From outer space to the inner workings of computers, advances in science and technology have changed the way people live.

The classroom supplement “Trailblazers of Science and Technology” and this Teacher Guide have been created to help students learn about African American contributions to the sciences. The supplement and Teacher Guide also are designed to demonstrate how the newspaper can be an effective teaching tool.

This Teacher Guide will extend the lessons of the classroom supplement by offering activities that explore science through the daily content of the newspaper. Each activity is followed by a convenient reference line that details the state standards and skills addressed by the activity. A series of 8 1/2 x 11 activity sheets offer ready-made materials that may be photocopied for students.

The “Trailblazers of Science and Technology” supplement and Teacher Guide have been made possible by a generous contribution from Ford Motor Company Fund. Take a moment to thank Ford Motor Company Fund by having students write thank-you notes. Mail thank-you notes to “Trailblazers of Science and Technology,” Ford Motor Company Fund, c/o PCG Campbell, 3200 Greenfield Road, Suite 280, Dearborn, MI 48120.

Your Newspapers In Education program also would like to hear your comments about this and other programs. Please fill out the Evaluation Survey on the back page of this section and mail or fax it to the NIE Department as directed.
ACHIEVERS IN ALL FIELDS

Black History is a story of courage, perseverance and achievement. In science, technology and all other fields African Americans have overcome barriers and achieved success with skill and education. The activities in this unit are designed to introduce students to the success of African Americans in science and other fields and to introduce the newspaper.

1. **Black Achievers**
   Opportunities for African Americans were once greatly limited in science, technology and other fields. But from NASA's Mae Jemison to Dr. Benjamin Carson, African Americans have become leaders in all areas of science. Have students search the newspaper today or for several days for African Americans who are achieving success. Ask them to list these people who are influencing news, science or culture on a sheet of paper. For each, have them write what the person is doing to achieve success, and how science plays a part in that career. For non-scientific careers challenge students to stretch their thinking—the effects of science may be indirect!

   **STANDARDS/SKILLS:** Acquiring information from multiple sources and then evaluating, organizing and communicating it; constructing meaningful understanding of our diverse cultural heritage.

2. **Much to Admire** *
   Ask students to look through the paper and pick an African American they admire. With the "Much to Admire" activity sheet, have them write what qualities the person has that makes them admire him or her. Have students follow up by writing which of those qualities they have as individuals. Direct them to write which of those qualities they consider the most important. Finish by asking them to write which qualities would be most important for an African American to succeed in a scientific career.

   **STANDARDS/SKILLS:** Using written and visual texts to research issues of importance that confront adolescents and their community.

3. **Science Jobs** *
   More minorities are entering science fields today than ever before. Yet businesses would like to attract even more. As a class, discuss the advantages of careers in science and technology. Then have students find a science or technology business in the ads or stories of today's newspaper. Divide students into teams and have each team draw up a five-point message for a school assembly to attract African American students to a career with this business. Have each team explain the importance of each point to the class.

   **STANDARDS/SKILLS:** Locating and interpreting social science information; utilizing the persuasive power of text as an instrument of change in the community.

4. **Role Models**
   When African Americans achieve success in a field, their actions may inspire children to go into that field in later life. As a class, talk about the benefits of having African American students choose careers in science and technology. How could this help individual students? How could it help the community? Finish by having students write a short newspaper editorial urging African Americans and other students to choose careers in science. Direct them to the editorial page of the newspaper to see how editorials are written.

   **STANDARDS/SKILLS:** Using the craft of the illustrator to express ideas artistically.

5. **Drawing Praise**
   Editorial cartoons use art to express opinions about people and things. Have students pick an African American they admire from the student supplement "Trailblazers of Science and Technology" or from the pages of the newspaper. Ask students to then draw an editorial cartoon celebrating the achievement of this person, and to give it an appropriate title. Display and discuss editorial cartoons.

   **STANDARDS/SKILLS:** Using the craft of the illustrator to express ideas artistically.

*Includes activity sheet for students.
Much to Admire

It’s important to have people to look up to. Scan today’s newspaper and pick an African American you admire in science or another field. In the spaces below, write what qualities the person has that makes you admire him or her. Then write which of these qualities you have as an individual. Next, write which of those qualities you consider the most important. Finish by writing which qualities would be most important for an African American to succeed in a scientific career.

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More minorities are entering science fields today than ever before. Yet businesses would like to attract even more. As a class, discuss the advantages of careers in science and technology. Then find a science or technology business in the ads or stories of today’s newspaper. Alone or in teams draw up a five-point message for a school assembly to attract African American students to a career with this business. Explain the importance of each point to the class.

Science/Technology Business

POINT 1

POINT 2

POINT 3

POINT 4

POINT 5
1. Space Teamwork *
   Teamwork is important in exploring space. Divide students into teams to plan the launch of a space probe. Their goal: to gather together the scientists needed for the effort. Have each team look through the Classified Ads in the newspaper and find all the science-related jobs available today. Using the “Space Teamwork” activity sheet, have them list which jobs would be important to launching a space probe, and write out why. Are there any important jobs for the probe that are missing from the Classifieds? If so have them write Help Wanted ads seeking people to fill these jobs.
   **STANDARDS/SKILLS:** Developing an awareness of contributions made to science by people of diverse backgrounds.

2. Spacy Names *
   Many sports teams have adopted space-age nicknames: The Houston Rockets, the Houston Comets, the Phoenix Suns and others. Ask students to look through the sports section of the newspaper and see how many such nicknames they can find. Then with the “Spacy Names” activity sheet, have them come up with three space names for sports teams they like. Challenge them to explain what the space term says about a team. Finish by having them draw a team logo for each one.
   **STANDARDS/SKILLS:** Experimenting with different ways to express ideas; demonstrating how communication can be influenced by word usage.

3. Big Numbers
   Space missions are a great way to test knowledge about huge numbers. The Galileo mission, which traveled to Jupiter, was one. Radio signals, for example, take 52 minutes to travel from Earth to Jupiter. Jupiter is about a half billion miles from Earth. Based on this, challenge students to compute how fast radio waves travel in space—per hour, minute and second.
   Finish by asking students to find three examples of big numbers in the newspaper and to create a word problem for each one. Have them exchange word problems. Allow them to use calculators to solve the problems.
   **STANDARDS/SKILLS:** Performing calculations to describe the speed and direction of an object; recognizing equivalent representations of numbers, such as decimals.

4. New Products
   Science news is important to newspapers because scientific discoveries often lead to new products. As a class, think of an item invented for space exploration that is now used for other things. Then have students find stories in today’s newspaper about other scientific discoveries. List possible uses for the discoveries.
   **STANDARDS/SKILLS:** Showing how themes of science, mathematics and technology apply in real world contexts; describing advantages and risks of new technologies.

5. Exploration Dollars
   The United States has been a world leader in the exploration of space almost from the beginning. But each satellite or space shuttle costs millions of dollars. Many people in Congress want to cut spending on space as a way to save money. Have students brainstorm about the good and bad results of cutting spending, and the value of the scientific information gotten from space. Finish by having them write the first three paragraphs of a news story based on the ideas expressed in class. Make sure they include more than one point of view in their accounts.
   **STANDARDS/SKILLS:** Engaging each other in conversations that attempt to clarify and resolve issues pertaining to national policy; explaining how public issues become problems and why people disagree about them.
Space Teamwork

Teamwork is important in exploring space. Divide into teams to plan the launch of a probe to a space destination of your choice. **Your team’s goal: to gather together the people needed for the effort.** Look through the Classified Ads and find all the science-related jobs available today. List which jobs would be important to launch your space probe, and write out why. Are there any important jobs for the probe that are missing from the Classifieds? If so, write Help Wanted Ads seeking people to fill these jobs on the back of this activity sheet.

**Destination of Our Probe:**

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<th>Job</th>
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DON’T FORGET: Write Help Wanted Ads on the back of this sheet if necessary.
Many sports teams have adopted space age nicknames: the Houston Rockets, the Houston Comets, the Phoenix Suns and others. Look through the sports section of the newspaper and see how many such nicknames you can find. In the spaces below, come up with three space names for sports teams you like. Explain what the space term says about each team. Finish by drawing a team logo for one of your choices on the back of this sheet.

**New Name for Team I Like:**

**Explanation:**

**New Name for Team I Like:**

**Explanation:**

**New Name for Team I Like:**

**Explanation:**

DON’T FORGET: Draw a logo for one of the teams on the back of this sheet.
UNIT 3

LIFESTYLE

Science and technology are transforming our lifestyles and lives. Advances in medicine are conquering diseases and even challenging the limits of old age. “Smart” homes and cars make day-to-day life easier through computers. Buying and selling products has been transformed by “e-commerce” and online services. The activities for Unit 3 explore the way science has impact on our lifestyle.

1. Internet Shopping
Websites have become a common addition to the way businesses identify themselves. Many experts predict “e-commerce” will eventually replace store shopping. Have students skim today’s newspaper and find five ads that include listings for Internet websites. Next to each, have them write a sentence explaining what they think might be offered on a site that is not included in an ad. Finish by asking them to decide whether they would buy the product advertised online.

STANDARDS/SKILLS: Analyzing how purchasers obtain information about goods and services from advertising and other sources; analyzing the reliability of information when making economic decisions.

2. Health, Science & Medicine
Health, science, medicine and food get much attention from newspapers because they affect so many people. Have students look through the newspaper today or for several days and find a story about one of these subjects. Ask them to write a sentence stating the new development in the study. Then have them write a sentence stating whom the finding will affect, and how it will affect them in the future.

STANDARDS/SKILLS: Acquiring information from multiple sources and then organizing and communicating it; showing how common themes of science and technology apply in real world contexts.

3. Genetics News *
The field of genetics has made a lot of news in the last several years. First scientists cloned sheep by inserting the genes of an adult into an embryo. Then scientists created “smart mice” by manipulating the genes that control memory. Should such techniques be used with people? Discuss cloning and genetics as a class. Then challenge students to search the newspaper for possible human subjects for cloning. Ask them to pick one person they would approve of cloning and one person whom they think it would be a bad idea to clone.

STANDARDS/SKILLS: Engaging each other in conversations that attempt to clarify and resolve issues of local, state and national policy; explaining how a public issue became a problem and why people disagree about it.

4. Say It With Art *
Editorial cartoons use art to make a point or state an opinion. Ask students to browse through today’s newspaper to find a lifestyle issue involving science or technology that will be important to teenagers in the future. Using the “Say It With Art” activity sheet, have them draw an editorial cartoon showing the good or bad that could occur on the issue.

STANDARDS/SKILLS: Using oral, written and visual texts to research issues of importance that confront adolescents; identifying and using the craft of the writer and illustrator to express ideas.

5. Local Business
Will your city be a “player” in the world of the future in jobs and business? What products will factories in your area make that will be needed worldwide? In teams, have students read the business section of the newspaper today or for several days. As a class, discuss what products and services are created locally for use elsewhere. Challenge students to use what they have gathered from the newspaper to predict how your city will contribute goods or services in the high-tech future.

STANDARDS/SKILLS: Acquiring information from multiple sources and then organizing and communicating it; identifying the current and potential contributions of national and world regions to trade.

*Includes activity sheet for students.
The field of genetics has made a lot of news in the last several years. First, scientists cloned sheep by inserting the genes of an adult into an embryo. Then scientists created “smart mice” by manipulating the genes that control memory. Should such techniques be used with people? Discuss cloning and genetics as a class. Then search the newspaper for possible human subjects for cloning. Pick one person you would approve of cloning and one person whom you think it would be a bad idea to clone. Give reasons for each choice.

**One Person to Clone**

Reason

**One Person Not to Clone**

Reason
SAY IT WITH ART

Editorial cartoons use art to make a point or state an opinion. Browse through today’s newspaper to find a lifestyle issue involving science and technology that will be important to teenagers in the future. Using the space below, draw an editorial cartoon showing a good or bad thing that could happen with this issue.
1. **Student Communication**

How do students today communicate? How do they get information they need for school or pleasure, and how do they convey information to others? With the “Communicate!” activity sheet, challenge students to find 10 communication devices or systems in today’s newspaper. Have them check off whether they use each to receive information, give information to others or both. Next ask them to rank the kinds of communication. Finish by having them pick the item or system they think will change the most in the future.

**STANDARDS/SKILLS:** Acquiring information from multiple sources and then organizing and communicating it; showing how common themes of technology apply in real-world contexts.

2. **Get Things Started**

A catalyst is a chemical substance that helps reactions happen faster by lowering the amount of energy needed to set a reaction in motion. After reviewing the definition of “catalyst” in chemistry, ask your students what they think it means when we call a person a catalyst. Lots of times people who make the news are catalysts. Instruct students to look in the news sections of the newspaper. How many catalyst people can they find? How many of these catalysts are African Americans or other minorities? How many work in science or technology?

**STANDARDS/SKILLS:** Showing how science concepts can be interpreted through creative expressions.

3. **Made to Order**

The order of the chemicals in human genes determines different human traits. Instruct your students to search the ads and stories in the paper for examples of other things for which order is important to how they work or are done. Have them list five on a sheet of paper. Then have them write a paragraph explaining one of their choices.

**STANDARDS/SKILLS:** Understanding how information is genetically passed from parents to offspring in coded DNA molecules and how genes are segments of DNA molecules.

4. **Water Everywhere**

Water is one of the most important molecules in the world. Water affects all living things because most living things need water to survive. With the activity sheet titled “Water Everywhere,” have students search the newspaper for ways water affects human, animal and plant life. Challenge them to stretch their thinking to include indirect effects as well as direct effects. Then have them write a short newspaper editorial about the importance water.

**STANDARDS/SKILLS:** Describing the basic requirements for all living things to maintain existence, including food, habitat, water, air, light and minerals.

5. **Animal Alterations**

Genetics is the scientific study of what makes living things the way they are. Direct your students to look through the newspaper for photos or names of animals (don’t forget the sports pages). Have them pick an animal and write out three features it has that interest them. Ask them if they would change these features through genetics if they could. Tell them to write reasons why or why not. Finish by challenging them to repeat the activity for a human in the news.

**STANDARDS/SKILLS:** Classifying familiar organisms on the basis of observable physical characteristics; describing how heredity and environment may influence characteristics of an organism.

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*Includes activity sheet for students.*
COMMUNICATE!

How do students today communicate? How do you get information you need for school or pleasure, and how do you tell information to others? Find 10 communication devices or systems in today's newspaper. List them below and check off whether you use each to receive information or give information to others. (You can check both.) Then rank the kinds of communication in order of importance (with 1 being highest). Finish by picking the item or system you think will change the most in the future and write a paragraph on the back of the sheet explaining why.

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<th>Rank</th>
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DON'T FORGET: Write your paragraph on the back of this sheet.
Water is one of the most important molecules in the world. Water affects all living things because most living things need water to survive. Search the newspaper for ways water affects human, animal and plant life. Stretch your thinking to include indirect effects as well as direct effects. Make a list of the effects in the spaces below. Then on the back of this sheet, write a short newspaper editorial on “The Importance of Water.”

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<th>Direct Effect</th>
<th>Indirect Effect</th>
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<td>Humans</td>
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<td>Plants</td>
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MORE CAN BE DONE
The Newspaper in Education supplement “Trailblazers of Science and Technology” and this Teacher Guide have explored the achievements and contributions of African Americans to our culture and society. But more can be done. The activities below are designed to extend the lessons of “Trailblazers of Science and Technology.”

1. Adopt a Leader
Have students “adopt” an African American leader in science, medicine or technology who is often in the news. Have them create a scrapbook of clippings from the newspaper and other publications that feature this person. Follow this person for a month, or a semester, or a year. Write the person and see if he/she can visit. Finish by having students use the collected material to write a short report on the person’s achievements for a year.

2. Black Science Organizations
Research African American science organizations and groups at the local, state and national levels. Have students record what they do, how they do it, and who is involved. Find out which ones have newsletters and request that they be sent to the class. Investigate which have websites that supply information or online services. Compile the list of institutions into a resource guide for future class use.

3. Art Contest
Sponsor a school or class art contest on the theme of “Trailblazers of Science and Technology.” Have students create artworks celebrating African American leaders in these fields. Mount an exhibit of artworks and invite local African American leaders to judge. Alert newspapers and TV stations about the project.

4. Book List
Compile a class list of books about African American leaders in science and technology. Encourage students to write short, signed “review blurbs” of the books to let others know who liked them and why. Add to this list as students read additional books. Pass the word to other classes that you have this resource and share its contents.

5. Meet a Professor
Contact an African American professor of science or technology at a local college and invite him/her to speak with your class at lunch or in the classroom. Have students prepare questions to ask about how this person decided to specialize in his/her field, day-to-day activities at the university, as well as books to read and enjoy.

6. Tour a Science Site
Arrange a tour of a science or technology business or a university science lab. Meet with different staff members to discuss how individuals on the staff contribute to the effort. See if one of the staff members would be willing to be a written or electronic pen pal keeping the class up to date on what he/she is doing on the job.

7. Make a Movie
Explore the life of an African American who has succeeded in science or technology by researching, planning and shooting a video documentary. Make it a class project or divide the class into teams for different projects. Host a “premiere party” to show the class videos. Contact local cable TV networks to see if they would be willing to air the videos for the community.

This Teacher Guide was created by Hollister Kids for Detroit Newspapers in Education. The designer was Renee Gwin. The writer was Peter Landry.
SURVEY

RATE THE PROGRAM
The "Trailblazers of Science and Technology" supplement and its Teacher Guide are designed to assist teachers in the classroom. To enable us to serve you as effectively as possible, we would like to hear your comments. Please complete the following questionnaire and return to the Newspaper in Education department of your newspaper.

1. Please grade the overall quality of the "Trailblazers of Science and Technology" program.

   + A + - B - + C - + D - F

   EXAMPLE: (B+ evaluation)
   + A - + B - + C - + D - F

2. Do you feel that your students are more knowledgeable regarding science issues as a result of this program?
   ( ) yes ( ) no

3. "Trailblazers of Science and Technology" was sponsored by Ford Motor Company Fund. Has your impression of Ford Motor Company changed as a result of this sponsorship?
   ( ) unchanged
   ( ) somewhat more favorable
   ( ) much more favorable

4. Did "Trailblazers of Science and Technology" meet your overall expectations?
   ( ) yes ( ) no

   If no, were expectations not met due to any of the following reasons:
   ( ) content of program materials
   ( ) delayed receipt of this guide
   ( ) missed/late delivery of student sections
   ( ) missed/late newspaper delivery
   ( ) difficulty incorporating materials into curriculum
   ( ) Other__________________________

4. What changes would improve this program?

5. What new program(s) would be most useful for you?

6. Circle the grade(s) you teach:
   K  1  2  3  4  5  6  7  8  9  10  11  12

7. The subject(s) you teach:

8. Your school district:

9. Optional information:
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   School:______________________________
   Phone:______________________________
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Thank you for helping us improve our educational services!