



HEROES OF THE ENVIRONMENT

TEACHER'S GUIDE

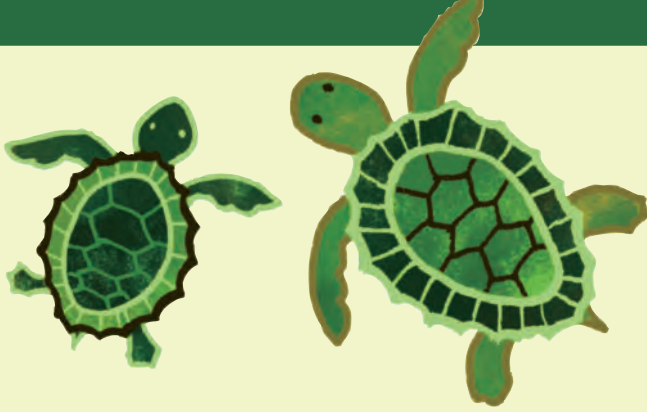
GRADES **4-8**



HEROES OF THE ENVIRONMENT

TRUE STORIES OF PEOPLE WHO ARE HELPING TO PROTECT OUR PLANET





GENERAL OVERVIEW

THIS TEACHER'S GUIDE CONTAINS:

Pre-Planned Activities for Students

1. Social Studies-Geography
2. Science
3. Language Arts

INTRODUCTION

In the book *Heroes of the Environment*, author Harriet Rohmer highlights the work of twelve people, from across North America, as they strive to improve our environment. The heroes include people of different ages, cultures, and locales: a teacher, a wrestler, a basketball star, and a teenager are among the people in this book who have put their ideas into action to make a difference in their communities and improve the environment. In this inspiring book, readers gain knowledge about a variety of environmental issues ranging from polluted rivers and mountaintop removal mining to air pollution and e-waste. The stories provide direct non-fiction connections to science topics such as alternative energies and water quality, as well as social studies topics concerning the history and culture of the Hopi and Gwich'in Native Americans. More importantly, the book introduces readers to the idea that one person can make a positive difference in this world by taking small steps that create a change. Through detailed illustrations, ample photographs, and inspiring narratives, readers will realize that they too have the ability to make a difference.

The Teacher's Guide to *Heroes of the Environment: True Stories of People Who Are Helping to Protect Our Planet* uses the book as a resource for creating class activities in the science, social studies, geography, and language arts disciplines. The Teacher's Guide also includes suggestions for standards-based lessons and activities. The power of this book lies in the engaging text that allows readers to easily identify with the everyday people featured as heroes. Hopefully readers will realize that with the right choices they can be regarded as heroes as well!

A QUICK GUIDE TO HOW THESE ACTIVITIES MEET THE FOLLOWING EDUCATIONAL STANDARDS:

SCIENCE CONTENT STANDARD A,B,C,F

NATIONAL GEOGRAPHY STANDARDS

NATIONAL COUNCIL FOR THE SOCIAL STUDIES
NATIONAL STANDARDS

STANDARDS FOR THE ENGLISH LANGUAGE ARTS



1 SOCIAL STUDIES: GEOGRAPHY

Mapping the Heroes

Heroes of the Environment highlights twelve different stories that are set in many different regions of the United States, plus one in Mexico City, Mexico. The table of contents identifies where each of the stories takes place. The diverse regions offer a fantastic opportunity for students to become familiar with different types of maps and to develop an understanding of the information the maps convey. As students analyze the different types of maps, they will be able to see how the climate and physical features of the areas where the stories take place are integral to the topics discussed. By comparing readily available topographical maps, satellite maps, and other informational maps, students will see that the maps themselves tell many stories. There are free resources on the internet that can be used for all ages. These activities can be used in a variety of ways, including with small groups, at stations with printed maps, at online computer stations, or as a whole group using a projector.

As an introduction, use Google Earth at www.earth.google.com (download the free application to your computer if you don't already have it) to guide students on a tour of the heroes' locations. First, find your location by typing an address into the search bar so that students can connect their proximity to the areas the stories take place. As you tour, introduce the students to relative and absolute locations. Draw students' attention to physical features such as mountains, rivers, lakes, or oceans. Point out human influences on Earth you may notice such as canals, buildings, bridges, or quarries. (Note that Google Earth offers detailed tutorials to aid in navigating the application.)

Explain to your students that there are five main themes of geography developed by the National Council for Geographic Education:

1. LOCATION: Have students find the absolute locations of Westerly, Rhode Island and Mexico City, Mexico. Then describe the relative location of each in relation to the nearest major landform or body of water.
2. PLACE: The "place" in which you live includes physical characteristics and human characteristics. In Chapter One, Will Allen describes purchasing the last farm in Milwaukee, which is a small two-acre tract of land surrounded by industrial and residential areas. This brief description gives the reader an idea that Milwaukee has lost much of its rural agricultural areas to more urban and industrialized uses. To identify human characteristics, have students refer to the statistics on the chart at the Choose Milwaukee Web site at http://www.choosemilwaukee.com/statistics_demographics.aspx to compare the census data from 1990 and 2000, identify different cultures, and analyze the job trends. Have



students identify physical characteristics such as major landforms in the Milwaukee area at <http://www.worldatlas.com/webimage/countrys/namerica/usstates/wiland.htm>.

3. HUMAN/ENVIRONMENT INTERACTION: People depend on the environment for their basic needs, change the environment to meet their needs, and adapt to the environment so that they can live there. Search Google Earth for "mountaintop mining stages" and click on the "mine site overview" location. Zoom in closer. Have students analyze the satellite images. Ask students to explain how humans changed the environment to meet their needs, as well as how these changes may impact the surrounding ecosystems.

4. MOVEMENT: Explain to students that throughout history, people have selected where they were going to live based on the best location for meeting their basic needs, which may include food, safety, shelter, or a comfortable climate. The Hopi Indian Reservation featured in Chapter Four involves a culture that has undergone tremendous changes over the past 1,500 years. Have students use the Minnesota State University Web site at <http://www.mnsu.edu/emuseum/cultural/northamerica/hopi.html> to research answers for the questions below.

- a) Researchers believe that the Hopis moved from Mexico traveling north around 500 B.C. At the time, the Hopis were hunter-gatherers. List two reasons why they might have moved north.
- b) Over a long period of time, their culture changed from hunter-gatherer to a more agriculture-based society. Think about the positives and negatives for both lifestyles. Why might a group of people choose an agriculture-based culture over the hunter-gatherer lifestyle?
- c) The Hopis chose large landforms called *mesas* on which to settle and build their communities. Consider the basic needs listed above. If you were going to build your house in this area, list three reasons why a *mesa* would be a good location choice.
- d) List two other events in history that changed how the Hopis lived and determined why the Hopis are currently living in the area they are now.

5. REGIONS: Areas can be divided into regions based on many different criteria including location, physical features, climate, economic factors, culture, as well as political boundaries. Chapter Eleven presents the Gwich'in people who live in Alaska and in Canada's Yukon and Northwest Territories.

a) Have students read through the information on the I Love Alaska Web site at <http://www.ilovealaska.com/alaska/cities.cfm?cityid=24> to identify possible region classifications. For example, what type of economic region could this be? Culture? Climate? Wildlife?

b) The Gwich'in area is considered part of the Arctic Region of Alaska. Have students match some of the different story locations to other environmental regions such as deserts, prairie, wetlands, mountains, and rivers.



2 SCIENCE ACTIVITIES

Growing Soil: The Oldest Form of Recycling!

In Chapter One's story, "Raising Food in the City," Will Allen teaches teenagers how to "grow" new soil because the soil in the old greenhouses on the land he purchased was contaminated by pollution. Composting in the classroom provides many learning opportunities for students including on the topics of ecosystems, food chains, soil quality, plant growth, nutrient cycles, experimental design, worm biology, sustainability, resource conservation, and reducing waste. Composting helps soil gain important elements that promote plant growth and clean the soil that has been contaminated, and the composting process reduces the need for chemical fertilizers and insecticides! Have students use the 2007 fact sheet found on the EPA's Municipal Solid Waste site at <http://www.epa.gov/osw/nonhaz/municipal/msw99.htm#links> to analyze the data concerning the amount of waste thrown away and recycled by Americans from 1960 to 2007 as an introduction to the importance of composting. There are many sizes and types of compost projects, as well as simple steps to get started, that can be found on the internet. Choose one that fits your needs either as an in-class demonstration or as a project for the whole school. The Web sites below are very helpful:

For general information, you may refer to "How to Establish Recycling and Composting Programs," from the EPA

<http://www.epa.gov/climatechange/wycd/waste/downloads/recycle.pdf>

For questions about what are good items to compost and what are not, refer to: <http://www.compostthis.co.uk/>

For additional classroom exercises, see "Composting in the Classroom," from the Wake County, North Carolina Solid Waste Management division of the Environmental Services department: <http://www.wakegov.com/NR/rdonlyres/C9EE924E-431F-46A2-853F-376ACA23566C/0/cic6final.pdf>

1a NATIONAL GEOGRAPHY STANDARDS

STANDARD 1: How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective

STANDARD 3: How to analyze the spatial organization of people, places, and environments on Earth's surface

STANDARD 4: The physical and human characteristics of places.

STANDARD 9: The characteristics, distribution, and migration of human populations on Earth's surface

STANDARD 14: How human actions modify the physical environment

STANDARD 15: How physical systems affect human systems

1b NATIONAL SOCIAL STUDIES STANDARDS

THEMATIC STRAND III. People, Places, and Environments: The study of people, places, and human-environment interactions assists students as they create their spatial views and geographic perspectives of the world beyond their personal locations.



For a comprehensive list of resources, see “Composting Educational Resources for Students and Teachers” provided by the Monmouth County, New Jersey Government Web site at <http://www.visitmonmouth.com/documents%5C24%5CComposting%20Education%20Resources.pdf>

<http://www.ucmp.berkeley.edu/help/timeform.html>

SERVICE-LEARNING EXTENSION

- Students can work with the school cafeteria manager to find out how much food is thrown out as waste each day and use the vegetable scraps and other nondairy, non-meat food waste in the compost pile.
- Students can use the compost to start a small school garden and grow fresh vegetables for a retirement home or a homeless shelter.
- Students can use the compost to grow flowers to present to retirement home residences, teachers, students, or community members.

2a NATIONAL SCIENCE EDUCATION STANDARDS:

STANDARD A: Ability to do scientific inquiry: design and conduct a scientific investigation

STANDARD B: Transfer of energy

STANDARD C: Structure and function in living systems
Population and ecosystems

STANDARD F: Population, resources, and environments



3 LANGUAGE ARTS/ ART ACTIVITIES

Speaking Up for the Mountains!

In Chapter Eight, “Fighting Mountaintop Removal Mining,” West Virginia resident Julia Bonds saw many negative changes occurring to the area in which she had grown up. In order for Julia to gain support for her cause, she needed to communicate her opinions and facts to others in a clear, organized fashion. This is a great opportunity to introduce persuasive writing to your students.

1. Brainstorm with students possible situations where residents in their local community might decide to voice their opinions to local governments in person or through a letter. Choose some of the editorials from your local paper to read to the class.
2. Use a t-chart to compare the letters by comparing facts and opinions used in each.
3. Refer to the article “Writing Persuasive Letters” by Elizabeth Ramos at <http://www2.scholastic.com/browse/unitplan.jsp?id=65> to download lists of power words to use as well as letter formats.
4. Encourage students to pretend they are residents who live in Julia’s area and want to write a letter in the form of a persuasive essay to someone in authority, to share their concerns.

ROLE-PLAY EXTENSION

- Have students brainstorm a list of all of the possible stakeholders in the mountaintop mining area for a role-play activity. (You may need to explain to students that a stakeholder is a person, group, organization, or system who affects or can be affected by an organization’s actions.) Your list might include mine workers, mine owners, residents, teachers at the nearby schools, the EPA, hunters, fishermen, etc. Make sure there is a wide range of points of view.
- Next, assign each student one of the roles from the brainstormed list. Have the students research facts about mountaintop mining and develop an argument to support their assigned point of view.
- Ask students to deliver their argument in front of the class, staying in the character of their assigned role.

Now You Can Do Homework At Night!

In Chapter Four, "Bringing Energy Independence to Indian Country," Debby Tewa describes growing up on a remote part of the Hopi Reservation without running water, electricity, or a telephone. Have your students apply this situation to their own lives using the following activities:

1. Brainstorm with your students appliances in their homes that need electricity to work and have them write the list on a piece of paper.
2. Have students choose five items on the list that they use on a daily basis.
 - a) Next to each of their choices, have them list a non-electric alternative.
 - b) Ask students to figure out how much more time the alternatives might take. What extra precautions might they need to use?
3. On graph paper or on a computer using a spreadsheet, have students create a chart that maps out a full day in their lives, listing what they do every two hours from 7 A.M. until 10 P.M. Next to each activity, instruct students to list the electrical appliances involved. Have students create a second chart illustrating what the same day would look like if they were to use non-electric alternatives.
4. Ask students to compose a narrative essay describing a day in their lives without electricity. Remind them to be sure to account for extra time and any necessary extra precautions.



INTEGRATING SOCIAL STUDIES EXTENSION:

Solar energy is only one of many types of alternate energies that people are using across the United States. The Web sites below contain maps that show the potential of each state for the use of a variety of alternative energies. Have your students refer to the information on the Web sites to complete the activities that follow the list.

Natural Resources Defense Council Map of Solar Energy, Wind Energy, Biomass, and Biogas Potential Energy <https://www.nrdc.org/energy/renewables/default.asp#map>

United States Geological Survey Map of Hydroelectric Power Water Use in the United States in 1990

<http://ga.water.usgs.gov/edu/maphytot.html>

Globe Energy Network Institute Geothermal Resource Potential Map <http://www.geni.org/globalenergy/library/renewable-energy-resources/world/north-america/geo-north-america/geo-us.shtml>

ACTIVITIES

- Create a data table that includes the name of your state and the names of the states that border your state as the row categories, and includes alternative energies as the column categories. Refer to the example data table below for examples of the types of alternative energies to place on the table.
- Have your students use the keys of the maps in the list of resources above to rate the potential to employ the alternative energies listed in your table for each state. You may do this by writing a check for medium to high potential, a dash for medium to low potential, or a zero for low or no potential.
- Analyze the results with your students. Ask students whether your state or the other states have the potential for alternative energies.
- Have students brainstorm some factors that may make one state have a higher potential than another state.

EXAMPLE DATA TABLE:

	Solar Energy	Wind Energy	Biomass Fuel	Biogas	Hydro-electric	Geothermal Energy
Louisiana						
Texas						
Arkansas						
Mississippi						



Why Are Wetlands So Important?

Wetland areas are spread throughout the United States. It was once considered wasted land, so much of it was filled in with sand and then heavily developed. Scientists now understand that wetlands provide very important values to their native animals, the environment, and humans. In fact, wetlands are thought to be the most biologically diverse ecosystems on Earth. Wetland loss is a national problem. Many states have lost over 50 percent of their original wetlands. The worst wetland loss is found in the states along the Gulf Coast. Chapter Ten introduces the reader to Barry Guillot and his students, who work to raise awareness about the importance of Louisiana wetlands not only in their home state but also in the entire country. Louisiana contains 40 percent of the nation's coastal wetlands and 80 percent of the coastal loss of wetlands! Through the following activities, students will explore the values and functions of wetlands. Have students research why Louisiana's coastal wetlands are so important to the entire nation. Focus their efforts on the amounts of seafood, oil, natural gas, and other resources that are widely used by United States citizens.

WETLAND METAPHOR ACTIVITY

Wetland Metaphors is a powerful activity for students to gain a thorough understanding of the value of wetlands. In the Wetland Metaphor activity found at the Barataria-Terrebonne National Estuary Program Web site, students use common objects such as an antacid, soap, and a pillow as metaphors that represent some of the many benefits (values) wetlands provide through the way they function. http://educators.btnep.org/client_files/editor_files/ACTIVITY%201-06%20Wetland%20Metaphors.pdf

WETLAND FUNCTIONS AND VALUES TRI-FOLD BROCHURE

There are many people who believe wetlands are wasted pieces of land that should be developed into stores and parking lots. Have students prepare an informational brochure that will illustrate how valuable wetlands are to all of us. Assign the following brochure topics for small groups or individuals to research:

TYPES OF WETLANDS	FISH/WILDLIFE HABITAT
RECREATION VALUES	ENDANGERED ANIMALS
STORM BUFFER ZONE	COMMERCIAL VALUES
WETLAND CHALLENGES	EROSION AND FLOOD CONTROL
CULTURAL VALUES	EDUCATION AND RESEARCH
WATER QUALITY/FILTRATION	WETLAND SUPERMARKET

Possible Brochure Checklist may include:

- One picture related to topic, student name, and title on the cover page
- Short explanation in "What is a wetland?" section
- Minimum three facts with sources that support the topic
- Minimum two pictures or diagrams related to the topic
- Works Cited (including pictures) placed on back page
- Brochure should be neat and easy to read
- Brochure should be checked for spelling/grammar



TECHNOLOGY EXTENSION:

- Have students research wetlands in Louisiana, wetlands near their homes, or other environmental issues in your area. Students can find out the facts and points of view from a number of sources and form their own opinions on the subjects.
- Students may create posters using the facts they discovered, or they may write a script and record an avatar public service announcement regarding the environmental issue. Go to <http://www.voki.com/> and design characters for free or use the avatar software that is provided with many of the premium webcams.

SERVICE LEARNING EXTENSION:

Start a small tree seedling nursery on your campus! Planting trees is a valuable part of habitat restoration. Students can plant seeds of local trees, care for the seedlings, and then plant the seedlings or donate them to other groups to plant! The LSU Coastal Roots Project offers valuable information on getting started on your seedling project in two links below:

For information on nursery management and restoration planting trips, refer to the LSU Coastal Roots Web site: <http://coastalroots.lsu.edu>

For information about how to set up a school restoration plant nursery and to learn about some of the considerations that go into starting a restoration program at your school, see Coleman, E., & Bush, E. (2002). *Putting Down Roots: Starting a Seedling Nursery for Wetland Replanting*. Louisiana Sea Grant College Program, Louisiana State University, Baton Rouge. Retrieved May 25, 2007 at <http://nsgl.gso.uri.edu/lsu/lsuh02002.pdf>



ABOUT THE AUTHOR

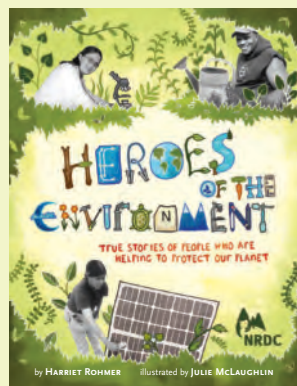
Harriet Rohmer is the founder and former publisher and executive director of Children's Book Press, the award-winning publisher of bilingual and multicultural picture books in San Francisco. Books that she has edited or written have won more than 100 major awards, including the American Book Award, the Coretta Scott King Award, and the Ezra Jack Keats Award.

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Heroes of the Environment
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3a NCTE / IRA STANDARDS FOR THE ENGLISH LANGUAGE ARTS

STANDARD 1: Students read a wide range of print and non-print texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment. Among these texts are fiction and nonfiction, classic and contemporary works.

STANDARD 2. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.

STANDARD 4. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

STANDARD 7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and non-print texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

STANDARD 8. Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

STANDARD 9. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).