Adjectives Chart describing the scientist from the previous activity. (10 minutes)

Collect these sheets OR their journals. Have the students sit on the floor as a group in front of the chalk board.

2. Inform the students that they will continue studying George Washington Carver by making a timeline.

Ask the students:

"What is a timeline?"

"How is a timeline useful?"

Allow for student answers. If they are unclear, inform them that a timeline is a group of important dates or events that are organized in the order in which they happened. Timelines are useful for studying particular dates and the order that things have happened. Explain to the students that George Washington Carver led a very exciting life, full of adventure and achievement. In order to understand all of the many things that happened in his life, they will make a timeline that shows it.

3. Present the chart/brainstorm from the previous activity. Ask students to read words from the chart and recall events in G.W. Carver's life that relate to that word. (This may be challenging for students, but allow them the opportunity to get ideas.)

4. Lay the string of yarn across the front of the students so that it makes a line between you and the students. Introduce the timeline sheet (drawing paper) with Carver's birth date.

   Ask the students:

   "Would this be at the beginning or the end of a timeline?" Allow for student answers. (Answer: The beginning – biographical timelines usually begin with the date of birth of the individual.)

   Place the sheet at the beginning of the timeline.

   Introduce the timeline sheet (drawing paper) with Carver's death date.

   Ask the students"

   "Would this be at the beginning or the end of a timeline?" Allow for student answers. (Answer: The end – biographical timelines usually end with the death of the individual."

   Place the sheet at the end of the timeline.

5. Once students understand how a timeline works, pick up the birth/death timeline sheets. Select students to illustrate these sheets. Continue to read each sheet, selecting individual students to illustrate each one.

   Once all students have gotten a timeline sheet to illustrate, allow students time to complete their illustrations.

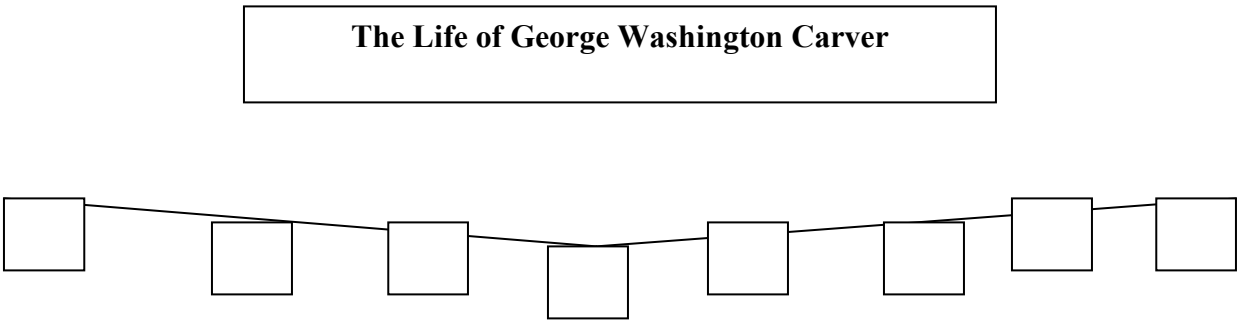
   (15 – 20 minutes)

6. Once all student have completed their illustrations, gather the students at the yarn. Allow students to present their illustrations, one by one.

As each student concludes, have students arrange each illustration in chronological order. DO NOT TAPE the illustrations at this time, as they may be rearranged in the process.

7. Once the students have presented and arranged the timeline accurately, tape the sheets to the line of yarn. Ask for two student volunteers to hold the timeline at each end and review the completed timeline with the students.

8. Display the timeline in the classroom. (See image below for example of end result.)



Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Reading/English Language Arts	
Standard 2.0 Comprehension of Informational Text: Students will read, comprehend, interpret, analyze, and evaluate informational text.	(2)2.1.a – Read and recognize nonfiction materials to gain information and content knowledge • Grade-appropriate reference materials • Multimedia resources (3)2.1.a – Read, use, and identify the characteristics of nonfiction materials such as textbooks, appropriate reference materials, personal narratives, diaries and journals, biographies, newspapers, letters, articles, websites and other online materials, other appropriate content-specific texts to gain information and content knowledge (2)2.3.c – Recognize sequential and chronological order (3)2.3.a – Identify and analyze the organization of text such as sequential and/or chronological order, main idea and supporting details, cause/effect, and problem solution

Module 9 • Lesson 2 • The Lowdown on Dirt: Practicing the Work of George Washington Carver

Background for Teachers:

The Brilliance of George Washington Carver

(from "Social Studies for Kids" at: http://www.socialstudiesforkids.com/articles/ushistory/gwcarver.htm)

George Washington Carver is perhaps one of the most famous names in American history. People generally know him as the inventor of peanut butter, but his contributions to science go way beyond that.

Carver was born in 1860 in Diamond Grove, Missouri. His parents were slaves, and so was he. Prone to sickness, he was a frail child for most of his growing-up years. Because of this, he was not suited to heavy-duty work in the fields of his master's farm. Rather, George was sent to another town in Missouri, Neosho, to get an education. He proved so successful a student that he attended and then graduated from high school, in Kansas. He applied and was accepted to Highland University, even getting a scholarship for his good grades, but was rejected when the president of the university discovered that Carver was African-American.

He was hungry for knowledge, and so Carver applied to and was accepted at Simpson College, in Indianola, Iowa. He later transferred to Iowa Agricultural College (now known as Iowa State University), where he made such an impression on his instructors that they offered a position right after he graduated. He was the first African-American on the faculty.

He had from an early age been interested in plants (the study of botany), and he continued this study at the university greenhouse, eventually earning his master's degree in agriculture in 1896. His greenhouse work included searching for cures for fungus diseases that ravaged cherry plants.

The following year, opportunity knocked again, as Booker T. Washington, the famed African-American educator, invited Carver to come teach at the famed Tuskegee Institute, in Tuskegee, Alabama. Carver accepted and became director of agriculture. Among his many famous achievements at Tuskegee were these:

- *He taught his students and other agriculture experts the practice of rotating crops, to ensure that fields didn't wear out their nutrient potential.*
- *He directed the planting of peas, which took nitrogen from the air and transferred it to the soil, creating nitrate-rich soil that was perfect for planting cotton and tobacco.*
- *He did the same with peanuts, which were also successful in enriching the soil.*

Peanuts, however, grew very quickly. Soon, the peanut crop threatened to overwhelm the farmers at Tuskegee. Carver came to the rescue by finding uses for the peanut. He ultimately

invented more than 300 products that used the peanut in development, including cheese, milk, facial cream, ink, shampoo, and soap.

Not stopping there, Carver moved on to the sweet potato, which also grew in abundance. More than 115 products later, Carver was famous again, making flour, starch, and artificial rubber using the sweet potato.

He turned next to the pecan, developing 75 products, found ways to use discarded corn stalks, and made paint and dye from clay.

Many of his ideas were used by the U.S. Military during World War I. His seemingly ceaseless imagination for using foods to make non-food items made his name a household word. He was invited to speak before Congress. Ford Motor Company founder Henry Ford invited Carver to his Dearborn, Mich., plant to discuss how to use goldenrod to make artificial rubber. Even the great Thomas Edison was impressed with Carver, inviting him to work at his Edison Laboratories for $100,000 a year. Carver refused, wanting to stay at Tuskegee.

He continued to work there until his death, on January 5, 1943. By that time, he had received numerous high-profile medals and awards and served on many boards and committees of the U.S. Department of Agriculture. A few months after Carver died, his birthplace became a national monument, the first dedicated to an African-American.

Among the products created by Carver from various foods are the following:

- *Adhesives*
- *Axle Grease*
- *Bleach*
- *Buttermilk*
- *Chili Sauce*
- *Cream*
- *Instant Coffee*
- *Linoleum*
- *Mayonnaise*
- *Meat Tenderizer*
- *Metal Polish*
- *Paper*
- *Peanut Butter*
- *Rubbing Oils*
- *Shampoo*
- *Shaving Cream*
- *Shoe Polish*
- *Sugar*

Useful websites:

http://www.socialstudiesforkids.com/articles/ushistory/gwcarver.htm

Action Synopsis

Students will gain insight into the work of George Washington Carver by conducting a scientific investigation in agriculture. They will develop hypotheses about plant growth in relation to soil quality. Then students will use the different soils for planting, and monitoring the plant growth as an indication of soil health. Finally, students will journal about this experience by writing an entry as the scientist George Washington Carver.

Time

2* sessions

**Note: It will take several weeks for the bean plants to grow. Select students every few days (2x per week) to measure the height of the plants until the beans flower. Results can be discussed once beans have flowered.*

Desired Outcomes

Students will:

Session 1
("Lowdown on Dirt" from http://home.howstuffworks.com/science-projects-for-kids-soil-experiments.htm)

- Apply the process of scientific investigation using soils.
- Recall the work of G.W. Carver as it relates to the investigation.

Session 2

- Describe a day in the life of botanist George Washington Carver based on previous activities.

What You'll Need

For Each Student
□ Pencil
□ Journal (Session 2)

For Each Group (Student groups of 2 or 3)
□ Trowel
□ Small flowerpot with saucers
□ Water
□ Bean seeds
□ Tall stakes
□ Tape or Label (for labeling flower pot)
□ **Soils:** Sandy soil, Soil with clay, Soil containing only compost

For Whole Class
□ Miracle Grow potting soil
□ Ruler (for future use to measure the height of plants)
□ Paper (graph paper optional)
□ Data collection chart (to be used over several weeks to track plant growth)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 3.
- Gather all materials needed for the day's activity.
- Visit the schoolyard to establish areas where the students can collect soil.
- Be sure to inspect the areas for glass or other potentially harmful items.

New Vocabulary

Hypothesis
A prediction.

Botanist
A scientist who studies plants.

Lesson Sequence

Session 1:

1. Review the topic of George Washington Carver with the students. Quickly have each student state one word or fact that describes this scientist. If necessary, post the Adjectives Chart and/or the Timeline for the students to refer to. (5 – 10 minutes)

2. Read the "Background for Teachers" section to the students. Explain to the students that they will be thinking like G.W. Carver for the activity. (5 – 10 minutes)

Investigation

3. Introduce the investigation. Explain that they will be conducting a similar investigation that George W. Carver did involving soil. Ask the students:

   "What are the things a plant needs in order to grow?" (Answer: Water, sunlight, carbon dioxide, and minerals from soil)

   "What do you think soil needs to have in it in order to be healthy?" (Answer: All plants are different, and therefore need differently types of soil to grow well. Depending on the habitat in which the plant grows, they may need different amounts of nutrients in their soil.)

Bring the students outside to the schoolyard area.

4. As you walk throughout the school grounds, have the students look for areas where plants grow poorly and areas where plants grow well. For each area, ask the students:

   "Is the soil trampled and hard?"

   "Is the soil soft and loose where plants grow well?"

   "Do you see any areas where the soil looks or feels sandy?

   "Do you see any areas where the soil looks or feels heavy?"

   "Do you see any areas where the soil looks or feels like clay?"

   (Remember to encourage the students to feel the soil as well as observe it.)

5. Bring the student to an area in the schoolyard with pots, hand trowels, and the different soil types (i.e. soil with clay, sandy soil, all compost, Miracle Grow potting soil) .

   Assign student groups (2-3 students) to fill a flowerpot with each kind.

Bring the students inside to the classroom.

6. Have the students label your flowerpots using:

   1) Soil description

   Examples: "Hard" "Loose, fluffy soil" etc.

   You may want to write adjectives on the board to help the students with their descriptions (i.e. hard, soft, loose, sandy, fluffy, heavy, light, clay-like)

7. Have student groups water their pots, then plant two or three bean seeds in each. Put a stake in each pot for the beans to climb. Keep the pots moist (but not soggy) while the beans sprout.

8. Fill out the data chart with the labeled descriptions and post the data chart in the classroom.

9. Place the bean plants near a window where they can get sun exposure throughout the day.

10. Twice a week until the beans flower, select students to record the date and measure the height of the plants with a ruler (in centimeters).

11. Once the beans flower, discuss your results with the class. Ask the students:

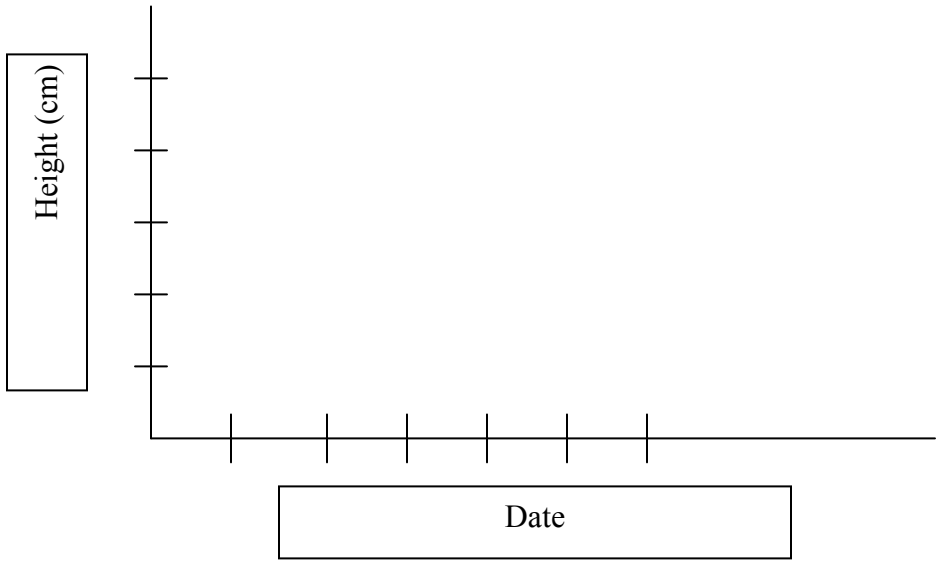
    "Which soil was the best for growing this type of bean plant?"

"What do you think made that soil the best for growing your plant?"

"What could you add to the other pots in order to make the soil healthier?" (Answer: compost, organic matter/fertilizer)

"Imagine you were George Washington Carver. How would you tell others about the type of soil they would need to grow a healthy crop?"

In addition to recording data in Data Chart, you may also have students graph their plant growth (height v. date), using different colors for each pot and making a line graph.



Session 2:

1. Remind the students that we have been talking about an African American botanist named George Washington Carver. Hold a brief discussion by asking the following questions:

   "What are some facts that we've learned about G.W. Carver?"

   "How have we been learning about George Washington Carver?"

   "How did you feel when you were doing your investigations yesterday?"

   "How do you think G.W. Carver felt when he was working?" (Have the students articulate their explanations.)

2. Inform the students that they will be imagining themselves as G.W. Carver by writing a journal about his day.

3. Distribute the sheet "A Day in the Life of George Washington Carver." Read over the sheet with the students, reviewing each writing prompt for students to respond to.

4. Allow at least 30 minutes for the students to write and illustrate their work. Once finished, students should place their work into the journal section of their KidsGrow folders. If time allows, have students volunteer to share their journals.

   (45 – 60 minutes)

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Reading/English Language Arts	
Standard 2.0 Comprehension of Informational Text: Students will read, comprehend, interpret, analyze, and evaluate informational text.	(2)2.1.b – Read and identify functional documents • Set of directions • Science investigations (3)2.1.b – Read, use, and identify the characteristics of functional documents such as sets of directions, science investigations (cont.) (2)2.a-c – Use print features (a), informational aids (b), organizational aids (c) when reading • Numbered steps (3)2.2.c – Use informational aids, such as introductions and overviews, materials lists, timelines, captions, glossed words, labels, numbered steps (cont.)
Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	(2)1.A.1.a – Describe what can be learned about things by just observing those things carefully and adding information by sometimes doing something to the things and noting what happens. (2)1.A.1.b – Seek information through reading, observation, exploration, and investigations. (2)1.B.1.b – Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas. (3)1.B.1.a – Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations. (2)1.C.1.c – Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).

Module 9 • Lesson 3 • Excuse Me, Mr. Carver? (An Interview with George Washington Carver)

Action Synopsis

Students will reflect on the information they have learned about George Washington Carver. They will use this information to develop interview questions they would ask G.W. Carver.

Students may work independently or in groups based on teacher discretion.

Time

1 session

Desired Outcomes

Students will:

- Recall facts about the life and achievements of George Washington Carver.
- Construct interview questions to ask G.W. Carver if given the opportunity.

What You'll Need

For Each Student

□ Pencil
□ Journal
□ K-W-L Chart (from previous activity)
□ "Excuse Me, Mr. Carver?" Interview sheet

For Whole Class

□ Chart paper (Titled: What I've Learned about George Washington Carver)
□ Computers (for the Extension only)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of previous lessons.
- Find and select pictures showing the positive traits of George Washington Carver (i.e. helping others, working with determination, etc.).
- Gather all materials needed for the day's activity.

Lesson Sequence

1. Distribute journals and K-W-L Charts (from previous activity) to the students. Direct the students to complete the following:

   - "L" column (What I've Learned)
   - "W" column (What I Want to Know)

   (10 minutes)

2. Gather the students on the floor in front of the chalk board with their K-W-L charts. Tape the chart titled "What I've Learned About…" to the board. Have students share facts that they've learned based on their study of George Washington Carver.

3. Inform the students that they will be journalists for the activity that day. Send the students to their seats with their journals. Distribute the "Excuse Me, Mr. Carver?" activity sheet.

4. Explain the directions to the students. Encourage them to look at their previous work in order to come up with ideas for questions. They should think about what they still want to know about G.W. Carver. Allow several minutes for this activity.

   (15 – 20 minutes)

5. When finished, gather the students on the floor and have them share their interview questions.

Extensions:

- Have students work in pairs and take turns acting as George Washington Carver. Students can interview each other based on what they know about Carver already, and how they think he would answer the questions.
- Bring students to the school computer lab. Have students research their questions to see if they can find the answers themselves.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Reading/English Language Arts	
Standard 4.0 Writing: Students will compose in a variety of modes by developing content, employing specific forms, and selecting language appropriate for a particular audience and purpose.	(2)4.3.b – Proofread and edit writing for • Complete sentences • Capitalization at the beginning of sentences • Punctuation at the end of sentences

Module 9 • Lesson 4 • Culminating Activities

Action Synopsis

Students will reflect on the life and achievements of George Washington Carver and develop a list of positive character traits possessed by him. They will identify ways and opportunities in which they can develop these traits in themselves. Students will use the knowledge gained from previous activities to design art that reflects the life and achievements of George Washington Carver.

Time

3 – 4 sessions

Desired Outcomes

Students will:

- Identify at least 3 positive character traits possessed by George Washington Carver.
- Show ways in which they can develop these positive traits in their own lives.
- Recall important facts regarding the life of George Washington Carver.
- Create a piece of art (i.e. mural, poetry, rap) that reflects the life and achievements of George Washington Carver.

What You'll Need

For Each Student

- Pencil
- Journal (optional – may want students to use their journals for documenting their designs and/or poem)
- "Just Like George Washington Carver!" Character Trait Sheet

For Whole Class

- Adjectives Chart (from previous lesson)
- Chart Paper (Write the Title: "I Can Be Just Like George Washington Carver")
- Crayons/Markers
- For mural:
  - Crayons, markers, or paints (depending on availability and choice)
  - Drawing/sketch paper
  - Pencils
  - Butcher paper (either one long piece or a few smaller ones, depending on how you would like the students to work)

 For poetry/rap (as an alternative activity to designing a mural):
- Pencils
- Journals
- Crayons/markers

 Optional: Previous lesson activities (i.e. Adjectives chart, Timeline, K-W-L) to remind students of information)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 3.
- Gather all materials needed for the day's activity.

New Vocabulary

Character trait
A word that describes a person.

Assessments

The journal at the beginning of this activity, the K-W-L chart, and the mural (or other art) can be used to assess student understanding of the life of G.W. Carver.

Lesson Sequence

Session 1:

1. Tape the G.W. Carver Adjectives Chart on the board. Review the words on the chart with the students by having them read them aloud and state a reason why that describes Carver.

   Ask the students to identify any other additional character traits that describe G.W. Carver based on recent activities.

   (5 – 10 minutes)

2. Using the Adjectives Chart, select several (5-7) words that you feel the students can understand easily. Write these words on the chart paper titled "I Can Be Just Like George Washington Carver." Brainstorm each word on the chart by reviewing the meaning of the word and how G.W. Carver demonstrated this word. THEN ask the students to identify situations/ways in which they can show this character trait in their own lives. Write these examples on the chart.
   Examples can include: determined, patient, creative, smart, brave

(10 minutes)

3. Divide students into small groups of 2 or 3 students. Give them a word from the "I Can Be Just Like George…" chart and have them work together to develop a skit that explains how the word can be applied in the students' lives. Walk around to each group and offer them help as needed. Allow 5 – 10 minutes for students to work in their groups. Once the students have finished, have each group share their skit with the class.

   (20 minutes)

4. Have the students go to their seats. Distribute the "Just Like George" Character Trait Sheet. Explain to the students that they will be using the activities from the day to decide ways that they can use the traits of George Washington Carver. Allow students several minutes to complete this activity. Once completed, students can share their sheets with the class (this can be optional).

   (20 – 30 minutes)

Session 2:

1. Warm-up/Anticipation: Distribute journals to each student, along with the journal sheet with the prompt: "If you had to describe George Washington Carver, what would you say about him?" Allow 10 – 15 minutes for students to complete this activity.

2. Once students have completed their journals, you may either collect all journals, or ask for student volunteers to share their responses.

3. Inform the students that they will be working together to create a piece of art that reflects on the life and achievements of G.W. Carver. You may use this time to review some of the materials from previous activities if necessary including the Adjectives Chart, photos, or reading materials used throughout the Module.

4. Allow students to work as independently as possible to complete one of the following:
   1) A mural or poster – You may need to brainstorm a title with the students, but they should work together to create the mural. Smaller groups may work together to create separate murals if you decide it necessary.

   2) A poem/rap about G.W. Carver – Students can work individually or in groups to develop a poem or rap about Carver.

   ** Students may need assistance to recall key information to include in their art. In this case, the charts and other resources will come in handy.

   Students should present their work and display it at the end of this activity.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Health Education	
Standard 1.0 Mental and Emotional Health: Students will demonstrate the ability to use mental and emotional health knowledge, skills, and strategies to enhance wellness.	(2)1.E.1.c – Identify positive and negative traits of characters in media. (Modified for content) (3)1.E.1.a – Select and model strategies to incorporate positive character traits.

Module 9: African American History (G.W. Carver)

Worksheets and Handouts

Grades 2 and 3

Insert K-W-L

The Lowdown on Dirt!

Name: _____

Soil Types Data Chart

	Pot 1: Soil with clay	Pot 2: Sandy soil	Pot 3: All compost	Pot 4: Potting Soil
DATE	HEIGHT (in centimeters)			

A Day in the Life of George W. Carver

When I wake up in the morning, the first thing I think of is _____

_____

I like my job as a botanist because _____

_____

When I invent a new way to use something, it makes me feel _____

_____ because _____

_____

When I get home from a long day I like to _____

_____

Excuse Me, Mr. Carver?

Name: _____

Directions:
1. **Think** about what you STILL want to know about the life of George Washington Carver.
2. **Imagine** you are writing a newspaper article on Mr. Carver.
3. **Create** 4 interview questions to ask him. Don't forget to use a question mark (?) to punctuate!!!

Question 1:

_____

_____

Question 2:

_____

_____

Question 3:

_____

_____

Question 4:

_____

_____

I Can Be Just Like George Washington Carver!

Name: _____

Directions:
1. **Choose** THREE words that describe G.W. Carver and write one in each circle.
4. **Write** a sentence explaining how you can show that trait in your life.
5. **Illustrate** your sentence.

_____

_____

I can _____

_____

I can _____

_____

G.W. Carver is…

_____

I can _____

_____

"If you had to describe George Washington Carver, what would you say about him?"

Name: _____

If I had to describe Mr. Carver, I would say that

_____

_____

_____

_____

_____

_____

This is how Mr. Carver looks to me:

Module 9 • Lesson 1 • Who Shirley Jackson?

Background for Teachers:

Profile of Shirley A. Jackson, PhD
(Source: http://www.rpi.edu/president/profile.html)

Dr. Shirley Ann Jackson is the 18th President of Rensselaer Polytechnic Institute, Troy, N.Y., and Hartford, Conn., the oldest technological university in the United States.

Dr. Jackson is the first African-American woman to receive a doctorate from the Massachusetts Institute of Technology (M.I.T.) She is one of the first two African-American women to receive a doctorate in physics in the U.S. She is the first African-American to become a Commissioner of the U.S. Nuclear Regulatory Commission. She is both the first woman and the first African-American to serve as the chairman of the U.S. Nuclear Regulatory Commission, and the first African-American woman to lead a national research university. She also is the first African-American woman elected to the National Academy of Engineering, and the first to receive the Vannevar Bush award for "a lifetime of achievements in scientific research, education, and senior statesman-like contributions to public policy."

Described by Time Magazine (2005) as "perhaps the ultimate role model for women in science," President Jackson has held senior leadership positions in government, industry, research, and academe.

Dr. Jackson holds a Ph.D. in theoretical elementary particle physics from M.I.T. and a B.S. in physics from M.I.T. Her research specialty is in theoretical condensed matter physics, especially layered systems, and the physics of opto-electronic materials.

In April, 2009, U.S. President Barack Obama appointed Dr. Jackson to serve on the President's Council of Advisors on Science and Technology (PCAST). PCAST is an advisory group of the nation's leading scientists and engineers who will advise the President and Vice President and formulate policy in the many areas where understanding of science, technology, and innovation is key to strengthening the economy and forming policy that works for the American people.

Shirley Ann Jackson Timeline
(Sources: http://en.wikipedia.org/wiki/Shirley_Jackson_(physicist) ,
http://www.rpi.edu/president/profile.html

August 5, 1946- Shirley Jackson is born in Washington, D.C.

1954- Shirley is fascinated with bees and studies their movements. This interest continues as she built and raced go karts. She applied Newton's Laws of Motion to help her win these races.

1964- Shirley graduates from high school as the valedictorian, having excelled in both math and science. She begins her studies at MIT that same year.

1973- Shirley becomes the first African American woman to earn a PhD from MIT

1976- Shirley begins working for AT&T Bell Laboratories where she makes many discoveries involving the particles in different materials.

1991- Shirley continues her research and begins teaching at Rutgers University.

1995- President Clinton appoints Jackson to serve as Chairman of the U.S. Nuclear Regulatory Commission (NRC), becoming the first woman and first African American to hold that position

1998- Dr. Jackson was inducted into the National Women's Hall of Fame for her significant and profound contributions as a distinguished scientist and advocate for education, science, and public policy.

1999- Jackson becomes the 18th president of Rensselaer Polytechnic Institute. She was the first woman and first African-American to hold this position.

2000- Shirley is inducted into the Women in Technology International Foundation Hall of Fame (WITI). WITI recognizes women technologists and scientists whose achievements are exceptional.

2002- Dr. Jackson is named one of the Top 50 Women in Science by Discover magazine, and recognized in a published book by ESSENCE titled *50 of The Most Inspiring African-Americans*

2009- President Barack Obama appoints Dr. Jackson to serve on the President's Council of Advisors on Science and Technology. She gives the President advice in the areas of science and technology as a means to benefit the American people.

Useful websites:

http://www.iwaswondering.org/shirley_scrapbook_main.html

http://www.rpi.edu/president/profile.html

http://en.wikipedia.org/wiki/Shirley_Jackson_(physicist)

Action Synopsis

Students will gain knowledge on the life and achievements of Shirley A. Jackson, a physicist and the first African American woman to earn a doctorate degree from the Massachusetts Institute of Technology (MIT). They will read a biography of the female scientist, highlighting struggles and achievements as a female African American scientist. Finally, students will analyze the scientist by sequencing major events in her life by developing a detailed timeline.

Time

2 sessions

Desired Outcomes

Students will:

Session 1

- Identify an example of an African American scientist (i.e. Shirley Jackson).
- Recall the achievement(s) made by this scientist.

Session 2

- Describe key events in the life of Shirley Jackson.
- Sequence key events in the life the scientist.

Note: Depending on the class size, more than one timeline can be created and hung in different areas of the school.

What You'll Need

For Each Student

□ Pencil
□ K-W-L chart

For Each Group

Session 2
□ Drawing paper
□ Crayons/Markers

For Whole Class

Session 1
□ Book: "Great Black Heroes: Five Brilliant Scientists" (level 4; Grades 2-3) (Hello Reader) (Paperback) by **Lynda Jones**
□ Chart Paper

Session 2
□ Book: "Great Black Heroes: Five Brilliant Scientists" (level 4; Grades 2-3) (Hello Reader) (Paperback) by **Lynda Jones**
□ Yarn (10 – 12 feet) of any color

 Clothespins (20 – 25; used to clip timeline drawings to the line of yarn) – tape may be used instead of clothespins
 Masking tape
 Computer or other books if needed

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 2.
- Gather all materials needed for the day's activity.
  Read the book "Great Black Heroes: Five Brilliant Scientists" (several pages) and identify opportunities to take a break from the reading to discuss or get a drink of water. If necessary, you may have to shorten the reading based on the needs of your class/group.
- If necessary, you may have to shorten the reading based on the needs of your class/group.
- (Session 2) Review Timeline in "Background for Teachers" and select several (8 – 10) key events to use for timeline.
- (Session 2) Write a description of each event at the top/bottom of a sheet of drawing paper including the DATE (will be used when students illustrate the event)
- Select a location in the classroom or hallway where the completed timeline can be displayed.

New Vocabulary

Appoint
To name officially.

Biography
A written account of another person's life.

Induct
To admit as a member.

Physicist
A scientist that deals with matter and energy and their interactions.

Theory
A guess.

Valedictorian
The student who has the highest rank in the graduating class.

Assessments

Pre-Assessment: Students will begin a K-W-L chart ("What I KNOW, What I WANT to Know, What I've LEARNED"

Lesson Sequence

1. Inform the students that they will be doing activities to learn about Shirley Jackson. Distribute the K-W-L worksheet titled "Shirley A. Jackson" and direct them to write OR draw the following:

   "K" – What they know about Shirley Jackson.
   "W" – What they want to find out about Shirley Jackson.

   Allow several minutes for this activity. (10 minutes)

   Collect these sheets, OR have students paste them into their Journals.

2. Once students have completed the Journal activity, gather students on the floor and present the book, "Great Black Heroes: Five Brilliant Scientists." Read the title aloud to the students.

   Ask the students:

   "Based on the title, do you think this is a book we would read to find out information?" (Answer: Yes)

   "What kinds of information do you think we will find out?" (Allow for various student answers)

   "Is this book going to be about a person or something else?" "Who/What?" Allow for student answers.

   Inform the students that they are going to hear a biography about a woman named Shirley Ann Jackson. Briefly describe the meaning of the term biography and who S.A. Jackson was.
   (5 – 10 minutes)

3. Read the book to the students, taking breaks as needed.

   Some ideas for breaking up the story:
   - discuss particular illustrations to see what information they give to the story
   - if something in the story can relate to students' lives, ask the kids if they've ever had the same feeling, experience, etc.
   - have students play "Shirley Says" modifying the game "Simon Says"

   (20 – 30 minutes)

4. Once you have read the book to the students, have the students think of one word to describe Shirley Jackson. Using the chart paper (tape to the chalk board) and markers, write the title "Shirley Jackson Adjectives" at the top of the paper.

Have each student 1) take turns to share their word, 2) explain why they felt that word describes Shirley Jackson, and 3) write their word on the chart.

Session 2

2. Distribute the K-W-L worksheet titled "Shirley A. Jackson" and direct them to write OR draw the following:

   "L" – What they have learned about Shirley Jackson, based on the previous activity.
   "W" – What they want to find out about Shirley Jackson.

   Allow several minutes for this activity. If you feel that it would help the students, display the Adjectives Chart describing the scientist from the previous activity. (10 minutes)

   Collect these sheets OR their journals. Have the students sit on the floor as a group in front of the chalk board.

2. Inform the students that they will continue studying Shirley Jackson by making a timeline.

   Ask the students:

   "What is a timeline?"

   "How is a timeline useful?"

   Allow for student answers. If they are unclear, inform them that a timeline is a group of important dates or events that are organized in the order in which they happened. Timelines are useful for studying particular dates and the order that things have happened. Explain to the students that Shirley A. Jackson led a very exciting life, full of adventure and achievement. In order to understand all of the many things that happened in her life, they will make a timeline that shows it.

3. Present the chart/brainstorm from the previous activity. Ask students to read words from the chart and recall events in Shirley Jackson's life that relate to that word. (This may be challenging for students, but allow them the opportunity to get ideas.)

4. Lay the string of yarn across the front of the students so that it makes a line between you and the students. Introduce the timeline sheet (drawing paper) with Jackson's birth date.

"Would this be at the beginning or the end of a timeline?" Allow for student answers. (Answer: The beginning – biographical timelines usually begin with the date of birth of the individual.)

Place the sheet at the beginning of the timeline.

Ask the students

"If a birth date goes at the beginning of the timeline, what would go at the end of the timeline?" Students should suggest the death date.

"Is Shirley Jackson dead, or is she still living?" Answer: Shirley Jackson is still alive, and therefore would not have a death date for the timeline. However, the most recent events in her life would be at the opposite end of the timeline from the birth date.

5. Once students understand how a timeline works, pick up the birth date timeline sheet. Select a student to illustrate this sheet. Continue to read each sheet, selecting individual students to illustrate each one.

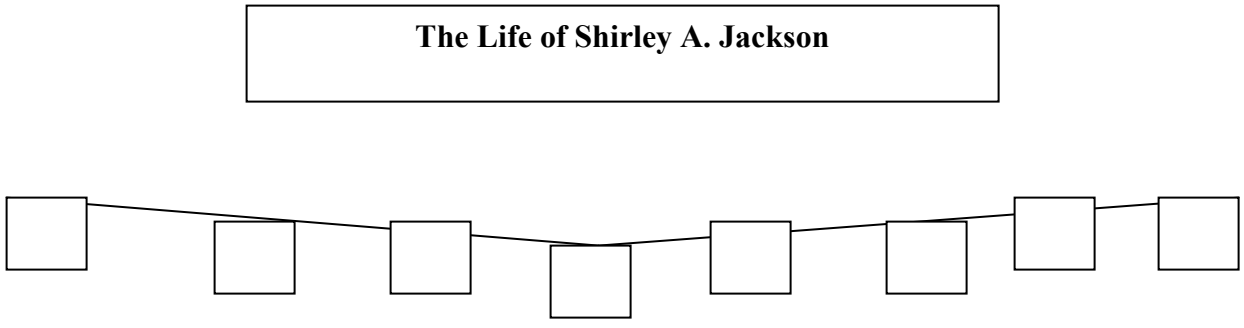
Once all students have gotten a timeline sheet to illustrate, allow students time to complete their illustrations.

(15 – 20 minutes)

6. Once all the students have completed their illustrations, gather the students at the yarn. Allow students to present their illustrations, one by one.
As each student concludes, have students arrange each illustration in chronological order. DO NOT TAPE the illustrations at this time, as they may be rearranged in the process.

7. Once the students have presented and arranged the timeline accurately, tape the sheets to the line of yarn. Ask for two student volunteers to hold the timeline at each end and review the completed timeline with the students.

8. Display the timeline in the classroom or hallway. (See image below for example of end result.)



Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Reading/English Language Arts	
Standard 2.0 Comprehension of Informational Text: Students will read, comprehend, interpret, analyze, and evaluate informational text.	(2)2.1.a – Read and recognize nonfiction materials to gain information and content knowledge • Grade-appropriate reference materials • Multimedia resources (3)2.1.a – Read, use, and identify the characteristics of nonfiction materials such as textbooks, appropriate reference materials, personal narratives, diaries and journals, biographies, newspapers, letters, articles, websites and other online materials, other appropriate content-specific texts to gain information and content knowledge (2)2.3.c – Recognize sequential and chronological order (3)2.3.a – Identify and analyze the organization of text such as sequential and/or chronological order, main idea and supporting details, cause/effect, and problem solution

Module 9 • Lesson 2 • Using Your Marbles: Practicing the Work of Shirley Jackson

Background for Teachers:
Source: http://www.iwaswondering.org/shirley_scrapbook_main.html

Shirley Ann Jackson is a particle physicist, a scientist who studies atoms and the particles they're made of, such as electrons, protons, and neutrons. Early in her career, Shirley made predictions about what happens to electrons when they're exposed to light and other things on the surface of a material.

An electron is like a marble that's rolling across a table with some rough spots. Because of the nicks and bumps on the table, you can't tell exactly where the marble will go – only where it will probably go.

If you want to predict the marble's path (as well as an electron's), you need to think like a physicist. Look at all the possible ways the marble will roll across the table. Then come up with a theory about the most likely path, how fast the marble will get across, and where it will end up.

Useful websites:

http://www.iwaswondering.org/shirley_scrapbook_main.html

Action Synopsis

Students will gain insight into the work of Shirley A. Jackson by conducting a scientific investigation in particle physics. They will develop a theory about the path of a marble on a given surface and the end point of that marble's path. Then students will test this theory given different surfaces. Finally, students will journal about this experience by writing an entry as the scientist Shirley Jackson.

Time

2 sessions

Desired Outcomes

Students will:

Session 1
- Apply the process of scientific investigation using particle theory.
- Recall the work of Shirley Jackson as it relates to the investigation.

Session 2
- Describe a day in the life of physicist Shirley Jackson based on previous activities.

What You'll Need

For Each Student

- Pencil
- Journal
- "Using Your Marbles" student investigation sheet
- "A Day in the Life of Shirley Jackson" reflection sheet

For Each Group

- A table (any flat surface) on which to work and make observations.
- A marble
- Modeling clay
- A piece of foam board
- Markers (black, blue, green)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 3.
- Gather all materials needed for the day's activity, including the slide show/book "Using Your Marbles: Think Like a Particle Physicist."
- Set up work areas at individual desks/tables for each group. Each center should have the following:
  - A piece of foam board
  - Modeling clay
  - Pencils
  - 3 markers (1 black, 1 blue, 1 green)
  - a block or textbook (to put the board at an incline to the table)

New Vocabulary

Atom
A particle that makes up all matter (matter is generalized as anything that takes up space).

Electron
A tiny particle that is part of an atom.

Hypothesis
A prediction.

Theory
(Review) A guess.

Lesson Sequence

1. Review the topic of Shirley Jackson with the students. Quickly have each student state one word or fact that describes this scientist. If necessary, post the Adjectives Chart and/or the Timeline for the students to refer to. (5 – 10 minutes)

2. Explain to the students that they will be thinking like Shirley Jackson for the activity. Briefly read the slide show "Using Your Marbles: Think Like a Particle Physicist" to the students. This will review key vocabulary terms as well as introduce the activity. (5 – 10 minutes)

3. Introduce the investigation. Explain that they will be using the same process Dr. Jackson uses to conduct experiments with a marble.

4. Have students go to their work area. Students should be in groups of 2 or 3 and should sit around one desk or table. Remind the students not to touch the materials until they are instructed to do so.

5. Distribute the investigation sheets to each student. Review the sheet with the class.

6. Develop a theory as a class and write it on the board using the example below to test during the activity.

Example: *"A marble traveling on an unsmooth surface will take* ***a different path/the same path*** *(choose one) than one on a smooth surface."*

Investigation:

(30 – 45 minutes)

(This should be done together step-by-step as one class, demonstrating each step to the groups and allowing them to use only the DATA sheet. If you have strong readers in the group, they may use both sheets, working independently):

1. Set up the board. The book or block should be under the foam board in order to make an incline. See example below:

Control

2. Instruct the students to mark the top of the board in the middle with an **X** to show where the marble's path will begin.

3. The students will record where the marble will roll on the board when it is a completely smooth surface. Allow the students to hold their marble at the **X** position and then release the marble. Remind the students to record their data on their investigation sheet.

Trial 1: Bumps on the Board

4. The students will predict where the marble will roll on the board when it is a bumpy surface. Instruct the students to use the modeling clay to stick bumps onto the foam board. With the BLUE marker, have the students work together to decide the end location of the marble and mark the bottom location on the board with a **"H"** for hypothesis. Have the students do the same markings on their investigation sheet.

5. Allow the students to hold their marble at the **X** position and then release the marble. Have the students use the blue marker to mark the board with **"A"** to show the actual end point. Remind the students to record their data on their investigation sheet.

The students should remove all clay from their board.

Trial 2: Dips in the Board

6. The students will predict where the marble will roll on the board when there are dips in the surface. Instruct the students to use the erasers on their pencils to poke dents into their board. With the GREEN marker, have the students work together to decide the end location of the marble and mark the bottom location on the board with a **"H"** for hypothesis. Have the students do the same markings on their investigation sheet.

7. Allow the students to hold their marble at the **X** position and then release the marble. Have the students use the green marker to mark the board with **"A"** to show the actual end point. Remind the students to record their data on their investigation sheet.

8. Once the students have cleaned up their work areas, discuss the results of the experiment as a class.

9. Review the theory developed by the class:

Ex: "A marble traveling on an unsmooth surface will take a different path than one on a smooth surface."

10. Discuss as a class whether or not they tested that theory, and whether or not they proved their theory.

Session 2:

1. Remind the students that we have been talking about an African American physicist named Shirley Jackson. Hold a brief discussion by asking the following questions:

   "What are some facts that we've learned about Shirley Jackson?"

   "How have we been learning about Shirley Jackson?"

   "How did you feel when you were doing your investigations yesterday?"

   "How do you think Shirley Jackson feels when she is working?" (Have the students articulate their explanations.)

2. Inform the students that they will be imagining themselves as Shirley Jackson by writing a journal about her day.

3. Distribute the sheet "A Day in the Life of Shirley Jackson." Read over the sheet with the students, reviewing each writing prompt for students to respond to.

4. Allow at least 30 minutes for the students to write and illustrate their work. Once finished, students should paste their work into their journals. If time allows, have students volunteer to share their journals.

   (45 – 60 minutes)

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Reading/English Language Arts	
Standard 2.0 Comprehension of Informational Text: Students will read, comprehend, interpret, analyze, and evaluate informational text.	(2)2.1.b – Read and identify functional documents • Set of directions • Science investigations (3)2.1.b – Read, use, and identify the characteristics of functional documents such as sets of directions, science investigations (cont.) (2)2.a-c – Use print features (a), informational aids (b), organizational aids (c) when reading • Numbered steps (3)2.2.c – Use informational aids, such as introductions and overviews, materials lists, timelines, captions, glossed words, labels, numbered steps (cont.)
Science	
Standard 1.0 Skills and Processes: Students will demonstrate the thinking and acting inherent in the practice of science.	(2)1.A.1.a – Describe what can be learned about things by just observing those things carefully and adding information by sometimes doing something to the things and noting what happens. (2)1.A.1.b – Seek information through reading, observation, exploration, and investigations. (2)1.B.1.b – Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas. (3)1.B.1.a – Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations. (2)1.C.1.c – Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).

Module 9 • Lesson 3 • Excuse Me, Dr. Jackson? (An Interview with Shirley Jackson)

Action Synopsis

Students will reflect on the information they have learned about Shirley Jackson. They will use this information to develop interview questions they would ask Shirley Jackson.

Students may work independently or in groups based on teacher discretion.

Time

1 session

Desired Outcomes

Students will:

- Recall facts about the life and achievements of Shirley Jackson.
- Construct interview questions to ask Shirley Jackson if given the opportunity.

What You'll Need

For Each Student

□ Pencil
□ Journal
□ K-W-L Chart (from previous activity)
□ "Excuse Me, Dr. Jackson?" Interview sheet

For Whole Class

□ Chart paper (Titled: What I've Learned about Shirley Jackson)
□ Computers (for the Extension only)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of previous lessons.
- Find and select pictures showing the positive traits of Shirley Jackson (i.e. setting high goals, working with determination, etc.)
- Gather all materials needed for the day's activity.

Lesson Sequence

1. Distribute journals and K-W-L Charts (from previous activity) to the students. Direct the students to complete the following:

   - "L" column (What I've Learned)
   - "W" column (What I Want to Know)

   (10 minutes)

2. Gather the students on the floor in front of the chalk board with their K-W-L charts. Tape the chart titled "What I've Learned About…" to the board. Have students share facts that they've learned based on their study of Shirley Jackson.

3. Inform the students that they will be journalists for the activity that day. Send the students to their seats with their journals. Distribute the "Excuse Me, Dr. Jackson?" activity sheet.

4. Explain the directions to the students. Encourage them to look at their previous work in order to come up with ideas for questions. They should think about what they still want to know about Shirley Jackson. Allow several minutes for this activity.

   (15 – 20 minutes)

5. When finished, gather the students on the floor and have them share their interview questions.

Extensions:

- Have students work in pairs and take turns acting as Shirley Jackson. Students can interview each other based on what they know about Jackson already, and how they think he would answer the questions.
- Bring students to the school computer lab. Have students research their questions to see if they can find the answers themselves.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Reading/English Language Arts	
Standard 4.0 Writing: Students will compose in a variety of modes by developing content, employing specific forms, and selecting language appropriate for a particular audience and purpose.	(2)4.3.b – Proofread and edit writing for • Complete sentences • Capitalization at the beginning of sentences • Punctuation at the end of sentences

Module 9 • Lesson 4 • Culminating Activities

Action Synopsis

Students will reflect on the life and achievements of Shirley Jackson and develop a list of positive character traits possessed by her. They will identify ways and opportunities in which they can develop these traits in themselves. Students will use the knowledge gained from previous activities to design art that reflects the life and achievements of Shirley Ann Jackson.

Time

3 – 4 sessions

Desired Outcomes

Students will:

- Identify at least 3 positive character traits possessed by Shirley Jackson.
- Show ways in which they can develop these positive traits in their own lives.
- Recall important facts regarding the life of Shirley Jackson.
- Create a piece of art (i.e. mural, poetry, rap) that reflects the life and achievements of Dr. Shirley Jackson.

What You'll Need

For Each Student

□ Pencil
□ Journal (optional – may want students to use their journals for documenting their designs and/or poem)
□ "Just Like Shirley Jackson!" Character Trait Sheet

For Whole Class

□ Adjectives Chart (from previous lesson)
□ Chart Paper (Write the Title: "I Can Be Just Like Shirley Jackson")
□ Crayons/Markers
□ For mural:
- Crayons, markers, or paints (depending on availability and choice)
- Drawing/sketch paper
- Pencils
- Butcher paper (either one long piece or a few smaller ones, depending on how you would like the students to work)

□ For poetry/rap (as an alternative activity to designing a mural):
- Pencils
- Journals

- Crayons/markers
- Optional: Previous lesson activities (i.e. Adjectives chart, Timeline, K-W-L) to remind students of information)

Preparing for the Lesson

Leaders will:

- Read the "Background for Teachers" section at the beginning of Lesson 3.
- Gather all materials needed for the day's activity.

New Vocabulary

Character trait
A word that describes a person.

Assessments

The journal at the beginning of this activity, the K-W-L chart, and the mural (or other art) can be used to assess student understanding of the life of Shirley Jackson.

Lesson Sequence

Session 1:

1. Tape the Shirley Jackson Adjectives Chart on the board. Review the words on the chart with the students by having them read them aloud and state a reason why that describes Jackson.

   Ask the students to identify any other additional character traits that describe Shirley Jackson based on recent activities.

   (5 – 10 minutes)

2. Using the Adjectives Chart, select several (5-7) words that you feel the students can understand easily. Write these words on the chart paper titled "I Can Be Just Like Shirley Jackson." Brainstorm each word on the chart by reviewing the meaning of the word and how Jackson demonstrated this word. THEN ask the students to identify situations/ways in which they can show this character trait in their own lives. Write these examples on the chart.

   Examples can include: determined, patient, creative, smart, brave

   (10 minutes)

3. Divide students into small groups of 2 or 3 students. Give them a word from the "I Can Be Just Like Shirley…" chart and have them work together to develop a skit that explains how the word can be applied in the students' lives. Walk around to each group and offer them help as needed. Allow 5 – 10 minutes for students to work in their groups. Once the students have finished, have each group share their skit with the class.

   (20 minutes)

4. Have the students go to their seats. Distribute the "Just Like Shirley" Character Trait Sheet. Explain to the students that they will be using the activities from the day to decide ways that they can use the traits of Shirley Jackson. Allow students several minutes to complete this activity. Once completed, students can share their sheets with the class (this can be optional).

   (20 – 30 minutes)

Session 2:

1. Warm-up/Anticipation: Distribute journals to each student, along with the journal sheet with the prompt: "If you had to describe Shirley Jackson, what would you say about him?" Allow 10 – 15 minutes for students to complete this activity.

2. Once students have completed their journals, you may either collect all journals, or ask for student volunteers to share their responses.

3. Inform the students that they will be working together to create a piece of art that reflects on the life and achievements of Shirley Jackson. You may use this time to review some of the materials from previous activities if necessary including the Adjectives Chart, photos, or reading materials used throughout the Module.

4. Allow students to work as independently as possible to complete one of the following:
   1) A mural or poster – You may need to brainstorm a title with the students, but they should work together to create the mural. Smaller groups may work together to create separate murals if you decide it necessary.

   2) A poem/rap about Shirley Jackson – Students can work individually or in groups to develop a poem or rap about Jackson.

   ** Students may need assistance to recall key information to include in their art. In this case, the charts and other resources will come in handy.

   Students should present their work and display it at the end of this activity.

Maryland SC Standards (2nd and 3rd Grade): *Standards are presented in the following format:* *(Grade)Standard.Topic.Indicator.Objective – Objective Statement*	
Health Education	
Standard 1.0 Mental and Emotional Health: Students will demonstrate the ability to use mental and emotional health knowledge, skills, and strategies to enhance wellness.	(2)1.E.1.c – Identify positive and negative traits of characters in media. (Modified for content) (3)1.E.1.a – Select and model strategies to incorporate positive character traits.

Module 9: African American History (Shirley Jackson)

Worksheets and Handouts

Grades 2 and 3

Insert K-W-L

Using Your Marbles!

Investigation Sheet

Name: _____

Today you will think like the scientist Shirley Jackson as you test a theory on particle movement!

Here's How to Do It:

1. Record the THEORY you've developed about the movement of marbles:

THEORY: _____

_____

2. Set up your ramp. Place your block under the foam board. With a BLACK marker, mark the top of the board in the middle with an **X** to show where the marble's path will begin.

3. Hold your marble at the **X** and then release it. Record **the path of the marble** as it rolls on the board when it is a completely smooth surface by drawing a line and marking the end of the board with a black dot. **Copy your data on your investigation sheet.**

4. How is the marble's path affected by bumps on the board?

   Use the modeling clay to stick bumps onto the foam board. With the BLUE marker, work together to decide the end location of the marble and mark the bottom location on the board with a "H" for hypothesis. **Copy this on your investigation sheet.**

5. Hold your marble at the **X** position and then release the marble. With the BLUE marker, record the path of the marble by drawing a line and mark the board with "A" to show the actual end point. **Copy your data on your investigation sheet.**

Remove all clay from your board!!!

6. How is the marble's path affected by bumps on the board?

   Use the modeling clay to stick bumps onto the foam board. With the GREEN marker, work together to decide the end location of the marble and mark the bottom location on the board with a "H" for hypothesis. **Copy this on your investigation sheet.**

7. Hold your marble at the **X** position and then release the marble. With GREEN marker, record the path of the marble by drawing a line and mark the board with "A" to show the actual end point. **Copy your data on your investigation sheet.**

2. Set up your ramp. Place your block under the foam board. With a BLACK marker, mark the top of the board in the middle with an **X** to show where the marble's path will begin.

3. Hold your marble at the **X** and then release it. Record **the path of the marble** as it rolls on the board when it is a completely smooth surface by drawing a line and marking the end of the board with a black dot. **Copy your data on your investigation sheet.**

4. How is the marble's path affected by bumps on the board?

Use the modeling clay to stick bumps onto the foam board. With the BLUE marker, work together to decide the end location of the marble and mark the bottom location on the board with a "H" for hypothesis. **Copy this on your investigation sheet.**

5. Hold your marble at the **X** position and then release the marble. With the BLUE marker, record the path of the marble by drawing a line and mark the board with "A" to show the actual end point. **Copy your data on your investigation sheet.**

Remove all clay from your board!!!

6. How is the marble's path affected by bumps on the board?

Use the modeling clay to stick bumps onto the foam board. With the GREEN marker, work together to decide the end location of the marble and mark the bottom location on the board with a "H" for hypothesis. **Copy this on your investigation sheet.**

7. Hold your marble at the **X** position and then release the marble. With GREEN marker, record the path of the marble by drawing a line and mark the board with "A" to show the actual end point. **Copy your data on your investigation sheet.**

Using Your Marbles!

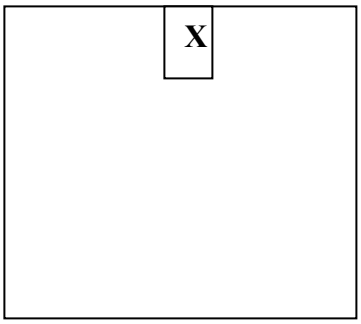
Data Sheet

Name: _____

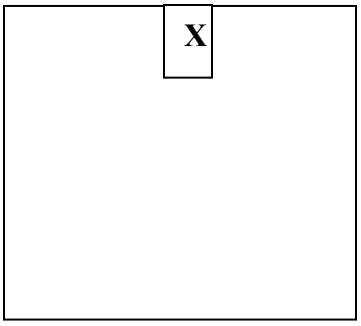
Today you will think like the scientist Shirley Jackson as you test a theory on particle movement!

The Path of a Marble on Different Surfaces

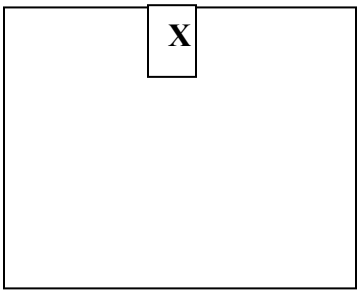
CONTROL
(smooth – no bumps or dips)



Bumpy Surface



Dipped Surface



Was your theory correct? _____

Why or why not? _____

_____

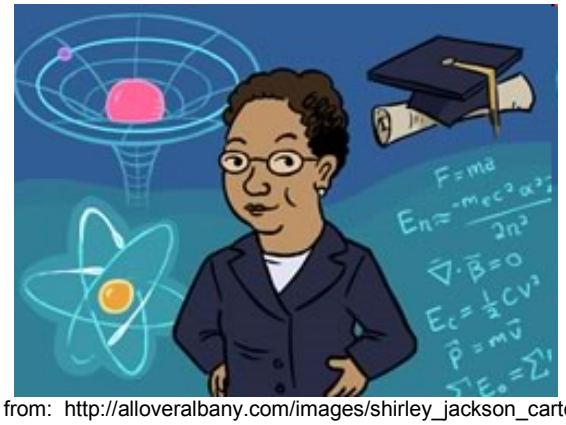


Image from: http://alloveralbany.com/images/shirley_jackson_cartoon.jpg

A Day in the Life of Shirley Jackson

When I wake up in the morning, the first thing I think of is _____

_____

I like my job as a physicist because _____

_____

The day President Obama asked me to work with him it made me feel

_____ because _____

_____

When I get home from a long day I like to _____

_____

Image from: http://www.njit.edu/news/2006/images/2006-027.jpg

Excuse Me, Dr. Jackson?

Name: _____

Directions:
1. **Think** about what you STILL want to know about the life of Shirley A. Jackson.
6. **Imagine** you are writing a newspaper article on Dr. Jackson.
7. **Create** 4 interview questions to ask her. Don't forget to use a question mark (?) to punctuate!!!

Question 1:

_____

_____

Question 2:

_____

_____

Question 3:

_____

_____

Question 4:

_____

_____

Just Like Dr. Jackson!

Name: _____

Directions:
1. **Choose** THREE words that describe Dr. Jackson and write one in each circle.
8. **Write** a sentence explaining how you can show that trait in your life.
9. **Illustrate** your sentence.

_____

I can _____

_____

Shirley Jackson is…

_____

I can _____

_____

_____

I can _____

_____

"If you had to describe Dr. Shirley Jackson, what would you say about her?"

Name: _____

If I had to describe Dr. Jackson, I would say that

_____

_____

_____

_____

_____

_____

This is how Dr. Jackson looks to me:

Module 9: African American History (Choose Your Own)

Worksheets and Handouts

Grades 2 and 3

Insert K-W-L

A Day in the Life of _____

When I wake up in the morning, the first thing I think of is _____

_____

I like my job as a _____ because _____

_____

When I _____, it makes me feel _____

_____ because _____

_____

When I get home from a long day I like to _____

_____

Excuse Me, _____?

Name: _____

Directions:
1. **Think** about what you STILL want to know about the life of your scientist.
10. **Imagine** you are writing a newspaper article on your scientist.
11. **Create** 4 interview questions to ask him/her. Don't forget to use a question mark (?) to punctuate!!!

Question 1:

_____

_____

Question 2:

_____

_____

Question 3:

_____

_____

Question 4:

_____

_____

I Can Be Just Like _____!

Name: _____

Directions:
1. **Choose** THREE words that describe your scientist and write one in each circle.
12. **Write** a sentence explaining how you can show that trait in your life.
13. **Illustrate** your sentence.

_____

_____

I can _____

_____

_____

is…

I can _____

_____

_____

I can _____

_____

"If you had to describe_____, what would you say about him/her?"

Name: _____

If I had to describe _____, I would say that

_____

_____

_____

_____

_____

_____

This is how _____ looks to me: