ON THE AIR

EXPLORING AIR POLLUTION SOURCES AND SOLUTIONS

Developed by

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Produced by

CLEAN AIR PARTNERS

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Introduction

Welcome Teachers!

Welcome to *On the Air: Exploring Air Pollution Sources and Solutions*. *On the Air* is an interactive teaching kit whose purpose is to engage students in the exploration of their environment as they study important air pollution topics such as Criteria Air Pollutants, the Air Quality Index, Particulate Matter, Ozone, the Health Effects of Air Pollution, Community Sources and Solutions and what is on everyone's mind—Global Warming.

The *On the Air* lesson plans present basic science concepts as well as math, technology, social studies, language arts and health education standards. The *On the Air* kit is unique in that the examples used to teach these concepts include local data, examples, and issues specifically relevant to the Baltimore and Washington metropolitan regions.

On the Air is an interactive teaching kit developed specifically for sixth grade students in the District of Columbia, suburban Maryland, the Baltimore region, and Northern Virginia. The curriculum includes seven activity units that are:

- tied to and cross-referenced to both your required curriculum and your state's education standards.
- inquiry based and designed to develop critical thinking skills.
- interactive, with hands-on activities, labs and investigations.
- complete with background information, student worksheets, teaching props and visual aids.
- relevant, fun, and engaging for students!

As educators, your input and participation was vital to the development of the *On the Air* curriculum. Your participation in its implementation will result in its success. Guidance, criticism, contributions, and suggestions are always welcome and appreciated. Please feel free to contact us at any time. With your help we can engage our youth in the exploration of air pollution's sources and solutions and provide them with the tools necessary to help them make decisions that will protect their health and improve the quality of our air.

Thank you for your dedication and participation!

Contents

Unit Overviews

Unit 1—Wanted For Polluting Our Air: An Introduction to the Six Major Air Pollutants

Unit Overview

This activity provides an overview of the common air pollutants. Students work in teams to research the six major air pollutants (ozone, nitrogen dioxide, carbon monoxide, particulate matter, sulfur dioxide, and lead). Students are provided with background readings and websites for information. Each team first completes a study guide about its assigned pollutant which includes pollutant description (what it is and where it comes from); major sources; effects of their type of pollution (on visibility, property, and health of humans and the environment); laws pertaining to their pollutant; and control measures. Using the information obtained, teams next complete a "wanted poster" of their pollutant. The wanted posters include all the pertinent information as well as a collage of images such as student drawings, magazine cut-outs, or Internet prints. Each student team then presents its poster to the rest of the class. Posters are displayed on the classroom wall for the duration of the program.

Unit 2—Air Quality Index

Unit Overview

Students are introduced to the Air Quality Index (AQI) through a teacher-led, interactive discussion using provided charts and mini-posters as teaching props. Students next discuss how to access real-time AQI information and maps. They then complete a study guide and map activity using an AQI map of the United States. The class then conducts a role-play activity in which students act out appropriate actions given different AQI as other students guess the AQI color. Students are encouraged to continue daily monitoring of their local AQI using different sources (newspapers, television, and/or Internet).

Unit 3—More than Meets the Eye: Particulate Matter and Fine Particle Pollution

Unit Overview

This activity is introduced with several teacher-led demonstrations on particulate matter (PM). Demonstrations include revealing by-products of combustion, creating smog, and observing fine, air-born particulates. Students next play a game in which foam balls, representing particulate matter, are thrown at a group of students representing lungs. Students representing cilia surround the lungs and must block the foam balls to keep them away from the lungs. Students will observe the cilia's ability to block different quantities and sizes of particles from reaching the lungs. Following a general discussion of the game and particulate matter (including its effects on health), students work in teams to create PM monitoring devices. Each team places its PM monitor at a different site around the school. Monitors are checked throughout the week and, using a provided scale, accumulated PM is noted on a data sheet. At the end of the week, the PM monitors are brought back to the classroom. Students complete data sheets and a class comparison table and results from all the monitors are compared and discussed.

Unit 4—Ozone and Us: Good Up High, Bad Nearby

Unit Overview

The first part of this activity introduces how ozone is made through a role-playing demonstration in which students take on the roles of the Sun, Moon, Volatile Organic Compounds (VOC), Nitrogen Oxides (NO_x), and Ozone (O_3). The *Ozone Revue* is followed with a teacher-led discussion about the health effects of ozone. Students are then directed to the Internet to view a "Recipe For Ozone" which animates the formation of ozone. In Part II of this activity, student pairs are provided with actual, archived ozone and temperature data from a summer day in the Washington D.C. area. They complete a Student Data Sheet and graph the data over time (one day). The students then compare their results and discuss how time of day and temperature affect ozone levels.

Unit 5—Our Lungs, Our Air, Our Health: The Health Effects of Air Pollution

Unit Overview

The first part of this activity introduces students to the human respiratory system. Using provided posters of the human respiratory system, the teacher leads a review of how air moves into and through the body. Students will also be directed to online animations depicting the respiratory system and how air pollution affects the lungs. In Part II of this activity, students conduct before and after measurements on each other to see the effects that exercise has on their own heartbeat and breathing rates. Students measure each other's resting heart and breathing rates, exercise for a specific amount of time, then re-measure and note body changes. Results are discussed and related to human activity on pollution alert days and the AQI.

Unit 6—Community Pollution: Sources and Solutions

Unit Overview

Students work in teams to research specific pollution sources (including power plants, fuel burning, factories, and vehicles). Using information from provided *Solutions to Pollution Team Packets*, each team completes a research guide which includes describing source examples, citing specific pollutants from each source, graphing pollutant emissions from their pollution source, and describing local examples of sources. Following a review of Clean Air Act provisions as well as a list of personal actions (*Things You Can Do for Cleaner Air*), students brainstorm solutions for their particular sources. Student teams then create a presentation with their information and share their findings with the rest of the class. Following a wrap-up discussion, students are encouraged to educate others about pollution by sharing their presentations with other classes at school.

Unit 7—Climate Change

Unit Overview

In Part I of this unit, students rotate through different Climate Change Information Stations to learn about the earth's atmosphere, greenhouse gases, the greenhouse effect, the carbon cycle, and rising CO_2 and temperature levels. Students answer questions and complete a worksheet to reinforce key concepts presented at each station. Next, using illustrated information cards as a guide, the class conducts a discussion about the potential effects of increased global temperatures. In Part II of this unit, students investigate everyday actions we can all take to decrease CO_2 emissions.

Curricular Ties for Virginia, Maryland, and the District of Columbia

(Education standards are articulated in Appendices A, B, and C.)

UNIT 1	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
SCIENCE	6.1.i 6.6.g 6.9.a	1.6.A.1.d 1.6.C.1.b 1.6.C.1.f 6.6.A.1.c 6.6.A.1.d 6.6.A.1.e 6.6.B.1.a 6.6.B.1.b 6.6.B.1.c	6.1.6 6.1.7 6.1.8 6.6.3 6.6.4 6.6.5
HEALTH	6.1.c	1.6.A.3.a	
COMPUTER/ TECHNOLOGY	C/T 6-8.6 C/T 6-8.7	see Appendix B	
LANGUAGE ARTS	6.2.c 6.3.d 6.5.a	1.6.D.1.a 1.6.D.1.b 1.6.D.3.c 1.6.D.3.d 2.6.A.1.a 2.6.A.1.b 6.6.A.1.a 6.6.A.1.b 6.6.A.1.c 7.6.A.1.a 7.6.A.1.c 7.6.A.1.e 7.6.A.1.f	6.LD-D.1 6.LD-O.6 6.LD-V.10 6.IT-E.1 6.R.1
SOCIAL STUDIES		6.6.D.1.a 6.6.D.1.c 6.6.D.1.d 6.6.F.3.a	6.5.11 6.6.1

UNIT 2	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
SCIENCE	6.6.g	6.6.B.1.a	6.1.6 6.1.8 6.6.5
HEALTH	6.1.c 6.6.a 6.7.a	1.6.A.3.a 1.6.A.3.b 1.6.A.4.a 3.6.A.2.a	
COMPUTER/ TECHNOLOGY	C/T 6-8.6 C/T 6-8.7		

UNIT 2 (cont'd)	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
LANGUAGE ARTS	6.2.c 6.3.d 6.5.a	1.6.D.1.a 1.6.D.1.b 2.6.A.1.a 2.6.A.1.b 6.6.A.1.a 6.6.A.1.b 6.6.a.1.c	
SOCIAL STUDIES		6.6.D.1.a 6.6.D.1.c 6.6.F.1.a	6.5.8 6.6.1

UNIT 3	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
SCIENCE	6.1.c 6.1.f 6.1.i 6.6.g	1.6.A.1.c 1.6.B.1.d 1.6.C.1.a 1.6.C.1.b 1.6.C.1.e 1.6.C.1.f 6.6.B.1.a	6.1.3 6.1.7 6.1.8 6.6.4
HEALTH	6.1.c	1.6.A.3.a	
COMPUTER/ TECHNOLOGY		see Appendix B	
LANGUAGE ARTS		6.6.A.1.a 6.6.A.1.b 6.6.A.1.c	
SOCIAL STUDIES			6.5.8 6.5.11 6.6.1

UNIT 4	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
SCIENCE	6.1.i 6.6.d 6.6.g	1.6.A.1.d 1.6.A.1.h 1.6.B.1.d 1.6.C.1.a 1.6.C.1.b 6.6.A.1.c 6.6.B.1.a	6.1.6 6.1.7 6.1.8 6.6.3 6.6.4 6.6.5
HEALTH	6.1.c	1.6.A.3.a 1.6.A.4.a 3.6.A.2.a	
COMPUTER/ TECHNOLOGY	C/T 6-8.6 C/T 6-8.7	see Appendix B	

UNIT 4 (cont'd)	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
LANGUAGE ARTS	6.3.d 6.5.a 6.5.b	6.6.A.1.a 6.6.A.1.b 6.6.A.1.c	
SOCIAL STUDIES		6.6.D.1.c 6.6.F.1.a	6.5.8 6.6.1
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SCIENCE	6.1.c 6.1.i	1.6.A.1.d 1.6.A.1.h 1.6.B.1.d 1.6.C.1.a 1.6.C.1.b	6.1.7 6.1.8
HEALTH	6.1.c 6.6.a	1.6.A.3.a 1.6.A.3.b 1.6.A.4.a 3.6.A.2.a	
COMPUTER/ TECHNOLOGY	C/T 6-8.6 C/T 6-8.7	see Appendix B	
LANGUAGE ARTS	6.2.f 6.3.d 6.5.a	1.6.D.1.a 1.6.D.1.b 2.6.A.1.a 6.6.A.1.a 6.6.A.1.b 6.6.A.1.c	6.LD-V.10
MATHEMATICS		7.6.D.1.b 7.6.D.1.c	

UNIT 6	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
SCIENCE	6.1.i 6.6.g 6.9.a 6.9.d	1.6.A.1.d 1.6.A.1.h 1.6.C.1.a 1.6.C.1.b 1.6.C.1.f 6.6.A.1.c 6.6.A.1.d 6.6.A.1.e 6.6.B.1.a 6.6.B.1.b 6.6.B.1.c	6.1.6 6.1.7 6.1.8 6.6.3 6.6.4 6.6.5
HEALTH	6.1.c 6.7.a	1.6.A.3.a 1.6.A.3.b 1.6.A.4.a	
COMPUTER/ TECHNOLOGY	C/T 6-8.6 C/T 6-8.7	see Appendix B	

UNIT 6 (cont'd)	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
LANGUAGE ARTS	6.2.c 6.3.d 6.5.a	1.6.D.3.c 1.6.D.3.d 2.6.A.1.a 6.6.A.1.a 6.6.A.1.b 6.6.A.1.c 7.6.A.1.a 7.6.A.1.c 7.6.A.1.e 7.6.A.1.f	6.LD-D.1 6.LD-O.6 6.LD-V.10 6.IT-E.1 6.IT-A.6 6.R.1
SOCIAL STUDIES		6.6.D.1.a 6.6.D.1.c 6.6.D.1.d 6.6.F.1.a 6.6.F.3.a 6.6.F.3.c 6.6.G.3.a 6.6.G.3.b 6.6.G.3.c 6.6.G.3.d	6.5.8 6.5.11 6.6.1 6.6.8
MATHEMATICS	6.18.a	1.6.C.1.c 7.6.D.1.b 7.6.D.1.c	6.PRA.9

UNIT 7	VIRGINIA	MARYLAND	DISTRICT OF COLUMBIA
SCIENCE	6.6.d 6.6.g	1.6.C.1.b 1.6.C.1.f 3.6.D.1.e 3.6.F.1.a 6.6.A.1.c 6.6.A.1.d 6.6.A.1.e 6.6.B.1.b 6.6.B.1.c	6.1.7 6.1.8 6.4.4 6.6.3 6.6.4 6.6.5
HEALTH	6.1.c		
LANGUAGE ARTS	6.2.f 6.3.d 6.5.a	1.6.D.1.a 1.6.D.1.b 1.6.E.4.b 1.6.E.4.d 2.6.A.1.a 2.6.A.1.b 6.6.A.1.a 6.6.A.1.b 6.6.A.1.c	6.LD-D.1 6.LD-0.6 6.IT-E.1 6.R.1 6.M.3
SOCIAL STUDIES		6.6.D.1.d 6.6.F.1.a 6.6.G.3.b	6.2.4 6.5.8 6.5.11 6.6.1 6.6.2
MATHEMATICS	6.18.a	1.6.C.1.c 1.6.C.2.a	6.PRA.9

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Appendix A

Virginia Standards of Learning for Grade Six

Education Standards Correlated to *On the Air: Exploring Air Pollution Sources and Solutions*

Science

Scientific Investigation, Reasoning, and Logic

6.1 The student will plan and conduct investigations in which

c) precise and approximate measurements are recorded;

f) a method is devised to test the validity of predictions and inferences;

i) data are organized and communicated through graphical representation (graphs, charts, and diagrams)

Matter

6.6 The student will investigate and understand the properties of air and the structure and dynamics of the Earth's atmosphere. Key concepts include

d) how the atmosphere changes with altitude;

g) the importance of protecting and maintaining air quality.

Resources

6.9 The student will investigate and understand public policy decisions relating to the environment. Key concepts include

a) management of renewable resources (water, air, soil, plant life, animal life);

c) the mitigation of land-use and environmental hazards through preventive measures;

d) cost/benefit tradeoffs in conservation policies.

Health

Knowledge and Skills

6.1 The student will apply critical thinking skills and personal management strategies to address issues and concerns related to personal health and well-being. Key concepts/skills include:

c) the effects of environmental influences on personal health.

Information Access and Use

6.6 The student will access and analyze information for the purpose of improving personal and family health. Key concepts/skills include

a) assessment of personal and family wellness.

Community Health and Wellness

6.7 The student will evaluate the benefits of becoming a positive role model within the family and the community. Key concepts/skills include
a) involvement in community and family projects.

Computer/Technology

Technology Research Tools

C/T 6-8.6 The student will use technology to locate, evaluate, and collect information from a variety of sources.
- Use databases and spreadsheets to evaluate information.
- Use Internet and other electronic resources to locate information in real time.

C/T 6-8.7 The student will evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.
- Use search strategies to retrieve information.
- Evaluate the accuracy, relevance, and appropriateness of electronic information sources.

English

Oral Language

6.2 The student will listen critically and express opinions in oral presentations.
c) Present a convincing argument;
f) Use grammatically correct language and vocabulary appropriate to audience, topic, and purpose.

Reading

6.3 The student will read and learn the meanings of unfamiliar words and phrases.
d) Use word-reference materials.

6.5 The student will read and demonstrate comprehension of a variety of informational selections.
a) Identify questions to be answered;
b) Make, confirm, or revise predictions.

Mathematics

Probability and Statistics

6.18 The student, given a problem situation, will collect, analyze, display, and interpret data in a variety of graphical methods, including
a) line, bar and circle graphs.

Appendix B

Maryland Voluntary State Curriculum for Grade Six

Education Standards Correlated to *On the Air: Exploring Air Pollution Sources and Solutions*

Science

Standard 1.0 Skills and Processes

A. Construction Knowledge

1. Design, analyze, or carry out simple investigations and formulate appropriate conclusions based on data obtained or provided.
   - c. Explain and provide examples that all hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.
   - d. Locate information in reference books, back issues of newspapers, magazines and compact disks, and computer databases.
   - h. Use mathematics to interpret and communicate data.

B. Applying Evidence and Reasoning

1. Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment.
   - d. Describe the reasoning that lead to the interpretation of data and conclusions drawn.

C. Communicating Scientific Information

1. Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.
   - a. Organize and present data in tables and graphs and identify relationships they reveal.
   - b. Interpret tables and graphs produced by others and describe in words the relationships they show.
   - e. Explain how different models can be used to represent the same thing. What kind of a model to use and how complex it should be depend on its purpose. Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering.
   - f. Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.

Standard 3.0 Life Science

D. Evolution

1. Explain that in any particular environment, the growth and survival of organisms and species depend on the physical conditions.

e. Describe ways in which changes in environmental conditions can affect the survival of individual organisms and entire species.

F. Ecology

1. Give reasons supporting the fact that the number of organisms an environment can support depends on the physical conditions and resources available.
   a. Explain that populations increase or decrease relative to the availability of resources and the conditions of the environment.

Standard 6.0 Environmental Science

A. Natural Resources and Human Needs

1. Recognize and compare how different parts of the world have varying amounts and types of natural resources and how the use of those resources impacts environmental quality.
   c. Identify and describe how the natural change processes may be affected by human activities.
   d. Identify and describe problems associated with obtaining, using, and distributing natural resources.
   e. Identify possible solutions to problems associated with obtaining, using, and distributing natural resources.

B. Environmental Issues

1. Recognize and explain that human-caused changes have consequences for Maryland's environment as well as for other places and future times.
   a. Identify and describe a range of local issues that have an impact on people in other places.
   b. Recognize and describe how environmental change in one part of the world can have consequences for other parts of the world.
   c. Identify and describe that ecosystems can be impacted by human activities.

Health

Standard 1.0 Mental and Emotional Health—Students will demonstrate the ability to use mental and emotional health knowledge, skills, and strategies to enhance one's self-concept and one's relationship with others.

A. Mental and Emotional Health

3. Identify components to promote personal well-being.
   a. Define and give examples of the components of personal well-being.
   - Physical
   - Environmental

   b. Investigate the components of personal well-being to assess areas of personal need.

4. Apply the decision-making process to personal issues and problems.
   a. Predict how decisions regarding behavior have consequences for self and others.

Standard 3.0 Personal and Consumer Health—Students will demonstrate the ability to use consumer knowledge, skills, and strategies to develop sound personal health practices involving the use of health care products, services, and community resources.

A. Personal and Consumer Health

2. Demonstrate the ability to identify and practice health enhancing behaviors and reduce health risks to live safer, healthier lives.
   a. Evaluate personal health behaviors.

Computer/Technology

Students will develop abilities to assess the impacts of technology.

Develop an understanding of the effects of technology on the environment.

- Explain that the management of waste produced by technological systems is an important societal issue.
- Explain that decisions to develop and use technologies often put environmental and economic concerns in direct competition with one another.
- Recognize and explain that technological changes and advances have consequences for the immediate environment as well as for other places and future times.

Language Arts

Reading Standard 1.0 General Reading Processes

D. Vocabulary

1. Develop and acquire vocabulary through exposure to a variety of texts.
   a. Acquire new vocabulary through listening to, independently reading, and discussing a variety of literary and informational texts.
   b. Discuss words and word meanings daily as they are encountered in text, instruction, and conversation.
3. Understand, acquire, and use new vocabulary.
   c. Use resources to confirm definitions and gather further information about words.
   d. Use new vocabulary in speaking and writing to gain and extend content knowledge and clarify expression.

E. General Reading Comprehension

4. Use strategies to demonstrate understanding of the text (after reading).
   b. Identify and explain what is directly stated in the text.
   d. Draw conclusions or make generalizations about the text.

Reading Standard 2.0 Comprehension of Informal Text

A. Comprehension of Informal Text

1. Develop and apply comprehension skills by reading a variety of self-selected and assigned print and electronic informational texts.
   a. Read, use, and identify the characteristics of non-fiction materials to gain information and content knowledge.
   b. Read, use, and identify the characteristics of functional documents.

Reading Standard 6.0 Listening

A. Listening

1. Apply and demonstrate listening skills appropriately in a variety of settings and for a variety of purposes.
   a. Attend to the speaker.
   b. Ask appropriate questions.
   c. Contribute relevant comments.

Reading Standard 7.0 Speaking

A. Speaking

1. Demonstrate appropriate organizational strategies and delivery techniques to plan for a variety of oral presentation purposes.
   a. Identify the purpose, audience, and setting for a presentation.
   c. Select and plan for appropriate use of visual aids.
   e. Gather/construct adequate support.
   f. Identify and use a variety of organization structures, such as narrative, cause and effect,chronological order, description, main idea and detail, problem/solution, question/answer, comparison and contrast.

Social Studies

Standard 6.0 Social Studies Skills and Processes

D. Acquire Social Studies Information

1. Identify primary and secondary sources of information that relate to the topic/situation/problem being studied.
   a. Gather and read appropriate print sources, such as journals, periodicals, government documents, timelines, databases, reference works, and web sites.
   c. Locate and gather data and information from appropriate non-print sources, such as music, artifacts, charts, maps, graphs, photographs, video clips, illustrations, paintings, political cartoons, multimedia, interviews, and oral histories.
   d. Access and process information that is factual and reliable from readings, investigations, and/or oral communications.

F. Analyze Social Studies Information

1. Interpret information from primary and secondary sources.
   a. Interpret information in maps, charts and graphs.
3. Synthesize information from a variety of sources.
   a. Recognize relationships in and among ideas or events, such as cause and effect, sequential order, main idea, and details.
   c. Assess the costs and benefits of alternatives.

G. Answer Social Studies Questions

3. Use current events/issues to answer questions.
   a. Summarize the main points of an issue explaining different viewpoints.
   b. Make a decision based on the analysis of issues and evaluate the consequences of these decisions.
   c. Identify and formulate a position on a course of action or an issue.
   d. Propose and justify solutions to social studies problems.

Mathematics

Standard 1.0 Knowledge of Algebra, Patterns, and Functions—Students will algebraically represent, model, analyze, or solve mathematical or real-world problems involving patterns or functional relationships.

C. Numeric and Graphic Representations of Relationships

1. Locate points on a number line and in a coordinate plane.
   c. Graph linear data from a function table.
2. Analyze linear relationships.
   a. Identify and describe the change represented in a graph.

Standard 7.0 Processes of Mathematics—Students demonstrate the processes of mathematics by making connections and applying reasoning to solve problems and to communicate their findings.

D. Connections

1. Relate or apply mathematics within the discipline, to other disciplines, and to life.
   b. Identify mathematical concepts in relationship to other disciplines.
   c. Identify mathematical concepts in relationship to life.

Appendix C

District of Columbia Learning Standards for Grade Six

Education Standards Correlated to *On the Air: Exploring Air Pollution Sources and Solutions*

Science

Scientific Thinking and Inquiry

6.1. Broad Concept: Scientific progress is made by asking relevant questions and conducing careful investigations. As a basis for understanding this concept, and to address the content in this grade, students should develop their own questions and perform investigations.

3. Identify dependent and independent variables in those investigations that have controls. And, if no controls are used explain why.

6. Locate information in reference books, back issues of newspapers and magazines, CD-ROMs, and online databases.

7. Draw conclusions based on scientific evidence, and indicate whether further information is needed to support a specific conclusion or to discriminate among several possible conclusions.

8. Record and organize information in simple tables and graphs, and identify relationships they reveal. Use tables and graphs as examples of evidence for explanations when writing essays or writing about lab work, fieldwork, etc. Read simple tables and graphs produced by others, and describe in words what they show.

The Solar System

6.4. Broad Concept: The transfer of energy through radiation and convection currents affects many phenomena on the Earth's surface.

4. Explain that much of the heat from the sun is absorbed by the land and oceans and then is released into the atmosphere.

Resources

6.6. Broad Concept: Sources of materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept.

3. Recognize that the Earth's resources for humans, such as fresh water, air, arable soil, and trees, are finite.

4. Explain that the atmosphere and the oceans have a limited capacity to absorb wastes and recycle materials naturally.

5. Investigate and describe how pollutants can affect weather and the atmosphere.

Language Arts

Strand: Language Development

Discussion

6.LD-D.1. Apply understanding of agreed-upon rules and individual roles to make decisions, including eliciting and considering suggestions from each group member, defining individuals' roles and responsibilities, and coming to consensus.

Oral Presentation

6.LD-O.6. Give oral presentations with focus, organization, and point of view, matching purpose, message, occasion, voice modulation, and nonverbal elements to the audience.

Vocabulary and Concept Development

6.LD-V.10. Determine meanings, pronunciations, alternate word choices, correct spellings, and parts of speech of words using dictionaries, glossaries, thesauri, and other resources (printed and electronic).

Strand: Informational Text

Expository Text

6.IT-E.1. Identify and analyze the author's stated purpose, main ideas, supporting ideas, and supporting evidence.

Argument and Persuasive Text

6.IT-A.6 Recognize arguments for and against an issue.

Strand: Research

6.R.1. Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual and group projects. Define the need for information and formulate open-ended research questions.

- Initiate a plan for searching for information.
- Use an expanded range of print and electronic resources (atlases, databases, online resources).
- Gather relevant information through interviews.
- Locate specific information within resources by using indexes, tables of contents, and electronic searches of key words.

Strand: Media

6.M.3. Create multimedia presentations using computer technology, including graphics and animation.

Social Studies

Places and Regions

6.2. Students acquire a framework for thinking geographically, including the location and unique characteristics of places.

4. Give examples of critical issues that may be region-specific and others that cross regional boundaries within the United States.

Physical Systems

6.5. Students acquire a framework for thinking about Earth's physical systems: Earth-sun relationships, climate and related ecosystems, and land forms.

8. Describe the ways in which Earth's physical processes are dynamic and interactive.

11. Use a variety of means to research the sources of different types of pollution in the local community and design measures that can be taken to reduce each type of pollution.

Environment and Society

6.6. Students analyze ways in which humans affect and are affected by their physical environment.

1. Identify human-caused threats to the world's environment: atmospheric and surface pollution, deforestation, desertification, salinization, overfishing, urban sprawl, and species extinction.

2. Identify ways in which occurrences in the natural environment can be a hazard to humans: earthquakes, volcanic eruptions, tornadoes, flooding, hurricanes and cyclones, and lightning-triggered fires.

8. Develop policies that are designed to guide the use and management of Earth's resources and that reflect multiple points of view.

Math

Strand: Patterns, Relations, and Algebra

6.PRA.9. Produce and interpret graphs that represent the relationship between two variables (x and y) in everyday situations.