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## SCIENCE • The 5Ws of SCIENCE/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers and note cards or provide the student worksheet S 1-1.

**Activities:** Have students analyze science-related articles from the newspaper by outlining the 5 Ws—who, what, when, where, why. Each of the 5 Ws is written on an index card along with the information taken from the article. Headlines belonging to the articles should be clipped and saved. Have students read the information from one of the index cards and ask another student to match the information to the headline.

Students can also record the information on the graphic organizer S 1-1 and share what they write with other students. They should tear out the pages from the newspaper where the stories appear and staple them to the completed worksheets.

Have students focus on success stories by saving stories about problems that have been solved and needs that have been met through scientific research and discovery and social action related to environmental and other science-related concerns. Direct them to the success stories when they answer the who, what, when, where and why questions. Call attention to stories where young people or people in the local community are involved and present them as role models.

## SCIENCE • TOOLS of SCIENCE/ SCIENTIFIC INQUIRY

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers and the student worksheet S 1-2.

**Activities:** Have students look for items that illustrate the types of tools used by scientists. They should list them or cut them out and display them under the following categories:

- Laboratory
- Printed
- Field
- Other Important Tools

If the newspaper does not feature tools in one category, students should look for items in science textbooks and journals and around their classroom. Provide the graphic organizer S 1-2 for students to record their answers.

Follow up by asking them to choose one important tool from the list and write and design a newspaper ad for the item. They should be sure to list its outstanding features, its uses and its cost.\*

\*Daniel Barnekow, *Graphic Organizers for Science Classes*

## SCIENCE • STEPS in SCIENTIFIC RESEARCH/ SCIENTIFIC INQUIRY

### Nature of Science Scientific Inquiry

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers and the student worksheet S 2-3.

**Activities:** Ask students to choose one or more newspapers stories about science and read them carefully. Direct them to look for references to the steps involved in conducting a research study. They should write what they find on the graphic organizer S 2-3. Encourage them to complete the chart with examples they find. Students can place numbers beside corresponding information in news stories to show the steps given below:

1. Identify a problem or question.
2. Formulate a hypothesis or make a prediction.
3. Design an experiment to test the hypothesis.
4. Conduct an experiment to test the hypothesis.
5. State the findings.

Ask students if they find more references to the final step or "findings" than the other steps. If so, ask them why they think newspapers focus on findings. Discuss why it is important to know how the findings were obtained.

## SCIENCE • AREAS of SCIENCE/ SCIENTIFIC INQUIRY

### Nature of Science Personal and Social Perspectives

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide students with copies of the newspaper. Discuss the role of newspapers in providing information that updates textbooks.

**Activities:** To supplement textbooks with more up-to-date information, ask students to look for newspaper articles about scientific changes and discoveries. Then have them put the articles in a notebook with sections labeled astronomy, biology, botany, chemistry, geology, meteorology, physics and zoology. The newspaper articles should be placed in the appropriate section. Under each category, they should identify the stories about scientific research and discovery that most affect their lives or the lives of people they know.

## SCIENCE • CAREERS in SCIENCE and TECHNOLOGY/ NATURE of SCIENCE

### Nature of Science

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers and the student worksheet S 2-4.

**Activities:** Have students look in classified ads, newspaper stories and special sections on careers for careers in science or technology. They should record answers for two scientists, technologists or engineers on the graphic organizer S 2-4.

## SCIENCE • CAREERS in SCIENCE and TECHNOLOGY/ NATURE of SCIENCE, continued

### Activities,

**continued:** Questions include the following:

1. Who are they?
2. What do they do?
3. Where do they work?
4. Why is their work important?
5. Would I enjoy their work? Why?

Follow up by having students interview someone who works as a scientist or engineer. They should take careful notes and record the best quotes. Have them write a story about the person in journalistic style. For models on how to write the stories, select and have students read stories about scientists that appear in the story. They may be breaking news stories about a recent discovery or an in-depth profile or feature about a scientist and his/her work. They may also choose to write opinion and, if they do, they should use editorials as models.

Personal and Social Perspectives

## SCIENCE • PEOPLE in SCIENCE/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide copies of newspapers and science textbooks. Students should locate people in the textbooks who have made important contributions to the field of science (Pasteur, Edison).

Time this activity to coincide with reports of special awards such as the Nobel Prizes.

**Activities:** Over several weeks, ask students to look for current news about people who are contributing to scientific research. Students should indicate whether or not they think those people and their contributions will be recorded in textbooks and explain why or why not. They should discuss why the contributions are reported in the newspaper. Do the articles inform the reader? Do they offer advice or guidance? Do they praise the scientist?

Many early scientific discoveries and inventions were made by men or women working alone. Today scientific advancements are usually the result of team effort or an extension of someone else's research. Discuss why that is so. Have students find examples of scientists working together in the stories they find about research.

Scientific Inquiry  
Historical Perspectives

## SCIENCE • PROFILE of a SCIENTIST/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers that include a profile about a scientist or scientists and provide the student worksheet S 3-5. On the worksheet, have students record information about a scientist who is featured in the newspaper.

Scientific Inquiry

## SCIENCE • PROFILE of a SCIENTIST/ NATURE of SCIENCE, continued

### Scientific Inquiry

**Activities:** Ask students to look for quotes in the stories that comment on the nature of science and explain methodologies. For example, in a news report, published in February 27, 2003, about a medical doctor whose research produced a breakthrough treatment for preventing preterm births, the newspaper's staff writer explained the role of scientists, "Scientists know that the work they do is slow and incremental, part of the process of advancing understanding, maybe finding a piece of a puzzle that will fit a piece that someone else has found, and then lead to another piece." The doctor whose work is described in that story said he is "extremely gratified" that his work produced a breakthrough.

Have students classify stories about scientific research into two categories. They should look for stories in the newspapers about scientists who find a piece to the puzzle or advance understanding, and look for other stories about scientists whose work produced results that represent a significant advance in scientific knowledge or in treating illness.

From the stories about scientists, have students choose one or more stories about a modern-day scientist and complete as much of the graphic organizer S 3-5 as they can.

The worksheet asks for the following information:

1. Name
2. Important dates/events
3. Places where the scientist lives and works
4. Fields of study
5. Important advances or breakthroughs
6. Other scientists whose life and work benefited the scientist under study
7. Interesting personal information
8. Additional information

Based on what students discover about modern-day scientists, have them use the graphic organizer LA 76 to record and explain the qualities of a good scientist.

## SCIENCE • SCIENCE as NEWS/ NATURE of SCIENCE

### Personal and Social Perspectives Historical Perspectives

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Have newspapers and science textbooks available.

**Activities:** Using the styles of writing in today's newspapers, have students write a story about one of the early, great scientists such as Louis Pasteur or Madame Curie as if the scientific breakthroughs were happening today.

Have students prepare a newspaper designed around a specific unit being studied. For example: A unit on the history of science might include the following:

1. an editorial written about Darwin's theory
2. letters to the editor presenting opposing views
3. an interview with the Bishop of the Catholic Church in which he states his views concerning the theories of Galileo

## SCIENCE • The LIMITS of SCIENCE/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers.

**Activities:** Explain that science does not test beliefs. Scientists produce and examine concrete evidence. Locate newspaper stories that deal with beliefs or statements that would be outside the realm of science. They should also identify statements that scientists can test through observation and experimentation and suggest ways of doing so.

Using newspapers as their source, ask students to come up with a list of questions that scientists cannot answer and questions that scientists can pursue.

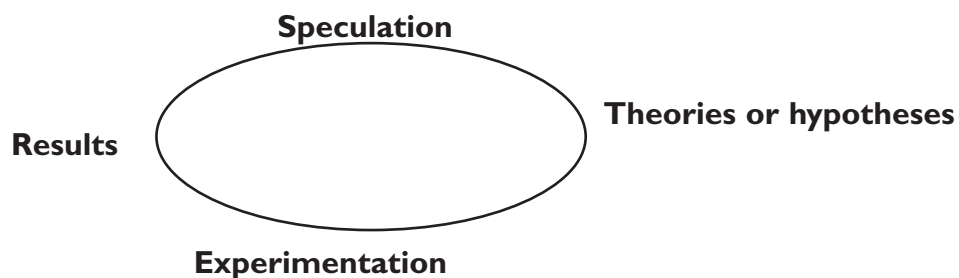
Scientific Inquiry

## SCIENCE • SPECULATING about RESULTS/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers that contain reporting about science.

**Activities:** Explain the following process that feeds off of and leads to more scientific discovery: Speculation is the spinning off of ideas, a form of brainstorming to come up with creative ideas, about the meaning of and approaches to science and further research that needs to be conducted. Results from experiments often lead to speculation about their implications which leads to new theories or hypotheses that must be tested through experimentation. Trace the process in news stories. Refer to the graphic below:



Follow up by having students speculate about stories dealing with scientific advances. Have them formulate questions that might lead to further investigations.

Scientific Inquiry

## SCIENCE • FUNDING for SCIENCE/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers that contain stories about science. Provide the student worksheet S 5-6.

Personal and Social Perspectives

## SCIENCE • FUNDING for SCIENCE/ NATURE of SCIENCE, continued

**Activities:** Have students read stories to find out who receives funding for scientific research. They should identify the organization that made or is awarding the grant, the purpose of the grant, the person, persons or institutions that received or are receiving the grant, and details that explain why those receiving the funding were chosen. Provide the graphic organizer S 5-6 for students to record what they find. Students should look for answers to the following questions:

1. Who awarded funds? For what purpose?
2. Who received funds? Why?
3. Who or what organization stands to benefit financially or otherwise?

Follow up by asking students if and how the source of the funding has any financial stake in the outcome of the research.

## SCIENCE • HOW DO YOU KNOW?/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers that contain stories about science and scientific research.

**Activities:** Tell students that “How do you know?” is the simple, important question to keep in mind as they read about scientific research (and other issues in the news). In determining the answer to that question, students must determine the accuracy and credibility of the study. Instruct students to use the following set of questions when evaluating reports about scientific studies reported in newspapers:

1. What is the question or theory?
2. Can science answer the question?
3. What are the pros and cons for the findings? Are there contradictory findings?
4. Is the design for the experiment sound?
5. Does the research study have integrity?
  - a. Who funded the study?
  - b. Who conducted the study?
  - c. Who are the stakeholders? Who has the most to lose or gain as a result of the research?
  - d. Do facts reported in the stories support the interpretations?

If students believe they cannot answer the question (How do you know?) using the newspaper reports, have them read other sources of information. They should read science journals that provide detailed accounting of scientific research. Have them suspend judgment of the results until they feel fully informed about the research design, its sponsors and the results.



## SCIENCE • EVIDENCE to SUPPORT HYPOTHESES/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspaper stories about scientific research and the student worksheet S 7-7. For example: Recent articles in newspapers discussed the adverse effects of salt. Intake of salt was linked to high blood pressure and stroke. Yet some scientists quoted in the articles questioned these findings; they stated a need for additional research.

When evaluating reports from scientists, look for or have students look for qualifications, titles and business ties. Some industries stand to gain from positive reports on products. Some scientists work for industries that have a stake in the outcome of the research. The scientists may be less than objective. Likewise, organizations too eager to gain recognition and to report negative findings should be questioned.

Aside from the politics associated with science, serious debate is common. Science requires extensive research and results must be duplicated to be accepted. The issue is whether enough evidence exists to accept a hypothesis (defined as educated guesses or opinions and expressed as generalizations) as fact on which to base further research.

Regardless of the hypothesis and the results, there are likely to be skeptics and disbelievers. Some people probably still think that the earth is flat and that moon landings were a hoax.

**Activities:** Have students read and collect news stories about scientific research. They should write the hypothesis on which the research is based and try to figure out if the evidence clearly points to one conclusion. Differing opinions need to be found in the articles and the qualifications of all experts examined.

Create a rating scale and have students place the research and conclusions taken from the stories on it.

1	2	3	4	5	6	7	8	9	10
subject to question							widely held to be true		

Provide the graphic organizer S 7-7 for students to record their information.

The exercise above requires interpretation and comparison of news reports and shows the gray area between fact and opinion.

## SCIENCE • SPIN OFFS/ NATURE of SCIENCE

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers that provide science news. Look in particular for news about the space program.

**Activities:** Much of the research conducted by those working in the space program is helpful in other ways. For example: New ways of monitoring body functions have been found. Have students look for news about ways that space exploration has contributed to society.

## SCIENCE • SPIN OFFS/ NATURE of SCIENCE, continued

Scientific Inquiry

**Activities, continued:** They should also look for technology that provides benefits beyond its original purpose. Have them identify benefits that "spin off" from medical and other scientific research. A medicine produced to treat one disease may benefit someone with another disease or in treating one medical problem, researchers may find that a medicine helps in other ways. For example, research dealing with aspirin has shown the benefits of aspirin in preventing heart disease and other illnesses.

## SCIENCE • RISKS/ NATURE of SCIENCE

Historical Perspectives

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers. Pay close attention when newspapers cover the space program.

**Activities:** Have students study the history of flight and focus on the risks taken by the first people who attempted to fly and the risks that today's astronauts take. Debate the space shuttle and space station programs based on research and public debate.

Look for other examples in history and current events of people taking risks to advance science. People often will agree to participate in drug trials or agree to surgical procedures without knowing what the end result will be and whether they will be harmed in the process. Scientists must be very careful to inform people who participate in risky studies, so that they know what they are agreeing to do. Laws require disclosure to protect human subjects who participate in scientific research.

## SCIENCE • MAKING PRODUCTS POSSIBLE/ NATURE of SCIENCE

Technology

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers.

**Activities:** Ask students to locate newspaper ads for products that were not available 20 years ago. Ask them to hypothesize as to the scientific advances that made these new products possible. Students should test their hypotheses by conducting research on the various products.

## SCIENCE • SCIENTIFIC DEVELOPMENT/ NATURE of SCIENCE

Scientific Inquiry

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers and the student worksheet S 8-8. Explain that science is a process of advancing knowledge and understanding. Current scientific discoveries build on the past.

**Activities:** Ask students to trace the development of a scientific discovery. First have them find a story that tells about a scientific breakthrough and explain what had to happen before the latest breakthrough could occur. Have them circle any clues in the story.

Or have them find a tool, device or an example of the latest technology in the newspaper. After looking for and recording information from the newspaper about the way the discovery developed, ask students to conduct additional research. They should record what had to happen before the latest discovery could be made on the graphic organizer S 8-8. The student worksheet asks for the following information:

1. Scientific discovery or latest technology
2. What discovery or invention came before that?
3. What discovery or invention came before that?
4. What discovery or invention came before that?
5. What discovery or invention came before that?
6. Predict what will come next...

Students can work alone, in teams or small groups to trace the development of the current advancement in science. They should trace the development as far back in time as they can.

Using the graphic organizer LA 25-16 along with this activity will encourage research to obtain additional information.

## **SCIENCE • AGE of INVENTIONS/ TECHNOLOGY**

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers, the World Almanac and the student worksheet S 9-9.

**Activities:** Ask students to guess when different items advertised in newspapers were invented. Then they should select objects invented within the last fifty years. Examples include computers, digital cameras, scanners, microwave ovens and CD players. Have them place the names of the selected objects on a timeline that is separated into decades from 1950 to the present. Have them use the graphic organizer S 9-9 to record their guesses

Follow up by having them conduct research to find out when items were actually invented and/or when they became widely available. They should check the World Almanac and research material, particularly the Internet, for a list of inventions and the year of their introduction. They should count their correct guesses and create another timeline that tells when the objects were actually invented. You may want students to continue to add objects to the timeline as they obtain more information. They may also want to interview people whom they know and who will remember when they first used or owned one of the inventions.

When making their guesses, they should also guess at which items are the earliest inventions. They might also group items that they think were invented near the same time and discuss why they think that happened.

Using microfilm and other available sources, have students locate ads that ran in papers when the products were new or just introduced. Ask how life changed as a result of the new products and designs.

## SCIENCE • UNDERSTANDING TECHNOLOGY/ SCIENCE and TECHNOLOGY

### Technology

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers, the student worksheet S 10-10 and the following information about technology presented in the Science section of the N.C. Standard Course of Study: "While science tries to understand the natural world, technology tries to solve practical problems. Technology expands our capacity to understand the world and to control the natural and human-made environment...." The word technology has many definitions according to Stephen Kiln, Professor of Mechanical Engineering at Stanford University:

1. Artifact or hardware such as a hammer or computer
2. Methodology or technique such as painting or using a calculator or microscope
3. System of production such as an assembly line
4. Social and technical system such as an airplane which suggests interrelated devices, i.e. pilots, fuel, tickets, runways, etc.)

**Activities:** Ask students to illustrate the above definitions by finding items in the newspaper that fit each one. They can find drawings, photos and stories in which the type of technology is applied to solve a problem, build an object of practical value or provide a service. Provide the graphic organizer S 10-10 for students to record their answers. They should explain their choices.

Have them choose one item from the list and list its costs and benefits. They should conduct research and use their personal experiences as the basis for their list.

Follow up with a discussion of the various technologies they use in their daily living. They should interview someone who lived without one significant tool that is currently available. They should ask the person what he or she thinks has been gained through the use of the new tool (benefits) and what has been lost (costs).

## SCIENCE • NATURE'S LAWS/ PHYSICAL SCIENCE

### Nature of Science

**Goal:** To make observations and conduct investigations to build an understanding of magnetism and electricity.

**Preparation:** Provide newspapers and science textbooks.

**Activities:** Ask students to find examples in the newspaper of the application of Newton's Laws. Students should explain articles and pictures which illustrate gravity, force and equilibrium. Examples include roof design, dams, power shovels and lawnmowers. Science textbooks provide additional information.

Have students locate examples of characters in the comic section who defy scientific laws. Examples include floating through the air with the help of a single balloon.

## SCIENCE • CLASSIFYING MATERIALS USED in CLOTHING/ PHYSICAL SCIENCE

- Goals:** To make observations and build an understanding of the properties of common objects.  
To make observations and conduct investigations to build an understanding of the properties and relationships of objects.

**Preparation:** Provide newspapers, catalogs, paper and pencils.

**Activities:** Have students find five ads for clothes made of different materials. Then ask them to classify them as synthetic fibers, natural fibers or skins. Students should then classify the clothes they are wearing and answer the following questions:

1. Which classification of clothes is most expensive as stated by the ads? Why do you think this is so?
2. Which classification had the most ads?
3. To what groups of people would each classification of clothing most likely appeal? Why?

## SCIENCE • CLASSIFYING OBJECTS/ PHYSICAL SCIENCE

- Goals:** To make observations and build an understanding of the properties of common objects.  
To make observations and conduct investigations to build an understanding of the properties and relationships of objects.

**Preparation:** Have newspapers available, especially ads, to complete the activities involving classification. Other materials needed vary according to the directions given to students. They may cut out and glue on paper or simply circle the items in the newspaper.

**Activities:** Ask students to identify pictures in ads that have factors in common:

- the same color
- the same size/shape
- the same material (clay, metal, cloth, paper)

Each set can be cut out or circled.

They can also select one object and describe certain of its properties.

Emphasize the senses. For example: If a tire were chosen from an ad, give the following outline:

- A tire feels...
- A tire smells...
- A tire looks...
- A tire tastes...
- A tire sounds...

The information can be used to write a story and to illustrate personification if written in the first person.

Have students classify advertised items by identifying the sense(s) that each primarily appeals to. For example: TV appeals to the senses of sight and sound and perfume to the sense of smell. Use the information to lead into a discussion of why people buy what they do.

## SCIENCE • MACHINES and their PROPERTIES/ PHYSICAL SCIENCE

Technology

**Goals:** To make observations and build an understanding of the properties of common objects.

To make observations and conduct investigations to build an understanding of the properties and relationships of objects.

**Preparation:** Provide newspapers and the student worksheet S 12-11.

**Activities:** Using the newspaper, have students locate and list machines that make work easier. Examples include calculators, computers, washing machines and can openers. The list can be classified in several ways, such as easy or difficult to use, expensive or inexpensive or by where it is used, in the kitchen, at school, in the office, etc. Provide the graphic organizer S 12-11 for students to record their answers. Have students identify the newspaper sections where most machines appear. Ask:

1. Were more found in retail and classified ads? Were there any articles that mentioned machines?
2. Were machine ads scattered throughout the paper or located mainly in one section?
3. Were machines usually advertised at department stores or specialty stores?

Ask students to create their own invention including an illustration of its parts, descriptions of what it is made of, the costs and how the invention will benefit mankind. Also have them create an ad for the invention.

## SCIENCE • SELLING a MACHINE/ PHYSICAL SCIENCE

Technology

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers. Share the definition of machine. A machine is defined as anything that makes work easier or faster. A compound machine is two or more machines working together.

**Activities:** Have students select a machine from advertisements in the newspaper. Ask them to become the machine and sell themselves to the class by telling what things they can do, how much they cost and where they can be purchased.

## SCIENCE • ELECTRICITY and its USES/ PHYSICAL SCIENCE

Personal and Social Perspectives  
Technology

**Goals:** To make observations and conduct investigations to build an understanding of magnetism and electricity.

To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers.

**Activities:** Ask students to locate examples of uses of electricity in the newspaper. After a discussion of how electricity affects their daily lives, students should write a story about "A Day Without Electricity." If students need prompting, ask

## SCIENCE • ELECTRICITY and its USES/ PHYSICAL SCIENCE, continued

**Activities, continued:** questions such as: Instead of watching TV or playing video games, what will you do? What would you do without a blow dryer or curling iron? a microwave?  
Also have students do the following:

1. Look at the retail and want ads and circle all electrical items.
2. List the items in order of importance and frequency of use.
3. Figure out what selling points the items would have if electricity were done away with.

Personal and Social Perspectives  
Technology

## SCIENCE • SPACE EXPLORATION/ EARTH and SPACE SCIENCE

**Goals:** To make observations and use appropriate technology to build an understanding of the earth/moon/sun system.  
To acquire an understanding of the earth in the solar system and its position in the universe.

**Preparation:** Provide copies of newspapers and the student worksheet S 13-12.

**Activities:** Ask students to read and take notes on articles in the newspaper dealing with United States space exploration. This should be done for several weeks. Then, based on information obtained, have students write a summary of the status of U.S. space exploration. Predict what will happen in the next 25 years and discuss how this will affect our lives. Provide the graphic organizer S 13-12 for students to record their answers.

Personal and Social Perspectives

## SCIENCE • EXPANDING ENERGY NEEDS/ EARTH SCIENCE

**Goal:** To develop abilities necessary to do and understand scientific inquiry in the earth and environmental sciences.

**Preparation:** Provide newspapers and the student worksheet S 13-13.

**Activities:** Have students read newspaper articles dealing with the cause/effect situations arising from expanding energy needs and/or fuel shortages. Students should make two lists of the causes--one in which the causes produce beneficial results; the other in which the causes produce undesirable results. Ask students to write possible solutions to the problems presented. Provide the graphic organizer S 13-13 for students to record their answers.

Personal and Social Perspectives

## SCIENCE • The SOURCE of WEATHER INFORMATION/ EARTH SCIENCE

**Goals:** To conduct investigations and use appropriate tools to build an understanding of the changes in weather.  
To conduct investigations and use appropriate technology to build an understanding of weather and climate.  
To conduct investigations and use appropriate technologies and information systems to build an understanding of the atmosphere.

Personal and Social Perspectives

## SCIENCE • The SOURCE of WEATHER INFORMATION/ EARTH SCIENCE

**Preparation:** Provide newspapers and a large weather map. Ask students:

1. How is a typical weather map made?
2. What data regarding weather observations is needed?
3. How is this information obtained?

Include in the discussion the fact that weather stations throughout the world freely exchange their information through the use of standard message forms. That information is received at the National Meteorological Center where a complete weather map is drawn up and then transmitted to all the forecast centers in the country. All atmospheric data goes through Asheville, N.C.

Ask students to describe ways that various media (newspapers, radio, TV and Internet) alert the public to weather problems and the effectiveness of each media. Then ask how they and their family members obtain weather information on a daily basis and where they get weather information when weather is severe enough to disrupt daily routines.

**Activities:** Ask students to find the weather map in the newspaper and locate:

1. an area where there is a high pressure center
2. an area where there is a low pressure center
3. an area that is fair, cloudy, partly cloudy, rainy, snowy
4. a cold front
5. a warm front
6. a stationary front
7. directions of air flows
8. the place where the lowest temperature is expected
9. the number of weather zones in North Carolina (compare the expected temperatures in each)

Follow up by having them locate and read weather stories that appear in the newspaper. In every circumstance, have them research the condition that pushed weather to the front pages and the factors that contributed to the severe weather.

## SCIENCE • The EFFECT of WEATHER/ EARTH SCIENCE

**Goals:** To conduct investigations and use appropriate tools to build an understanding of the changes in weather.

To conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere.

**Preparation:** Provide newspapers.

**Activities:** Ask students to locate articles in the newspaper in which weather conditions play a major role (sports events, auto accidents). Have students keep a record to see if one kind of weather condition causes more trouble than other kinds.

Have students compare the effects of snow, wind, rain or fog on transportation. Discuss factors other than weather that affect transportation. Look for those factors in news reports.



**Goals:** To conduct investigations and use appropriate tools to build an understanding of the changes in weather.

To conduct investigations and use appropriate technology to build an understanding of weather and climate.

To conduct investigations and utilize appropriate technologies and information systems to build an understanding of the atmosphere.

**Preparation:** Provide newspapers during a time when the news reports extreme weather conditions, particularly ones that might damage people and property. They will benefit from learning about tornadoes, hurricanes, floods, droughts, etc. as they occur and when their effects are apparent. Also provide the student worksheet S 15-14.

**Activities:** Direct them to find out as much as they can from the news about the dangers nature presents, the causes, effects and ways to prevent or reduce the damage. They should complete the graphic organizer S 15-14 with the information they obtain from the newspaper. Have them record the following:

1. Weather condition or danger
2. Location
3. Causes
4. Effects on people and property
5. Ways to prevent or decrease the damaging effects

Follow up with questions such as the following: Is the location one cause of the devastation? Do socio-economic factors such as lack of adequate housing or sanitation contribute to the problem and make the circumstances worse for those involved? Who steps forward to help? individuals? state agencies? federal government? international community?

## SCIENCE • INVESTIGATING POLLUTION/ EARTH SCIENCE

**Goals:** To build an understanding of the geological cycles, forces, processes and agents that shape the lithosphere.

To design and conduct investigations to demonstrate an understanding of scientific industry.

**Preparation:** Provide newspapers and the student worksheet S 15-15. Open class with a discussion and/or debate about the importance of environmental questions. Ask students to use newspapers and books such as Rachel Carson's *Silent Spring* as resource material.

**Activities:** Ask students to investigate the problem of pollution by:

- A. Clipping newspaper photos showing various forms of pollution. Take pictures within the community that reveal the same kind of pollution shown in newspaper photos.
- B. Reading articles pertaining to local pollution problems and answering questions such as:

## SCIENCE • INVESTIGATING POLLUTION/ EARTH SCIENCE, continued

### Activities, continued:

1. What is the community doing about pollution?
  2. What city ordinances are in effect?
  3. What can you do to help fight pollution?
- C. Investigating through newspaper articles the causes of and ways of preventing pollution, noting the related health problems.
- D. Studying newspaper articles to find out what the national pollution issues are and seeing if those issues affect the local community in any way. Explore the question: Why is pollution a more pressing problem in some places than in other places?
- E. Answering key questions about a specific pollution problem. Offer the graphic organizer S 15-15 with the following questions:
1. What is the pollution problem?
  2. When did the problem begin?
  3. Who in the community is working on the problem?
  4. Where is the problem?
  5. What can I do to help?
  6. Where did the pollution originate? Did industrial pollution come from distant places and not from industry in your own community?
  7. Did weather play a factor in the pollution?

Write a paper in which you discuss the following statement: Pollution is a global concern that calls for local action. Give specific examples. Explore ways that students have become involved in conducting environmental research through the Globe program.

See the Web site <http://www.globe.gov> (accessed March 26, 2003).

Have students collect stories about people and institutions that have worked to solve pollution and other environmental problems and have succeeded in their efforts to improve the environment. They should save the stories by tearing out the newspaper pages where they find the stories and placing the pages in folders.

## SCIENCE • UNDERSTANDING POLLUTION/ EARTH SCIENCE

**Goals:** To build an understanding of geological cycles, forces, processes and agents that shape the lithosphere.

To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Have newspapers available.

**Activities:** As an extension of a study or discussion on pollution, ask students to locate words in the newspaper related to pollution. Examples include oil slicks, smoke and trash. Those words can be written on the board and the meanings discussed.

## SCIENCE • UNDERSTANDING POLLUTION/ EARTH SCIENCE, continued

**Activities, continued:** Follow up with questions and examples:

1. Does everyone agree that the words listed relate to pollution?
2. Who determines what pollution is?
3. What are the short-term causes and effects of pollution? For example: Illegal dumping causes contamination of water.
4. What are the long-term causes and effects of pollution? For example: Increased industrial waste causes contamination of air and water and those in turn cause health problems. As the public is made aware of the dangers to health, pressure mounts on public officials to set and enforce guidelines for control of wastes.

Then have students describe and/or draw a world where pollution has gone unchecked and another world where it has been controlled. They should look for political cartoons that dramatize environmental issues and show varying points of view.

Personal and Social Perspectives

## SCIENCE • The USE of PESTICIDES/ EARTH SCIENCE

**Goal:** To build an understanding of geological cycles, forces, processes and agents that shape the lithosphere.

**Preparation:** Provide newspapers.

Lead a discussion on the use of pesticides: What are the pros and cons of using pesticides (insecticides and herbicides)? What groups of people are likely to be in favor of their use? against their use?

**Activities:** Instruct students to locate newspaper advertisements and articles dealing with drugs or pesticides used to destroy insects. Ask students to study the ads, read the articles and conduct research to answer these questions:

1. What insects are to be destroyed and why?
2. What dangers are there in using the pesticides?
3. Do the ads or articles warn of any dangers?

Personal and Social Perspectives

## SCIENCE • The CHANGING EARTH/ EARTH SCIENCE

**Goal:** To develop an understanding of the ecological relationships among organisms.

**Preparation:** Make newspapers and science textbooks available.

Discuss examples of changing geological patterns on the earth which humans create such as man-made lakes and man-made jetties along the North Carolina coasts. Also, provide the student worksheet S 17-16.

**Activities:** Have students locate examples of changing geological patterns in newspapers and identify good and bad results they cause. List questions for students to discuss as they read newspapers and conduct research:

Personal and Social Perspectives

## SCIENCE • The CHANGING EARTH/ EARTH SCIENCE, continued

### Activities, continued:

1. Should humans interfere with nature?
2. How can the effects of interference be determined, before and after the actions?
3. What types of lands are "protected"?
4. How do developers and industry gain access to protected lands?
5. What economic/political forces come into play when decisions are made that affect natural resources?

Using science textbooks, students should locate information explaining how general properties of earth materials are determined.

## SCIENCE • PEOPLE SOLVING ENVIRONMENTAL PROBLEMS/ EARTH SCIENCE

**Goals:** To build an understanding of the geological cycles, forces, processes and agents, which shape the lithosphere.

To build an understanding of the geological cycles, forces, processes and agents, which shape the atmosphere.

To build an understanding of the geological cycles, forces, processes and agents, which shape the hydrosphere.

**Preparation:** Provide local and regional newspapers and the student worksheet S 18-17. Ask local NIE Coordinators for directions on how to conduct a Target Date activity. Have students write for different newspapers and/or use Web sites to read different newspapers. You can choose to focus on North Carolina newspapers or newspapers from across the country. Or using the Web, students can look at newspapers from around the world. The N.C. Press Association Web page, <http://www.ncpress.com>, provides links to N.C. newspapers and the Newspaper Association of America Web page, <http://www.naa.org>, provides links to national and international newspapers.

**Activities:** After students receive the newspapers, have each of them read a different paper looking for science-related stories. Have them use the stories to identify people in communities working to solve problems related to topics such as the soil (lithosphere), air (atmosphere) and water (hydrosphere). Ask them to complete the graphic organizer S 18-17. Students should form groups and if their newspaper fails to have a story, they should read stories that other students find. Using their area newspaper and online newspapers, they should create a file of stories about the topics. At the conclusion of their study, they should write a position paper on what needs to be done about one or more problems. Encourage them to look for ways to get involved in their own communities.

## SCIENCE • HUMAN DEVELOPMENT/ LIFE SCIENCE

- Goals:** To conduct investigations and make observations to build an understanding of the needs of living organisms.  
To conduct investigations and build an understanding of animal life cycles.  
To make observations and conduct investigations to build an understanding of animal behavior and adaptation.  
To develop an understanding of the unity and diversity of life.

**Preparation:** Provide newspapers. Use photographs, stories and comics for the activity. Outline the stages of human development: baby, child, adolescent and adult (young to senior adult).

- Activities:** Have students select photographs and stories about people at various stages of development and paste them on paper from youngest to oldest. Ask them to write the name of someone they know who is at each stage of development and indicate their relationship to each person. They should focus on ways that they help and are helped by people at the various stages.  
To follow up, students can look in newspapers for photos and stories about people at different stages of life relating to one another.

## SCIENCE • AGE and BEHAVIOR/ LIFE SCIENCE

**Goal:** To build an understanding of animal growth and adaptation.

**Preparation:** Make available several issues of the newspaper. Give background information about human development. For example: All babies are different and differences continue to emerge as they grow up. However, each stage or age group is special and can be characterized. For example, teenagers are concerned with gender roles and attune to peer pressure.

- Activities:** In newspapers, identify and have students identify normal human behavior and the ages of people who are likely to exhibit the behavior. Also note any abnormal behavior that is reported. Discuss problems that people of all ages share. Comics and advice columns often deal with issues related to age, gender and different roles (parent, child, employee, etc.).  
Have students present their information through writing and a display of photos and stories they find.

## SCIENCE • OVERPOPULATION/ LIFE SCIENCE

**Goal:** To conduct investigations and use technologies and information systems to build an understanding of population dynamics.

**Preparation:** Provide newspapers, the student worksheet S 19-18 and additional research materials.

- Activities:** Have students read and take notes on newspaper articles dealing with the effects of overpopulation such as famine, diseases and inadequate living conditions. Then they should identify areas where those problems are prevalent and read articles and conduct further research to find out why the problem of overpopulation is difficult to solve, particularly in some areas of the world.

## SCIENCE • OVERPOPULATION/ LIFE SCIENCE, continued

**Activities, continued:** Students should look for examples in the newspaper of people working to relieve overpopulation and related problems. Have them offer solutions to the problem of overpopulation. Provide the graphic organizer S 19-18 for students to record their answers.

Read and record information from newspapers about urban growth, land use and manufacturing. Compare newspapers that serve urban and rural areas to see if the following concerns are more pressing in urban settings where overpopulation is likely to occur.:

1. Waste disposal
2. Food supplies
3. Disease control
4. Resource availability
5. Transportation

Students may also compare reporting on the above concerns in industrialized and less industrialized nations. They should pay particular attention to Third World nations.

## SCIENCE • SOCIAL IMPLICATIONS of SCIENCE/ LIFE SCIENCE

**Goal:** To conduct investigations and use technologies and information systems to build an understanding of population dynamics.

**Preparation:** Provide newspapers and lead a discussion concerning the various aspects of biology, focusing on the social implications.

**Activities:** Have students collect newspaper stories on the social implications of biology. Ask questions to help them identify likely topics and implications:

1. What factors (hereditary and environmental) affect the growth and decline of population?
2. How do topography and climate affect population distribution?
3. What are the effects of heredity and environment on individuals and society?
4. How do geographic location and natural resources affect culture?

## SCIENCE • CONSUMER PROTECTION/ PERSONAL and SOCIAL PERSPECTIVES

**Goal:** To demonstrate an understanding of technological designs.

**Preparation:** Provide newspapers.

**Activities:** Ask students to read a newspaper article dealing with consumer protection (car safety standards, food quality standards). Then have them write a paragraph about the article. Students should include the consumer protection

## SCIENCE • CONSUMER PROTECTION/ PERSONAL and SOCIAL PERSPECTIVES, continued

### Activities,

**continued:** agency involved, scientific evidence presented and whether or not they think the evidence is convincing. Have them examine the experimental design and tell if and/or how they think the study can be improved. They should include three additional questions that need to be answered.

Nature of Science

## SCIENCE • SCIENCE and DAILY LIFE/ PERSONAL and SOCIAL PERSPECTIVES

**Goal:** To build an understanding of technological designs.

**Preparation:** Provide newspapers. Discuss ways in which scientific research and discovery have affected people's lives. For example: Work has been made easier. Certain jobs require personnel with specialized knowledge. People have become very dependent on machines.

**Activities:** Ask students to skim the newspaper, locate and list how science affects the lives of people. Students should note the section(s) of the newspaper where most of the information was obtained and decide whether there is a science column or section in the paper. If so, they should return to the column and section to find stories related to science.

Personal and Social Perspectives

## SCIENCE • SCIENCE and ETHICS/ PERSONAL and SOCIAL PERSPECTIVES

**Goal:** To design and conduct investigations to demonstrate an understanding of scientific inquiry.

**Preparation:** Provide newspapers. Many health/science articles found in the newspaper deal with ethics. Use the articles for class discussions and individual projects.

**Activities:** Students should collect health/science newspaper articles dealing with ethics. Examples include stories about cloning and genetic engineering. Related questions are: What impact do the issues have on society? Who decides the limits of research?

Students should locate facts given and opinions expressed in news and feature stories, analyses and editorials and debate the issues. They should list facts and then opinions, organizing the facts under the opinions they support. They should outline pros and cons of each position.

Have students extend their research to other sources. When conducting research, particularly over the Internet, instruct students to find out the person or organization supplying the information and take the goals of the person or organization into account as they weigh any arguments made on the issues under study.

Nature of Science  
Science as a Human Endeavor