What is Concept Mapping?

Concept mapping is a technique for drawing a kind of visual road map of how concepts are connected and understood. By drawing a concept map of an “Earthwatch” script, for example, you can identify the key concepts and show the relationships between them, helping your students understand more clearly the meaning of the script.

“Concept” means a regularity in an object or event that is labeled with a word, like “bottles,” “air,” “recycling,” and “pollution.” A concept is given new meaning when it is linked with other concepts, as in “recycling the bottles” or “pollution in the air.” Concepts also change when new connections are made. Consider this sequence using the concept “grass”: “grass is green,” “grass is a plant,” “grass is a monocot,” “grass photosynthesizes.” With each phrase, the meaning of the concept “grass” becomes broader and richer.

Concept mapping can foster more creative, meaningful, long-term learning as well as more positive feelings about learning. Students from grade 1 on have been taught how to use concept mapping to help them learn more effectively. By drawing concept maps, students begin to see the relationships between new information and what they already know. The new information then becomes more relevant to them and can be recalled more readily. In addition, in mapping even old and familiar material, students sometimes recognize new relationships and meanings.

By examining your students’ concept maps with them, you can learn what they know and think about a subject. (Are they misunderstanding an idea or missing a concept? Do they feel confused or frustrated? Or do they understand the topic with great insight in a way you never expected or even thought of yourself?) You can then tailor the lesson to fit their needs. Thus, concept maps help us take into account the most important factor influencing learning—what students already know—and then teach them accordingly. Also, by comparing maps that students draw before a lesson with those they draw after it, you can assess how well a student understands what you taught.

For a comprehensive discussion of concept mapping and its uses, see Novak and Gowin (1984, pp. 15-54).

How to Draw a Concept Map

“Earthwatch” scripts are excellent materials for concept mapping because they offer short, concise descriptions of important subjects or issues.

Step 1: Select and read an Earthwatch script. Circle the key concepts necessary for understanding the script (Figure 1).

Step 2: Decide which concept is the most important or most inclusive idea, and make a list with this concept at the top. Find the next most general concept in the script and write it next. Continue to rank-order all the concepts. There is no single “correct” way to rank the concepts because the meaning of the text may be interpreted in more than one way (Figure 2).
Plants and Pollutants

It's no secret that air pollution can make people ill. But did you know it can also take a toll on plants? One Wisconsin scientist says air pollution may reduce yields of some farm crops as much as 20 percent.

Sulfur dioxide and ozone are the air pollutants that most commonly harm plants. Sulfur dioxide results from the burning of fossil fuels such as oil and coal. It is troublesome mainly near factories and power plants. Ozone, on the other hand, is a by-product of automobile exhaust and is much more widespread.

Theodore Tibbitts, a horticulture professor at the University of Wisconsin-Madison, says these pollutants seldom kill plants, and they usually do not harm their flowers or fruit. But he says they do injure leaves, and that's where the trouble begins.

Sulfur dioxide and ozone can enter a leaf through pores on its surface. Once inside, the pollutants disrupt the photosynthetic process in the leaf. This stunts the growth of leaves and can reduce the yields of many crops.

Air pollution is not the farmer's biggest worry. Tibbitts says drought, floods, frost, insects and disease can all take a bigger toll on crops, and the farmer, understandably, is more concerned about coping with those threats.

Nevertheless, says Tibbitts, air pollution's effects on plants are a legitimate concern. He says planting more tolerant crops in polluted areas could help. But the most important thing, he says, is to control pollution from industry and automobiles in the first place.

Figure 1: Key Concepts in “Plants and Pollutants”

Figure 2: Concepts in “Plants and Pollutants” in Declining Order of Importance
resulting from burning 1 fossil fuels such as oil and coal at factories and power plants in the forms of sulfur dioxide ozone automobile exhaust

Figure 3: A Concept Map of "Plants and Pollutants"
Step 3: Begin constructing a concept map by placing the broadest, most inclusive concept at the top of a large piece of paper. Work down, adding more specific concepts.

Step 4: Join the concepts with lines and label the lines with linking words that show meaningful connections between the concepts. One way to practice map-making is to write concepts and linking words on paper rectangles and then rearrange these as you see new relationships.

Step 5: Now look for links between concepts and label these connections. You can add concepts not in the text to increase the comprehensiveness of the map or to clarify your understanding of the concepts. You also can add examples of concepts (e.g., soybeans, potatoes, tobacco, grapes, and peas are examples of the concept “crop”) (Figure 3).

Step 6: Remember that there is no one way to draw a concept map. As your understanding of relationships among concepts changes, so will your map. Draw a new map if you see new ways to link concepts. Keep your maps and refer to them to help you see how your understanding evolves.

Now that you and your students have drawn (and redrawn) concept maps of a script, have one of the map-makers “read” the map so that it’s clear to the other students what the script is about. Are there any concepts you would like to add to help you understand the script more completely? Do you have questions about the content that you’d like to investigate? (Example questions for the script mapped in figures 1-3 are presented in the following section, Questions for Classroom Investigation.) Come up with your own questions for the script you mapped, then find the answers to some of them. Remember that concept mapping can be used to clarify any subject.

Scoring Criteria

Novak and Gowin (1984, p. 36) suggest using the following scoring system to evaluate how well your students have integrated and understood this exercise (Figure 4).

- **Propositions**: Is the relationship between two concepts indicated by the connecting line and linking word(s)? Is the relationship valid? For each meaningful, valid proposition shown, score 1 point.

- **Hierarchy**: Does the map show hierarchy? Is each subordinate concept more specific and less general than the concept drawn above it (in the context of the material being mapped)? Score 5 points for each valid level of the hierarchy.

- **Cross links**: Does the map show meaningful connections between one segment of the concept hierarchy and another segment? Are the relationships shown significant and valid? Score 10 points for each cross link that is both valid and significant, 2 points for each cross link that is valid but does not illustrate a synthesis between sets of related concepts. Cross links can indicate creative ability; therefore, special care should be taken in identifying and rewarding its expression. Unique or creative cross links might receive special recognition or extra points.
Examples

Specific events or objects that are valid examples of those designated by the concept label can be scored 1 point each.

Criterion (optional)

In addition, a criterion concept map can be constructed and scored for the material to be mapped, and the student scores divided by the criterion map score to give a percentage for comparison. (Some students may do better than the criterion and receive more than 100% on this basis.)

Hierarchy

Level 1

Level 2

Level 3

Level 4

Cross Links (if valid and significant) 10 x 2 = 20

Examples (if valid) 4 x 1 = 4

58 points total

Figure 4: Scoring Model for Concept Maps
Questions for Classroom Investigation

Although each script in *Earthwatching III* presents facts and issues on a topic, a script may leave some questions unanswered and may stimulate other questions worth investigating. *Earthwatching III* can suggest investigations not only in science but in art, history, literature, geography, social studies, mathematics and other disciplines. We encourage you and your students to ask further questions about the topics discussed in this book and find imaginative ways to incorporate them into your studies.

To get you started, here are some examples of spinoff questions from several scripts. Each question could serve as a subject for classroom investigation.

"Plants and Pollutants"

- What is combustion? What are the results of this process?
- How do we develop pollution-tolerant plants?
- How can sulfur dioxide and ozone pollution affect people?
- Why is sulfur dioxide pollution less pervasive than ozone pollution? Is sulfur dioxide pollution a problem only near factories?
- Why is ozone called a "by-product" of car exhaust? How does it form? What is the chemical formula for ozone? Why is ozone so reactive?
- What is the structure of a leaf? How does ozone enter a leaf? What does ozone do to a leaf? How does this affect the plant?
- Should farmers be more concerned about ozone pollution than they are? Should other people be more concerned, too? Why?
- How do we measure ozone levels? How would you find out about ozone levels in your state? In the United States?
- Where is ozone monitored in your state? In the United States?
- Are the causes and effects of the ozone problem discussed in the script the same as or different from those of the ozone layer in the upper atmosphere?
- What are some other forms of air pollution?
- How can we control air pollution?
- What can you do to reduce ozone and other forms of air pollution?
"The Snowflake Man"

- How do snowflakes form? Why do they have six sides?
- Do people still study snowflakes? Where and why (e.g., in avalanche control, military research, oil rigs, glaciers, the Antarctic, art and design)?
- What effect does snow have on the landscape, on wildlife, on people (e.g., insulation, shelter, mobility, food availability)?
- In our society, what are peoples' attitudes towards snow? Is snow considered beautiful, a nuisance? What attitudes about snow are portrayed on television weather forecasts? Why do we often have a negative view of snow? Do you like snow? Why or why not? What are some other societies' attitudes about snow (e.g., the Laplanders and Inuit peoples of the Arctic)?
- How is snowfall recorded? Is there as much snowfall in your state now as there used to be?
- Have weather patterns changed since Snowflake Bentley's time?
- Obtain annual snowfall records for your region and draw a graph. If you see long-term changes in snowfall, what do you think are some possible reasons for the changes?

"Big Blasts and Bumper Crops"

- What are volcanoes? How do they form? Where do they form?
- What role do volcanoes play in the Earth's evolution?
- Why do you think paintings of dinosaurs usually have volcanoes in the background? Is this an accurate portrayal of the Earth when the dinosaurs were living?
- Although a volcanic explosion on the equator may benefit U.S. corn crops, what are the effects of the explosion where it happens (e.g., El Chichon in Colombia, Mount St. Helens in Washington)?
- What other ways can volcanic activity be beneficial or harmful to people (e.g., geothermal energy in Iceland and New Zealand, poisonous gas in Cameroon)?
- What are some historic "big bangs" (e.g., Krakatoa, Vesuvius)? What eventually happened to the ash that was spewed into the upper atmosphere by these eruptions?
- If ash from volcanic eruptions affects the world's weather, what do you think dust and smoke from a nuclear explosion could do?
- Describe what is meant by the concept "spaceship Earth" or the phrase "everything is connected to everything else."
- What are some folk stories/fears/myths about volcanoes?
- How well can scientists predict when volcanoes will erupt? How do they do this?
Example Activity

Earthwatching III can be useful in many curriculum areas. The following activity shows how the script, "Dumping Diapers," could be used in a math unit to illustrate concepts of measurement. It also suggests how to use the same script and subject to teach lessons in home economics and to help students make the connection between classroom activities and the world outside of school. We encourage you to devise similar activities from the many other scripts in this book.

Activity

Objective: To help students develop skills in measurement and cost analysis and interpret their findings in the context of an actual environmental problem.

Grades: 7-12.

Subjects: Mathematics, social studies, home economics, health, environmental education.

Background: Earthwatching III script "Dumping Diapers" (page 85).

Materials: Disposable diapers, metric ruler, gram balance, graduated cylinder, container for saturated diaper, water.

Procedure

Step 1. Measure a dry disposable diaper as follows:
   a. Use the gram balance to calculate weight (to the nearest gram).
   b. Use the metric ruler to calculate volume in cubic centimeters.

Step 2. Measure a saturated disposable diaper as follows:
   a. Use the graduated cylinder to calculate maximum volume of water a disposable diaper can hold (to the nearest milliliter).
   b. Use the balance to calculate (1) the weight of the saturated diaper and (2) the weight of the water alone.
   c. Use the ruler to measure the diaper’s volume (to the nearest cubic centimeter).

Step 3. Answer the following questions:
   a. Assume that the maximum weight limit for a typical garbage can is 18.5 kilograms. How many saturated diapers can it hold?
b. Read the Earthwatching III script “Dumping Diapers.” How many days will it take a family with one young child to accumulate 18.5 kilograms of saturated disposable diapers (round to the nearest 0.25 day)?

c. If garbage collection is once a week, how many garbage cans will a family that uses disposable diapers need for two young children?

d. If a garbage truck can carry an average of 5,900 kilograms of refuse, how many garbage cans full of saturated disposable diapers can one truck haul without exceeding its capacity?

e. One garbage truck can hold a week’s worth of saturated disposable diapers from how many children in all?

f. Calculate the volume of a typical one-car garage in cubic meters. If the garbage collector goes on strike and a family with one young child has to store its saturated disposable diapers in the garage, how long will it be before the garage is full?

g. Calculate the total number of diapers a child will need from birth to age two. Calculate the mass and volume of both dry and saturated disposable diapers used by the child during this time.

Once your students have done the measurements and mathematical calculations, you can either consider the lesson complete or discuss the real-life implications of the measurements they derived. Here are some questions raised by the “Dumping Diapers” activity that you may wish to consider with your students.

- What happens to disposable diapers after people throw them away?
- About how many children in your community are under the age of two? If all of them used disposable diapers, how much landfill space would be filled with diapers in one year? Do you think this is a good way to use land? Why or why not?
- How many years will it be before your community landfill is full? What will your community do with its waste after that?
- What laws does your community have for treating human waste? Do these laws apply to waste contained in disposable diapers?
- Assume that your local store sells disposable diapers in two sizes of bags: 48 per bag for $10.99 and 18 per bag for $4.49. What would a sales tax of 5 percent add to the cost of each bag? Which is your best buy? Calculate the percentage of your savings.
- The smaller bag has a rebate coupon: If you mail in labels from three small bags, you’ll get a $1 rebate. Considering the rebate, which is your best buy (including the 5 percent tax)? Calculate the percentage of your savings.
Assume that a child requires 48 cloth diapers, which can be washed and reused, from birth to age two. A package of 12 cloth diapers costs $8.37. What is the total cost to purchase cloth diapers for one child, including a 5 percent sales tax? What is the cost difference between a two-year supply of disposable diapers and a two-year supply of cloth diapers?

What other costs should parents consider when using cloth diapers (e.g., detergent, electricity, water, washer and dryer wear, time)?

A commercial diaper service has compiled the following statistics about diaper costs (toddlers often require 90 or more diapers per week):

- 90 diapers, home delivery service: $10.15/week
- 90 disposable diapers: $18.50/week
- 90 diapers, home-laundered: $9.36/week

(including estimated costs of detergent, water, electricity, washer and dryer, etc.)

If you were a parent, which diaper option would you choose? Why? Is cost your only concern? Have you considered other pros and cons, such as energy use, environmental impacts, convenience, your child’s comfort, etc.?

About 80 million children are born in the world every year. If all of them used disposable diapers, how many disposables would be consumed every year? What do you think about this?

Investigate what people in other parts of the world use to diaper their children.

Brainstorm ways that old cloth diapers can be recycled-used for other purposes.

Investigate how much paper pulp is required to manufacture a disposable diaper. How many trees must be cut to make the diapers used by one child from birth to age two?

Investigate the possible health effects of disposing of human wastes in landfills.
Infusing Earthwatching III into a Curriculum

At first glance, "infusion" may sound complicated, but it is really a simple idea. It's also an important one. Infusion means using environmental topics like those in Earthwatching III as a vehicle to achieve your teaching objectives in math, art, languages-in all subjects (not only science) at all grade levels. By doing this, you integrate environmental education into the regular curriculum rather than treat it as a separate subject.

Adding environmental content to the curriculum may require additional planning and instruction. The exact amount depends on how much information you have at hand and how much more you would like to know about a topic. But you do not have to be an expert on the environment to use environmental topics in your classes. By selecting examples of personal interest to you and your students and investigating them together, everyone can learn more. Such inquiry can enhance your teaching and your students' enthusiasm about learning.

The following paragraphs describe some environmental topics or activities that can be addressed in various curriculum areas according to A Guide to Curriculum Planning in Environmental Education (Engleson 1985, pp. 60-62).

**Agriculture**
- Groundwater contamination from agricultural chemicals; organic and inorganic pest controls; soil erosion, nutrients, and conservation; water conservation, irrigation, salinity, and nonpoint-source pollution; threatened and endangered species and habitats; energy issues; biotechnology and its impact on agriculture; economics and environment.

**Art**
- The nature of aesthetics; environmental ethics; natural and urban environmental aesthetics; aesthetics in land-use planning; the role of art in communicating environmental messages; architecture; historic preservation.

**Foreign Language**
- Global perspectives; how we perceive people of other countries; how people of other countries view us; commonalities and differences among peoples; how people of other countries feel about and deal with environmental issues; how we influence the environments of other nations. (Study current publications to learn about other nations' environmental concerns, such as France's position on nuclear energy, the effects of acid rain on German forests, and the destruction of tropical rain forests in Latin America.)

**Health Education**
- The relationships among physical, mental, and environmental health; occupational health; consumer health; hazardous chemicals in the home and workplace; the role of government in health issues; air, water, and noise pollution; healthful recreation; nutrition; disease; population issues.

**Home Economics**
- Water and energy use and conservation; excess packaging and solid waste disposal; recycling; food additives; hazardous household chemicals.

**Industrial Education**
- Resource use and conservation (energy, raw materials, water, land, air, etc.); use and disposal of hazardous chemicals; aesthetics in structural design; social and environmental responsibility; creativity; alternative technologies.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Language Arts</strong></td>
<td>Use environmental subjects in creative writing; reading; dramatics; speech; journal, editorial, letter, article, script, and report writing; research; literature; literary analysis.</td>
</tr>
<tr>
<td><strong>Mathematics</strong></td>
<td>Use environmental subjects when collecting and analyzing data; communicating results through charts and graphs; studying geometric shapes and patterns.</td>
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<tr>
<td><strong>Physical Education</strong></td>
<td>Canoeing, backpacking, camping, fishing, hiking, skiing, swimming, etc.; outdoor ethics; safety; pros and cons of hunting; consumptive versus non-consumptive outdoor activities; relationship of environment to human physical and mental health.</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td>Develop problem-solving skills and understand relationships among science, technology and society.</td>
</tr>
<tr>
<td><strong>Social Studies</strong></td>
<td>Describe, study, and analyze the relationships of human actions and behaviors to the environment and their impacts on the environment; develop citizenship skills, geography concepts, map skills; consider possible futures.</td>
</tr>
</tbody>
</table>

The next two sections describe in greater detail how to use Earthwatching III in social studies and health education, two curriculum areas for which it is especially suited.
Using Earthwatching III in Social Studies

The following chart correlates scripts in Earthwatching III with content that the Wisconsin Department of Public Instruction suggests be covered in K-12 social studies education. It is based on chapter 2 of A Guide to Curriculum Planning in Social Studies (Hartoonian 1986).

The chart is by no means all-inclusive; it merely provides examples of where Earthwatching III scripts might be used in the social studies curriculum. We encourage you to review the many other scripts in this book that address social issues and develop ways to incorporate their content into your social studies program at all grade levels.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Grade</th>
<th>Relevant Curriculum Questions</th>
<th>Relevant Scripts/Page Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air pollution</td>
<td>K</td>
<td>How can you care for your environment?</td>
<td>The Smog's on the Other Flue/ 7, Poolside Chat/ 66, Victims of Pollution/ 81, Homemade Air Pollution/ 99, and others ▼</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 What are the current trends in resource use? Is it possible to change these trends? How?</td>
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<tr>
<td>Hunger</td>
<td>K</td>
<td>How do different people meet their needs?</td>
<td>Bad Taste?/ 94, This Spud's for You/ 95, Feeling the Strain/ 110, Tragedy of a Continent/ 121, Where Hunger Strikes/ 122, and others ▼</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 How are the United States and the rest of the world interdependent? What are current trends in resource use and population growth? What alternatives exist for changing these trends?</td>
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<td></td>
<td></td>
<td>6 What issues, crises, and opportunities face each cultural region of the world?</td>
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<td>7 What are the causes and consequences of an uneven distribution of wealth in the world?</td>
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<td></td>
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<td>8-9 To what degree is population growth a problem? What issues of today are likely to be with us in the future?</td>
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<td></td>
<td></td>
<td>10-11 How is your community interdependent with the rest of the world?</td>
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<tr>
<td>Recycling</td>
<td>1</td>
<td>How does your school recycle materials? Your neighborhood? Your community?</td>
<td>New Life for Old Milk Jugs/ 77, Recycling Simplified/ 81, Return of the Returnables/ 83, Recycling at a Ripe Age/ 84, New Deposit, Big Return/ 85, Shifting Gears/ 86, and others ▼</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 What are the current trends in resource use? Is it possible to change these trends? How?</td>
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<td>Topic</td>
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<td></td>
<td>6</td>
<td>What changes have taken place in the way people use resources and produce goods and services?</td>
<td>(Continued from page 141)</td>
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<tr>
<td></td>
<td>10-11</td>
<td>How did life in the United States change during and after World War II?</td>
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<tr>
<td>Oceans</td>
<td>2</td>
<td>What are oceans? How many oceans can you find on a globe? What are coastlines? How do coastlines differ from each other? How close do you live to the nearest ocean?</td>
<td>The Fear of Cod/ 20, Surf and Turf/ 45, Mussel-bound Oil Rigs/ 51, Killer Waves/ 51, Skimming the Surface/ 53, A Plague of Plastic/ 86, Underwater Relief / 98, and others ▼</td>
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<tr>
<td></td>
<td>3</td>
<td>How do oceans affect weather and climate? How do they affect our lives?</td>
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<td>4</td>
<td>How do oceans influence coastal communities? In what ways do people make their livings from the oceans?</td>
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<td></td>
<td>7</td>
<td>How are people and oceans interrelated?</td>
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<td></td>
<td>9-10</td>
<td>How do people and society affect oceans? Is it possible to harm oceans? How?</td>
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</tr>
<tr>
<td>Transpor-tation</td>
<td>2</td>
<td>What forms of transportation are available in your community? Other communities?</td>
<td>A Better Idea/ 66, Poolside Chat/ 66, A Saline Solution/ 78, Travel Expenses/ 107, and others ▼</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>How might technology influence our future?</td>
<td></td>
</tr>
<tr>
<td>Climate</td>
<td>3</td>
<td>How do geography and climate affect communities?</td>
<td>Big Blasts and Bumper Crops/ 3, No Previous Experience/ 3, Behind the Drought/ 4, The South Rises Again/ 47, Our Brimming Great Lakes/ 48, History on the Bottom of the Sea/ 52, and others ▼</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>What is the nature of relationships between people and Earth systems? How are nations interdependent?</td>
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<td></td>
<td>9-10</td>
<td>What do people mean when they say the world has become a global community?</td>
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<tr>
<td>Topic</td>
<td>Grade</td>
<td>Relevant Curriculum Questions</td>
<td>Relevant Scripts/Page Numbers</td>
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<tr>
<td>Cities</td>
<td>3</td>
<td>Why do people live in cities? How do cities influence the environment? How does the size of a city influence the way its people live?</td>
<td>Star Light, Star Bright/ 7, Down the Drain/ 49, An Island in Distress/ 50, Thirst Aid/ 60, Leaky Pipes/ 61, City Limits/ 87, Paying the Piper/ 88, From Boom to Bust/ 89, Pushing the Limits/ 115, Thailand’s Sinking City/ 115, Supercity/ 116, and others</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>What is the nature of relationships between people and earth systems? How are nations interdependent?</td>
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<td></td>
<td>8-9</td>
<td>What important issues do nations face today?</td>
<td></td>
</tr>
<tr>
<td>Farming</td>
<td>3</td>
<td>What special problems do farmers face today? How do farming methods compare in different places?</td>
<td>Plants and Pollutants/ 6, New Roots/ 33, Salt of the Earth/ 35, Preventable Pollution/ 36, Harvest of Dust/ 38, Dust to Ashes/ 68, Chemical Dependence/ 118, Another Japanese Success/ 120, and others▼</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>What changes have taken place in the ways people use resources?</td>
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<tr>
<td></td>
<td>8-9</td>
<td>What important issues do nations face today? How are technology and global interdependence changing the economy of our nation and the world?</td>
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<tr>
<td></td>
<td>11</td>
<td>How might technology influence our future?</td>
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</tr>
<tr>
<td>Great Lakes</td>
<td>2</td>
<td>What are the Great Lakes? Where are the Great Lakes on a globe? How close do you live to the nearest Great Lake? Which states and provinces border the Great Lakes?</td>
<td>The South Rises Again/ 47, Our Brimming Great Lakes/ 48, A Costly Diversison/ 48, Probing a Great Lake’s Plumbing/ 49, Down the Drain/ 49, Hanging Ten on Lake Michigan/ 57, and others▼</td>
</tr>
<tr>
<td>Topic</td>
<td>Grade</td>
<td>Relevant Curriculum Questions</td>
<td>Relevant Scripts/Page Numbers</td>
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<tr>
<td></td>
<td>3</td>
<td>How do the Great Lakes affect weather and climate in the region around them? What cities are located on the Great Lakes? Why were these cities built on the lakes? (Continued from page 143)</td>
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<td></td>
<td>5-6</td>
<td>Who were the first people to live near the Great Lakes? Which early European explorers visited the Great Lakes? How was settlement of your state or province influenced by the Great Lakes? How and when did the Great Lakes get their names?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>What role do the Great Lakes play in international trade?</td>
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<tr>
<td></td>
<td>7</td>
<td>How and why do the United States and Canada share the Great Lakes?</td>
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Using Earthwatching III in Health Education

The following chart correlates scripts in Earthwatching III with content that the Wisconsin Department of Public Instruction suggests be covered in K-12 health education. It is based on Table 1 in A Guide to Curriculum Planning in Health Education (Bradley 1985).

The chart is by no means all-inclusive; it merely provides examples of where Earthwatching III scripts might be used in the health instruction curriculum. We encourage you to review the many other scripts in this book that address human health issues and develop ways to incorporate their content into your health program at all grade levels.
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<tr>
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Sources of Additional Information

Thousands of public and private organizations throughout the United States and Canada offer a variety of materials-books and pamphlets, films and videotapes, computer software, and curricula-helpful to environmental educators.

One of the most comprehensive lists and descriptions of these organizations is the Conservation Directory published annually by the National Wildlife Federation, 1400 Sixteenth Street N.W., Washington, DC 20036-2266. (Cost of 1990 edition: $18 plus $3.50 shipping and, in certain states, sales tax). Among other things, this excellent directory lists sources of information and audio-visual materials on conservation and environmental topics, current state education agency coordinators for environmental education, and other useful directories.

In addition to Earthwatching III, the Sea Grant Institute and the Institute for Environmental Studies at the University of Wisconsin-Madison offer many publications, including a selection of educational materials, on the Great Lakes and other environmental topics. For lists and prices, contact the UW Sea Grant Institute, 1800 University Avenue, Madison, WI 53705 (phone 608/ 263-3259), and the Institute for Environmental Studies, Room 15 Science Hall, 550 N. Park Street, Madison, WI 53706 (phone 608/ 263-3064).

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Bradley, Chet. 1985. A Guide to Curriculum Planning in Health Education. Wisconsin Department of Public Instruction, P.O. Box 7841, Madison, WI 53707.

Engleson, David C. 1985. A Guide to Curriculum Planning in Environmental Education. Wisconsin Department of Public Instruction, P.O. Box 7841, Madison, WI 53707.


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