



MODULE 3 Going Global

Notes for the Teacher

Activities Outline:

Activity 1 – *A Day in the Life of...*

Activity 2 – *Whose Watershed is This?*

Activity 3 – *Hope for the Future*

Subjects/Grades:

Science 8

Social Studies 10 & 11

Earth Science 11

Science and Technology 11

Resource Science 11 & 12

Geography 12

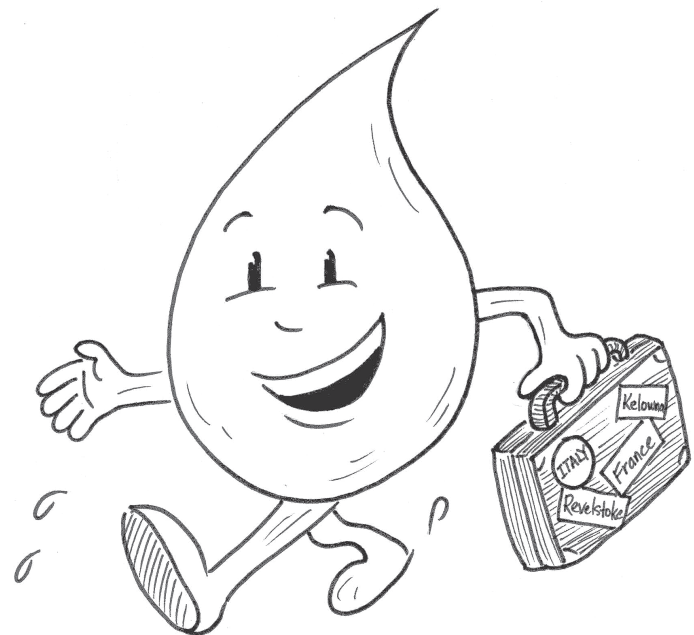
PRESCRIBED LEARNING OUTCOMES

SUBJECT AREA	CURRICULUM ORGANIZER	ACTIVITY
SCIENCE 8	Life Science (Social Issues) _____	Activities 1, 2 and 3
	Life Science (Global Ecosystems) _____	Activities 1, 2 and 3
SOCIAL STUDIES 10	Applications of Social Studies _____	Activity 2
SOCIAL STUDIES 11	Skills and Processes I _____	Activities 1 and 2
	Skills and Processes II _____	Activity 2
	Environmental Issues _____	Activities 1 and 2
EARTH SCIENCE 11	Geological Science (Resources and Environment) _____	Activities 1 and 3
SCIENCE AND TECH 11	The Nature of Science, Technology and Society (core) _____	Activity 3
	Resource Management and Environmental Planning _____	Activities 1, 2 and 3
	Pollution _____	Activities 1, 2 and 3
	Medicine, Health and Technology _____	Activity 3
	Consumerism and Population _____	Activities 1 and 2
	The Future _____	Activity 3
RESOURCE SCIENCE 11	Forests and Society _____	Activity 2
	Forest Ecology _____	Activities 1 and 2
RESOURCE SCIENCE 12	Management Perspectives _____	Activities 1 and 2
GEOGRAPHY 12	Resources of the Earth (Nature of Resources) _____	Activities 1 and 2
	Resources of the Earth (Sustainability of Resources) _____	Activity 2
	Resources of the Earth (Management of Resources) _____	Activities 1 and 2



Introduction

Welcome to Module 3, *Going Global*. In previous modules we explored watersheds as they related to British Columbians on a provincial scale. Now, in *Going Global* we take a look at the big picture of watersheds — on a global scale, that is. Using activities that focus on a different country, students will gain insight into another culture and the different ways in which human beings globally interact with, rely on, and modify their own watersheds.





ACTIVITY OBJECTIVES

In this activity you will:

- Understand that destruction and pollution of watersheds have an impact on people's daily lives
 - Reflect on the similarities and differences between water use in El Salvador and in Canada
 - Learn how to conserve fresh water in the home and in the school
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TIME

1.5 hours +

MATERIALS

- Poster paper and markers
- Paper and pens
- Access to the library
- Internet access

Activity 1: *A Day in the Life of ...*

First of all...

Bienviendos a El Salvador! (Welcome to El Salvador)

We all live in a watershed! Everyone and everything depends on water — people, their crops, animals, forests, the very soil — they all need water. But in El Salvador — a Central American country two-thirds the size of Vancouver Island — 96 percent of the once-fresh water is now polluted.



Imagine being in El Salvador 500 years ago. Picture a lush land of forests and lakes. At your feet, the Rio Lempa is full of fish. If you were tall enough to see over the tree-tops, you would see the mountain ranges that segment the country east to west. Between these two ranges lies fertile land. The people who lived in this land called it "Cuzcatlan" meaning "Land of Richness". The plains of El Salvador were filled with life, home to pumas, parrots, sloths, and many more animals. The shores were nursing grounds for sea turtles and shrimp.

For nearly 20,000 years the native peoples of El Salvador lived off the land, in a culture similar to that of the Aztecs and Maya in Mexico. The forests provided them with medicines, fruits, meats, and wood for cooking and construction. After the Spanish conquest 500 years ago, El Salvador's native people lost their traditional lands, starting a cycle of poverty that continues to this day.



But Today...

Imagine being in El Salvador again, this time in the year 2001. Standing on the bank of a river, you are surrounded by cars and people, and the smog is unbearable. Every time you close your eyes they hurt. There is so much noise; people are shouting at one another to be heard above the noise of traffic. A city has grown up along the river. There are people washing clothes in it, and downstream a cow is drinking. Behind the cow is a tire. There is garbage all along the shore, and downstream there are houses built right at the edge of the bank. There are no trees left; the soil is dry and cracked. In El Salvador's capital city, San Salvador, two of the most dangerous things a child can do are breathe the air and drink the water.

Today El Salvador could be called "Land of Dust". All but 5 percent of the original forests have been cut, and less than 7 percent of the country is covered in forest. Without forest roots and vegetation to hold moisture in the soil, topsoil has washed away and groundwater levels have dropped. Heavy use of pesticides and fertilizers to compensate for topsoil loss has resulted in toxic run-off in the streams and rivers. The lower water table and toxic chemicals have intensified the country's drinking water supply problem.

This toxic soup kills much of the life in the waterways. Contaminated water flows to the Pacific Ocean, polluting the coastal mangrove swamps, the breeding grounds for many aquatic species like shrimp.

Key Words

Deforestation: the action or process of clearing of forests.

Toxic: having to do with or caused by a poison.

Always act in such a way that the principles underlying your actions could become the principles of humanity.

—IMMANUEL KANT



Water Wise Tips

Here are a few water conservation basics for home and school.

In the Bathroom:

- Take a five-minute shower instead of a bath.
Amount saved: 57 litres per shower
- Don't use toilets as a wastebasket, flush only when you need to.
Amount saved: 45 + litres per day
- When brushing teeth, use a glassful of water instead of running the tap.
Amount saved: 11 + litres per brushing
- When taking a bath, don't run the water without closing the drain first. The warm water that comes after running the tap for a while will take care of that first cold burst of water.
- Regarding the toilets: "If it's brown flush it down, if it's yellow, let it mellow."



In the Kitchen:

- When washing dishes by hand, fill up the sink with soap and water instead of running the water the whole time.
Amount saved: 95 litres per load
- Keep a pitcher of water in the refrigerator when you want a drink instead of running the tap until the water cools.
Amount saved: 7.6 litres per drink
- Thaw frozen foods in the refrigerator, not under running tap water.
Amount saved: 19 + litres per meal
- Start a compost pile as an alternative to using a kitchen sink garbage disposal.

From
The North Beach Middle School Water Conservation
Web site:
<http://www.geocities.com/RainForest/7575/>

Activity Description

1. Read the case study *A Day in the Life of...* (right) which outlines a typical day in the lives of both a Canadian and a Salvadoran. Considering the information from the case study, make a list comparing the ways they each might use water over the course of a regular day.
2. Now consider your own daily routine. How many ways do you use water? Remember to include your water use at home, at school and at any other place you regularly frequent. Don't forget to think of things like the shower, washing machine, toilets, bottled pop, etc.
3. Now that you have identified some of the ways in which you use water, do some research and take a look at the bigger picture. You may want to consider the following questions: Where does your water come from, specifically? How is your drinking water treated? By whom? Where does your waste water go? How is it treated? How much water does your community use in a day? A week? A year?
4. Using the information that you have gathered, make a collage or poster that explores similarities and differences between your use of water and a Salvadoran's use of water. Try to include information such as cultural issues and environmental factors.

Extension Idea

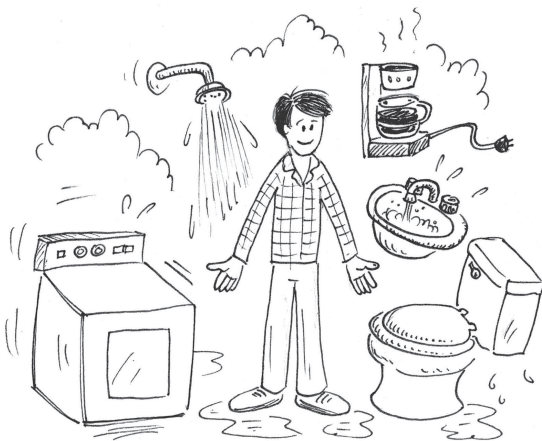
1. With a partner, make a list of people you know who may have lived in or come from another country.
2. Brainstorm a list of questions you can ask these people on the topic of clean water. Consider the following: How do people in that country get clean water? Do they have to walk far or buy expensive bottled water? How has the water situation in the country affected people's health? Where do farmers get water for their livestock and crops?
3. Arrange to interview at least one person from your list. (You may be able to interview people via e-mail if they live far away from you.)
4. Be dramatic! Re-enact your interview in front of the class. Dress the part — one of you as reporter, the other as interviewee. Or create a poster version of your interview — on an extra large sheet of paper, draw or collage an image of the interviewee, and use cartoon-style balloons to present your questions and your interviewee's answers.



CASE STUDY: A Day in the Life of...

John

BZZZZZZ..... The alarm goes off. John is not a morning person. He slides into his slippers and trundles to the bathroom where he turns on the tap and waits for the hot water. With his eyes half open, he looks at himself in the mirror. A shower — for sure! It's a big day. After his shower, John relieves himself, then flushes the toilet. He heads to the kitchen for breakfast. A cup of strong coffee wakes him up and he starts to think about his day. His interview isn't until 11:30. He goes to the closet to see what he has to wear and realizes that his only good shirt is dirty. He runs downstairs and throws the shirt and a few pairs of underwear in the washing machine and turns it on. While he is waiting, John piles the dishes into the dishwasher, then goes outside and sets the sprinkler to water the grass — it hasn't rained for ages. Once his shirt is washed and dried, John dresses and heads out for his interview.



Rosa

Cock-a-doodle-doooo! It's Saturday, but the rooster doesn't know the difference. Rosa gets out of bed and grabs a flashlight. She walks to the outhouse, carefully avoiding the rain barrel on her way. The barrel is empty, though; it hasn't rained for ages. When she goes back inside, Rosa takes a cupful of water from the gourd she brought from the river yesterday and heats it for café de maiz — a mixture of toasted corn, sorghum and seeds. When it is ready, she wakes up her mother and father. After breakfast, Rosa and her mother say goodbye to her father, who leaves for work in the nearby coffee plantation, and they begin to get themselves ready for the day. Rosa gathers the family's laundry while her mother contemplates all the things they will need water for that day: drinking, cooking, and watering the small vegetable garden in front of their house. Together Rosa and her mother walk towards the river. To get there, they follow the ditch in which the waste water from their village drains into the river. When they arrive, they meet other women from the village who are already washing their clothes and their hair. Rosa reflects on how lucky they are to have a water filter in the village so they don't have to drink this water straight from the river. When the washing is finished, they fill buckets, one for drinking water to be taken to the filter, and another two for cooking and cleaning. Their loads are heavy, but it is a beautiful sunny day, and they have friends to talk to as they walk the two kilometres home.



ACTIVITY OBJECTIVE

In this activity you will:

Participate in a role-playing exercise in the classroom through which you will understand the impacts of different watershed uses in El Salvador

TIME

2 hours + research time

MATERIALS

Map of El Salvador

Activity 2: *Whose Watershed is This?*

First of all...

For centuries watersheds have been centres for human life around the world. People have built homes near rivers and estuaries so they would have water to drink and so they could irrigate crops and feed animals. But as the world population increases and more of our watersheds become developed and polluted, many people are having a hard time finding clean water. One of the most important questions to consider about water is: how many people have access to clean water?

Generally, Canadians have easy access to clean drinking water. But an unacceptably large portion of the world population — one person in five — does not have access to safe and affordable drinking water, and half the world's population does not have access to sanitation. Each year 3 to 4 million people die of water-borne diseases, including the more than 2 million children who die of diarrhea (World Health Organization statistics, 1996).

Down the Drain — What a Lot of Water!

"Several international agencies have estimated that a reasonable quality of life depends on an average of about 80 litres of water per person per day for domestic, agricultural and industrial uses. In Canada and the United States, the average is about 500 litres every day, while in Madagascar it is 5.4 litres. The average in Vancouver, B.C. is about 700 litres a day."

— *Water Stewardship*,
Province of British Columbia

El Salvador is just one of the many countries around the world that suffers from severe watershed issues. Water pollution, air pollution and deforestation are but a few of the many environmental problems that plague El Salvador. In this activity you will learn a little bit about the ways people from different cultures relate to water and to their watersheds, and how this compares to the way that we here in British Columbia relate to and rely upon our own watersheds.



Activity Description

1. First, read the announcement for the hypothetical public forum on the future of the Rio Los Milagros Watershed, entitled *Town Meeting! Deciding our Watershed's Future* (page 50). As a class, decide on a time and place for this public forum.
2. Choose a character from the *Characters List* (page 51). (Alternatively, make up your own stakeholder who you think is relevant to the situation). Do research in the library, over the Internet, or through other appropriate research vehicles to more fully develop your character.
3. To better develop your particular role, consider (in character) the following questions:
 - Why am I interested in the future of the Rio Los Milagros Watershed?
 - What do I stand to gain or lose by protecting its future?
 - How can I participate in shaping the future of the watershed?
 - What plan would I like to see adopted in the Rio Los Milagros Watershed?
4. Take a week to fully research your role. Try to really get into it. Consider dressing as your character might, in real life.
5. Appoint a facilitator to the meeting — this could be the teacher.
6. At the start of the meeting, state that the objective is to come to consensus on how the Rio Los Milagros Watershed will be managed for the future. Then, taking turns, hold the town meeting. Remember to hear out everyone's opinions and consider all viewpoints. After each person has had a chance to air his or her opinion, and a healthy discussion has been had, try to arrive at some sort of consensus as to the future of the Rio Los Milagros Watershed.
7. Did you reach consensus? Did you change some of your views and opinions about how the watershed should be used (or not used at all)? What did you learn about your fellow stakeholders? Leave time at the end of the session to debrief and explore the feelings of the group about the activity.

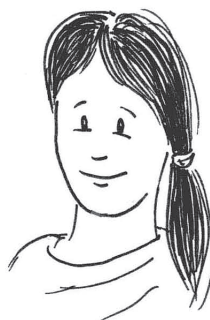
Hope means seeing that the outcome you want is possible and then working for it.

—BERNIE S. SIEGEL



Key Words

Consensus: a decision-making process in which all parties involved explicitly agree on the final decision and no one feels that his or her interests or values are violated.



Town Meeting! Deciding our Watershed's Future

The Salvadoran Centre for Appropriate Technology (CESTA) is a non-profit environmental organization that, in partnership with the municipality of San Antonio del Monte, has received funds to restore the Rio Los Milagros watershed. The first step in this process is to hold public consultations on what issues face people living and working in the area.

The forum will take place on _____ at _____
classroom between _____ and _____. CESTA will provide a
facilitator for this forum, Mrs/Mr. _____.

The Rio Los Milagros — or River of Miracles — watershed lies in the western part of El Salvador, in the Department of Sonsonate. It is a steep river that flows through agricultural land in the north where coffee and maize plantations grow, then winds south through smaller farms of maize, beans and bananas. In the lower third of the watershed, the river flows through the town of San Antonio del Monte. In total there are about 17,600 people living along the river, more than half in rural areas, and many businesses, schools and factories.

Many people make their living in the watershed, from farming and logging to ranching and fishing. Tour operators guide rafting trips through the upper sections of the watershed, while international tourists visit the estuary to see tropical birds and sea turtles. Two different species of endangered fish live in the watershed, as does one nesting species of endangered swallow.

People have been living in this watershed for centuries, but as the population grows, pollution, soil erosion, deforestation, and loss of aquatic life have all become issues of concern to the people of the area. The water in the river is no longer clean enough to drink.

At this town meeting the future of how we use, conserve and/or interact with our watershed will be decided.

Join us and make your voice heard! Hasta luego!



Characters List

CESTA Employee

The CESTA employee is a water specialist who has been working to clean up watersheds in El Salvador. This person's goal is to find out what problems and challenges face the local people in Rio Los Milagros, and to find or create appropriate technology solutions.

Plantation Owner Representative

The coffee plantation owner lives abroad and is not at this meeting, but appointed the plantation manager as a representative. The manager knows that the water levels in the river have decreased in recent years, and (s)he needs water for irrigating the coffee. This is the manager's biggest concern.

Villager # 1

This woman has come to the meeting because she is concerned about water pollution. She cannot afford to buy bottled water, so she drinks the water from the river. Her house is near a stand of forest, which she cuts on a regular basis for firewood to boil the water.

School Teacher

He too is very concerned with water quality. While he can afford to buy bottled water, many of his students cannot; they come to school sick with stomach problems from drinking dirty water.

Student

He has noticed that many of the farmers allow their cows to defecate in the river, which he and his friends used to swim in. He is also concerned because his family used to fish in the river but can no longer because there are no more fish.

Villager # 2

This woman wants to talk about washing in the river. There are certain places along the river that women have traditionally used for washing clothes, but these areas are becoming hard to reach because of erosion along the banks.

Farmer

The farmer is concerned about soil erosion. He has lost soil over the past few years and attributes this to loss of timber, overgrazing of cattle, and the practice of cutting trees for fuel. There is also very little water left in the river to irrigate his crops.

Fisherman

The fisherman is worried because there are very few fish left in the river; he is interested in cleaning the river. He helped CESTA when they tested the water of Rio Los Milagros for pollutants. The test showed high levels of fecal content from the waste water that leaches from latrines along the river's edge, as well as from fertilizers and pesticides used by the plantation owners.

Timber Company Owner

This person is not local, and does not live in the area. She is interested in continuing to log the area, but understands that there may be serious implications for the local people. Because of this understanding she has sent a representative to the meeting.

Mayor of San Antonio del Monte

The mayor is concerned about pollution and development of the watershed on the economy of the region. He doesn't want to lose the timber company or the plantations since they both bring money into the region, but he is aware of the health problems associated with polluted water sources.

Local Tourism Operator

Due to the loss of habitat from deforestation and water pollution, fewer birds and sea turtles are now living in the watershed. The tourists who used to come see them have stopped coming. The tourism operator is very worried about the many trip cancellations he has had lately.

Salvadoran Environmental Agency Worker

This person is a local environmentalist and wants the watershed restored to its natural state. She is concerned about the levels of pollution in the air and water and the level of deforestation, and is interested in exploring watershed restoration strategies.



ACTIVITY OBJECTIVES

In this activity you will:

- Understand the concept of appropriate technology
- Learn how appropriate technology can be used to help address watershed problems

TIME

Part I: 1 hour + research time

Part II: 1 hour

Total: **2 hours**

MATERIALS

- Poster paper and markers
- Access to the Internet

Key Words

Appropriate Technology:

CESTA uses the term appropriate technology to mean “affordable, low-tech, sustainable, locally-made solutions to local problems.” Some examples are: bicycle-powered corn grinders, medicines made from local plants, well pumps that can be used by people who have lost limbs, and using bicycles in the city instead of cars.

Grass roots: people and party organizations at the local level, especially in rural communities.

Activity 3: *Hope for the Future*

First of All...

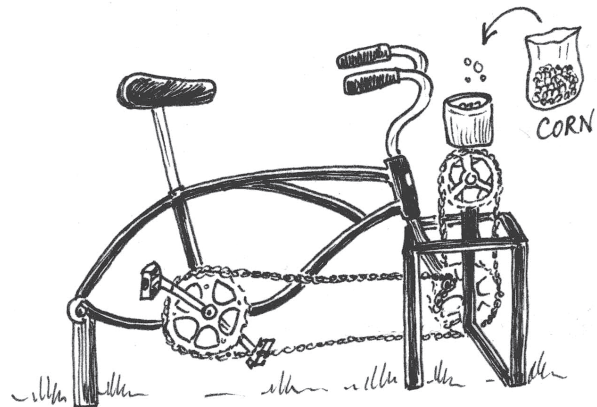
El Salvador was once an ecologically rich nation. Now it is one of the most environmentally-degraded countries in the world. Water pollution, air pollution and deforestation are but a few of the many environmental problems that plague El Salvador.

Why El Salvador? An Introduction to CESTA and GAIA

All in all, El Salvador has a lot of watershed issues to deal with, but steps towards positive solutions are being taken, and there’s hope for the future! Many people, in El Salvador and globally, are actively working towards addressing the problems that face the country. Here in B.C., this includes The GAIA Project. The GAIA Project is a partnership between the Sierra Club of British Columbia (SCBC) and the Salvadoran Centre for Appropriate Technology (CESTA). These organizations share common environmental and developmental goals and have, since 1991, fostered a unique partnership. CESTA is the largest environmental organization in El Salvador. CESTA’s goal is to work with communities to find appropriate technology solutions to the ever-increasing environmental problems in their small country. The GAIA Project works with CESTA to plan and implement many grass-roots sustainable development projects.

Though CESTA’s projects take place all over El Salvador, they have one thing in common. They are based on the idea that solutions to social and environmental problems can be found in the things and people around us.

In the following activity you will learn a bit more about how appropriate technology can be used to help watershed problems, both here at home as well as globally.



peddle-powered corn grinder



Activity Description

PART I

1. Hold a class discussion about the following question: What does technology mean? Discuss the various definitions of technology, listing them on the board. Try to think of (and list) as many examples of technology as you can, as well as how you use that technology in your daily life. Similarly, list as many water-related technologies as you can think of (these could include technologies for water testing, water collecting, generating energy, irrigating crops, etc).
2. Next, discuss the following question: What does appropriate technology mean? Again, list as many definitions as you can think of, as well as any examples and their uses. Try researching the topic of appropriate technology to get more information. A few web sites to check out are:

- Campus Centre for Appropriate Technology:
<http://www.humboldt.edu/~ccat/>
- Centre for Alternative Technology:
<http://www.foe.co.uk:80/CAT/>
- National Centre for Appropriate Technology:
<http://www.ncat.org/index.html>
- The GAIA Project: <http://www.gaiaproject.bc.ca/index.html>

How many examples of water-related appropriate technologies can you think of?

3. Compare and contrast the idea of technology with *appropriate* technology. Can you come up with a list of pros and cons for each? Create a comparative chart that displays what you have learned.

Creativity is the process of discovering something you did not start out with.

—COLLINGWOOD



PART II

1. Once you have a basic understanding of what appropriate technology is, read the letter *Greetings from El Salvador: A Letter Home* (right). This letter was written by Jennifer Hancox, a CESTA/GAIA intern working on a water quality project in El Salvador. Try to list all of the ways in which her project has affected the Salvadoran watershed she is working in. Consider the project from a cultural, social, economic and environmental point of view.
2. Now you are ready to start mind-mapping the concept of appropriate technology. For more information, read the info box *Mind Mapping 101* on page 56. Then, follow the basic steps for making a concept map listed in the info box. Remember to consider everything you listed during your discussion of appropriate technology as well as what you learned from Jennifer's letter home. Try to relate elements within your mind map back to the idea of appropriate technology as it could relate to a watershed.



Greetings from El Salvador: A Letter Home

Hí Everyone,

Sorry it has been such a long while since I have written. As per usual life has been keeping me very busy!

As you know I have been working for the past two years with CESTA (Centro Salvadoreño de Tecnología Apropriada). Work in El Salvador is very different than in Canada. I have learned to become more flexible — sometimes even the simplest tasks take five times as long to accomplish as in Canada.

When I first arrived two years ago, I helped CESTA to re-establish a water quality-testing laboratory. Their mobile equipment to test physical and chemical parameters had fallen into disuse, since no one knew how to use it. One of my first jobs was to revive the equipment, set up a basic but adequate laboratory space, and then train a number of staff members to maintain and use the equipment.

Then I helped to establish a water filter project to make water in several rural communities drinkable. The filters are made of concrete and have the capacity to filter water for one large family. The technology is pretty incredible — the filters are biological! The project has taken a long time to

get off the ground (just finding an uncontaminated source of sand in this country took months of searching!), but we now have built and installed 38 filters. I worked with Yolanda (one of CESTA's community promoters) to train people in the communities how to use and maintain the filters. Community members are very excited about the filters; their village wells are extremely polluted, but now they have a much safer source of drinking water! We proceed to monitor the use and effectiveness of the filters. Groups of community members have formed monitoring teams to ensure that everyone continues to use and maintain their filters well. We are also doing microbiological testing for fecal and total coliforms. So far, so good! Hopefully we will be able to find funding sources to continue working with the technology in other communities.

More recently I have started helping CESTA to establish an educational base for continued work with water. Along with my work colleague, Isabel, I have been designing interactive educational modules geared towards rural community members. The workshops include a diversity of topics including the hydrologic cycle, contamination and water shortages, how to measure water quality, water's affects on health and community-based solutions to water problems.

I hope that all is well with you. Take good care.

Hasta Pronto,
Jennifer





Mind Mapping 101

Mind mapping, also known as concept mapping, is a process in which concepts are identified, arranged in a hierarchical (pyramid) fashion, and connected with labeled lines. Concept maps are useful for showing the big picture, and for clarifying particularly difficult concepts.

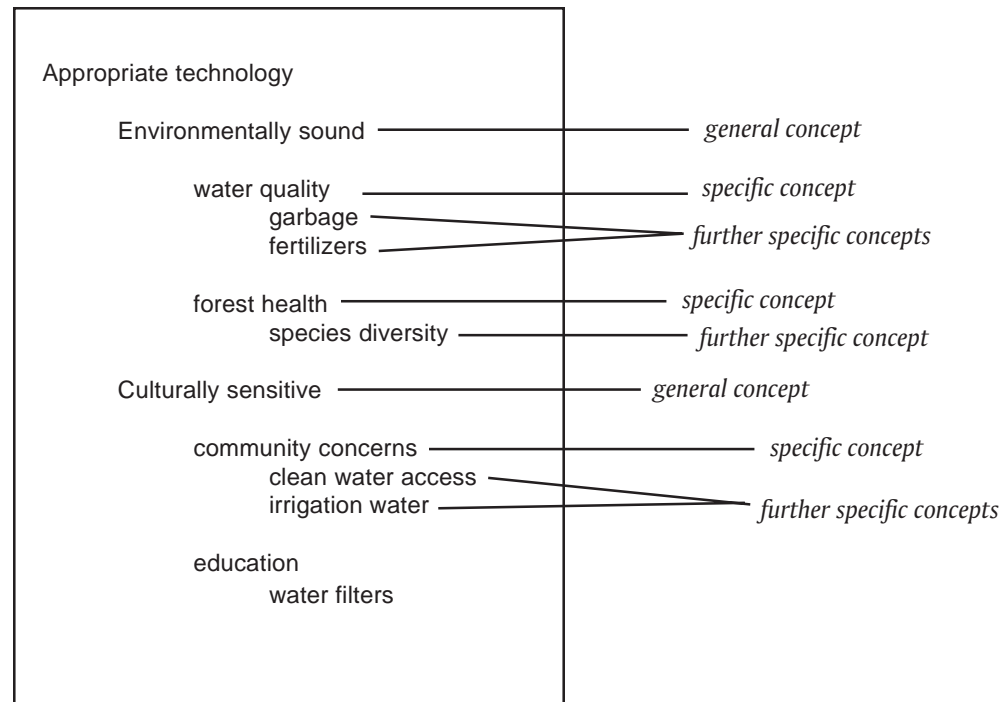
A mind map lets you rapidly produce an almost infinite number of ideas and at the same time organize them by placing each idea next to what it is related to. This makes a very powerful tool for creative writing or report writing, where it is important to get down all your ideas first. It is then easy to read the mind map and write a sentence or paragraph on each key word.

BASIC STEPS FOR MAKING A CONCEPT MAP

1. Brainstorm a list of general concepts relating to appropriate technology (i.e., *environmentally sound, culturally sensitive*). Once you have done this, try to list as many specific concepts as you can (i.e. *water quality, forest health*). List further specific concepts under the larger specific concept that each is related to (i.e. under *water quality*, you might have: *garbage, fertilizers*).
2. Now arrange your concepts accordingly, with the more general concepts at the top and the more specific concepts at the bottom. Concepts of the same general level should be at about the same height on the map. For example, *environmentally sound* would be at the top of the page, *water quality* would be slightly lower, and *garbage* and *fertilizers* would be still lower on the page.
3. This is where you start to link things up! Draw circles around your key concepts and consider how they connect. For each connection you see between concepts, draw a line connecting the concepts. Label the line with a description of how the two concepts connect. You may find you want to eliminate some of your original specific concepts as they no longer fit.
4. Finally, study your map. Are there any concepts or connections you want to add? Remove? Any areas you want to rearrange? Any links you want to redraw or any connections you want to rethink?
5. What did you learn through mind-mapping? Did you discover any new benefits of appropriate technology? How about connections? Were you surprised to see how various concepts linked together?
6. Write a short report outlining what you have learned about appropriate technology and how — when used in the right context — it can help address watershed problems.



Step No. 1



Step No. 3

