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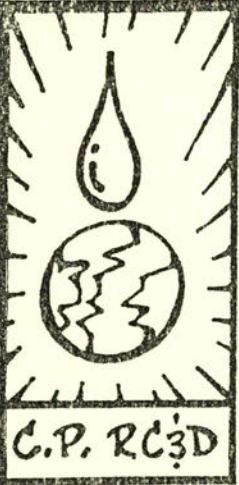
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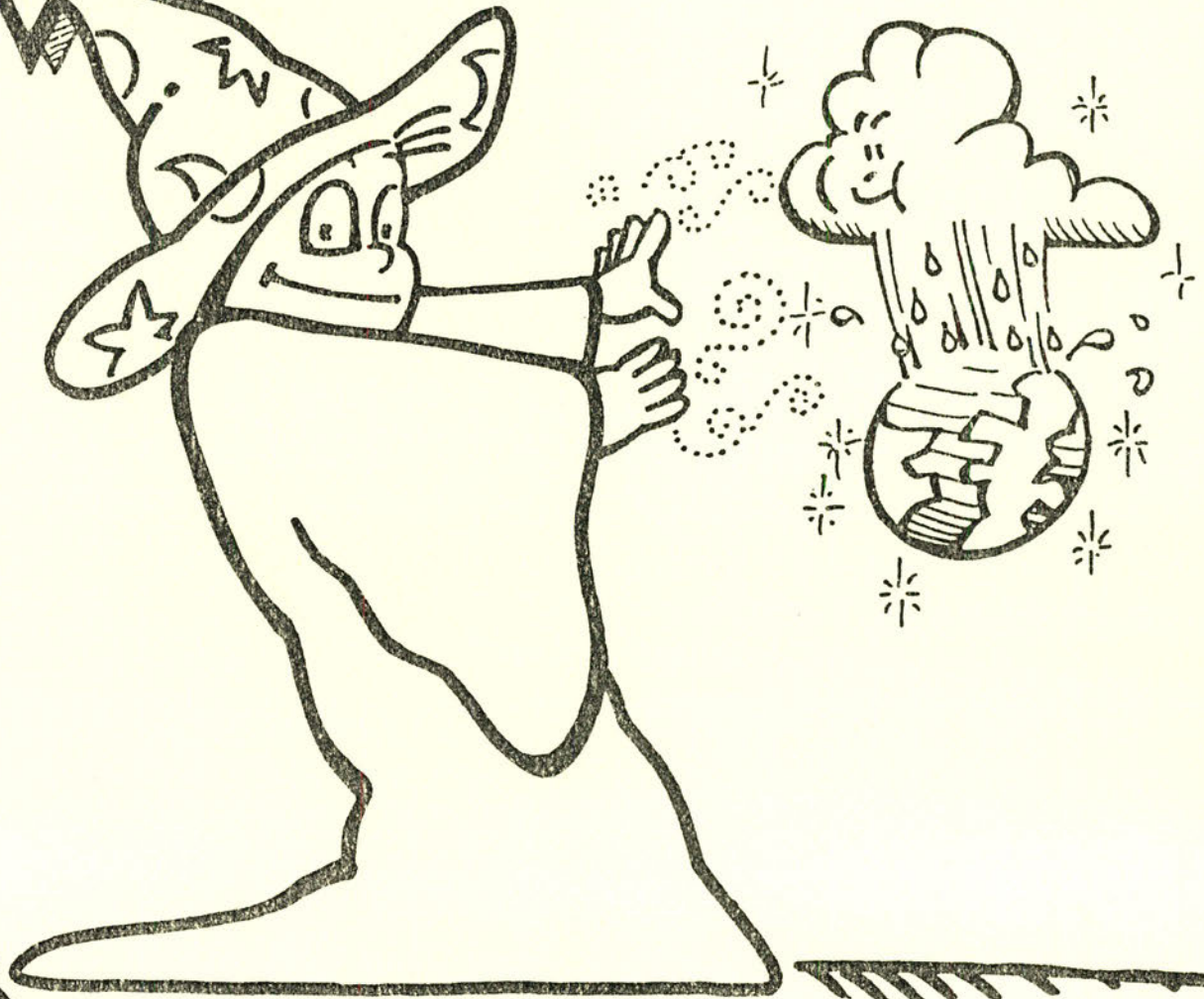
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WATER WIZARDS



CLINCH-POWELL RC3D COUNCIL

WATER WIZARDS

TEACHERS GUIDE

An environmental program for third grader focusing on water quality and related eco-issues.

"Localized efforts like Water Wizards are important in educating youth about environmental concerns."

Senator Albert Gore, Jr.
August 10, 1990
Clinch - Powell RC&D Office

FEATURES OF WATER WIZARDS

1. **Student workbooks** are provided. The workbook is divided into nine lessons, one for each full month of the school year. Each lesson plan includes background information on the topic, study questions and a fun activity called Water Wizard IWorkout. Vocabulary words are underlined in the text and defined in the glossary. The workbooks can also be used as coloring books.
2. **Teacher's Guide** provides step by step "how-to" instructions for each activity. Each lesson includes an experiment to illustrate the topic. Teacher manuals also include suggested extended activities to reinforce the topic.
3. **Classroom posters** are included to keep students excited about the program and to measure progress. The poster can be colored by students.
4. **Tee-shirts** will be provided to each student and teacher. We hope students and teacher will wear their shirts as an honor, especially on Water Wizard activity days. We want Water Wizards to feel special.
5. **Home Brew** extended learning sheets are designed to encourage students and parents to discover ways they can change their own lives and help save the earth. Home Brews can be pulled out of the workbook to take home.
6. **Graduation Certificates** will be presented to students at the end of the program to recognize their achievement.
7. **Timely** is the best way to describe the program. Not only is it very appropriate in today's world, but each lesson can be completed in 1/2 to 1 hour.
8. **Teacher training** to be provided on request. Or a trained instructor will train volunteers to help you.
9. **Evaluations** are important to measure the success of the program and to make revisions as necessary. You will be asked to make a short evaluation after each activity and then of the programs a whole at the end of the year. Please help us help you.

WATER WIZARDS

TEACHERS GUIDE

CONTENTS

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WATER WIZARDS

CONGRATULATIONS TEACHER!

You have been selected to participate in a special program in environmental education. We hope you will choose to participate.

Even though you are just one person, you have great influence over a whole classroom of people each year. You are one of the most important people in your students lives for nine months. They will remember you for the rest of their lives. What an opportunity to teach them how to be good citizens of the earth!

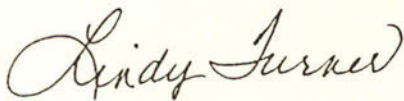
Water Wizards was developed especially for kids at this grade level, while they are so open to learning about the environment. Although the focus of the program is water, they will learn about many related environmental issues. But the best part is its FUN, for you and the students.

Water Wizards was also developed with you in mind. We appreciate the pressures you face in education and have tried to make the program as easy to incorporate as possible.

What is Water Wizards? It is a nine lessons in water quality awareness. Each lesson will focus on one aspect of water and will build on the knowledge gained from the previous lesson. Water Wizards incorporates science, math, reading vocabulary and critical thinking skills. The water issues they will be learning about are important here in our area, not just in a far away country.

Water Wizards is made possible by a grant from the State Planning Office to your county government to provide public education of water quality in the Clinch and Powell River basins in Tennessee.

We believe in Water Wizards and think you will also. It is our hope you will make it a regular part of your curriculum each year. If at any time you have questions, please call the RC&D office at (615) 828-5927 for assistance.



Lindy Turner
Project Coordinator
Route 2, Box 423
Rutledge, TN 37861

WATER WIZARDS

Dear Principal:

Your third grade teachers have been given an opportunity to participate in a program called Water Wizards. This program involves nine activities focusing on water but covering many other environmental issues.

Water Wizards is a complete program designed to be easy to incorporate for teachers and fun and educational for students. We believe students will feel special and honored to be involved and will begin to learn values they will carry with them until adulthood.

Protecting our environment is a very real problem today. These children will inherit an earth far more endangered than the earth of their grandparents. It is critical that today's children develop better habits than many of their elders and be equipped with knowledge to help them make intelligent decisions.

Time is a valuable commodity and we realize there are many requirements which must be met in third grade. For this reason we have kept the requirements at a minimum. Water Wizard activities can be completed in 1/2 to 1 hour each lesson.

We hope you will encourage your teachers to participate in Water Wizards. Attached is a list of the main features of the program. If you would like a copy of the teacher manual, please let me know and I will see that you receive one. You are also encouraged and invited to visit classrooms where Water Wizards are being taught. We welcome any input or suggestions you might have to improve the program.



Lindy Turner
Clinch-Powell RC&D Council
Route 2, Box 423
Rutledge, TN 37861
(615) 828-5927

Water Wizards

Dear Water Wizard Parent:

Your child is participating in a very special program this year called Water Wizards. As a Water Wizard, your child will be learning about the importance of clean water to his/her world and learn about many of the related environmental issues affecting water.

Your child will be given a workbook, a tee-shirt and a graduation certificate at the end of the year. Once per month Water Wizard activities will be held at school. Your child will learn about topics which are important here in your county and will participate in an experiment about water. He/she will be given a Water Wizard Home Brew sheet to bring home to share with you. Home Brew will highlight what the student has learned that day and includes ways you and your child can build on that knowledge. Our children will inherit an earth much less healthy than the earth of their grandparents. They will pay the price for the bad habits of their ancestors. It is critical that they be armed with knowledge and appreciation of their environment so that they can make informed decisions in their lives. As parents we can help our children by being involved and by setting a good example ourselves. Even small changes can make a difference when taken by many.

Children of this age are very open and eager to learn about the world around them. Let's help them all we can! This program is provided by the Clinch-Powell RC&D Council at no cost to you or your school system through a grant from the Governor's Planning Office to your county government. The Council includes Claiborne, Grainger, Hancock, Hawkins and Union Counties.

Teacher

"The Big Earth Burp"

Once upon a time, billions and billions of years ago, the earth was dry. There was no water. No life existed. This was when the earth was very young (in planet years)!

The center of the earth was very hot and unsettled like a whole world of volcanoes! It got so hot the earth "burped" to let some of the heat and gases out.

The hot gasses cooled off when they reached the atmosphere and then fell back to earth as rain. ALL the water the earth will ever have fell at that time.

So really there is no such thing as "fresh" water. All our water is billions of years old and has been recycled many times!

Our clean water is in trouble and needs your help or it may become extinct. Humans are polluting the water faster than the earth can recycle it to make it clean again.

Water Wizards can help save our clean water by learning about how water is polluted and telling others. They can also change things they do which pollute the water and ask people they know to change too!!

We created Water Wizards especially for you! So get ready to have fun learning about the water and what you can do to save it!!

Clinch-Powell

Resource Conservation and Development Council

Route 2, Box 423
Rutledge, Tennessee 37861
(615) 828-5927

WATER WIZARD

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WATER WIZARDS

WATER YOU KNOW

Purpose

The purpose of this activity is to help the student understand the importance of water to living things and the limited amount of fresh water available in the world.

Preparations

Review "Why is This Important" with students.

Materials: quart jar or empty mayonnaise jar, set of measuring spoons, eyedropper.

Experiment for "DO THIS..."

1. Explain to the children that an empty quart jar (1000 ml) will hold all the water on earth. Add water to the empty jar in the proportions that follow.
 - * 973 ml - The earth's oceans hold 97% of all water on the planet. Their saltiness greatly limits usefulness.
 - * 21 ml (1 1/2 tablespoons) - Ice caps and glaciers contain 2.1% of the earth's water. These sources of water are also inaccessible.
 - * 6.1 ml (1/2 tablespoon) - Groundwater (down to 13,000 ft) comprises 0.6% of the earth's water. Much ground water is too salty to be of use.
 - * 0.08 ml (2 drops) - Saline lake and inland seas account for 0.1% of all water on earth. Again, saltiness greatly limits usefulness.
2. Continue to add water to the jar. Most of the usable water on earth comes from the following sources:
 - * 0.09 ml (2 drops) - Freshwater lakes (like those in Tennessee) hold only 0.1% of all water on earth.
 - * 0.05 ml (1 drop) - Soil moisture accounts for 0.005% of all water on earth.
 - * 0.01 ml (1/5 drop) - The atmosphere at any time holds 0.001% of all earth's water.
 - * The rivers of all the world hold only 0.0001% of the water on earth. Such a small quantity that it cannot practically be added to the jar.
3. Despite the fact that we consider Tennessee as a state rich in water resources and relatively speaking it is, using the proportions from this demonstration, Tennessee would hold far less than a drop of the world's freshwater supply.

Reinforcement in "Can You Tell Me..."

Have students answer questions individually or as a group. Encourage Creativity. Let students complete Water Wizard Workout when time allows.

Extension

1. Review "Water Wizards Home Brew" and have students tear out and take home. Encourage students to share with their parents and incorporate activities into their daily life. Give students and opportunity to share results in class.
2. Show "Down the Drain" a 3-2-1 Contact videotape (available at your Board of Education Office).

"Water You Know"

YOU WILL LEARN

- * How water is important to living things and how much is drinkable.

WHY IS THIS IMPORTANT?

Have you ever been so thirsty it felt like your lips were stuck together? Have you ever seen the grass in your yard turn brown in summer? Have you ever seen a flower droop when you forgot to water it? These are some of the things that happen when people and plants need water.

All living things need water to survive. Your body is 75% water. In other words, if your body were a puzzle with one hundred pieces, 75 pieces would be water! People and animals can only live a few days without water. Plants need water too. They drink moisture from the soil through their roots. If the soil does not have water the plant may die. This is called a drought.

You may use water in many ways every day. Clean water is necessary for life, but not all water is clean. Water Wizards know why clean water is important and they teach others who don't.

Because the supply of water seems to go on forever, we forget that clean water is truly precious. At least 25 million people in poor countries die each year (three out of five are children) due to unclean drinking water and from diseases carried in unclean water supplies.

DO THIS...

Pay attention to your teacher and follow directions. You are going to discover how much water on earth is drinkable.

WATER WIZARD, CAN YOU TELL ME...

- * How water is important to living things?
- * How much of your body is made of water?
- * Eight ways that people use water?
- * Three ways that people can conserve water?

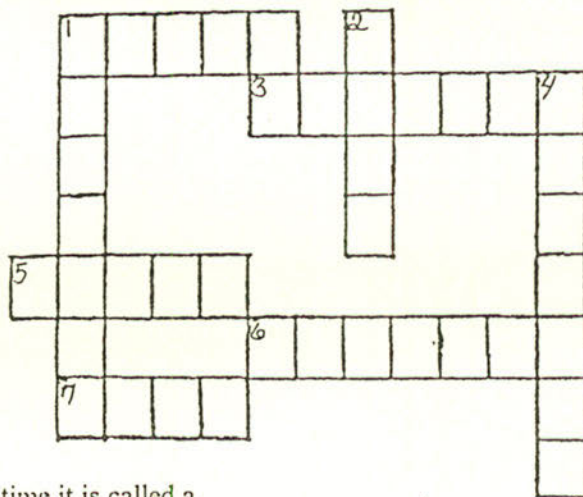
WATER WIZARD WORKOUT

ACROSS

1. Pets need fresh _____ to drink.
2. When it is very dry because it has not rained for a long time it is called a _____.
5. _____ are large plants that grow in the forest.
6. Daisies and tulips are two kinds of _____.
7. _____ is frozen rain.

DOWN

1. Water _____ know clean water is important.
2. Your _____ is mostly water.
4. If you need a drink of water, you are _____.



Water Wizards

"HOME BREW" WATER YOU KNOW

WATER WIZARD:

You learned a valuable lesson about water today. Share what you learned with your parents. Do you remember talking about these things?

1. Why water is important.
2. Your body is 75 percent water
3. Plants drink water through roots.
4. the many ways we use clean water every day.
5. How much of the water on earth is drinkable.

MORE WIZARD THINGS TO KNOW!

1. Name ten ways you and your family use clean water at home.
2. Find out where your water comes from.
3. Water comes out of the faucet very fast. The water wasted while you wait to get a cold drink could fill three gallon milk jugs.
4. If you leave water running while you brush your teeth, you can waste enough water to fill five gallon milk jugs.

WATER WIZARD WAYS TO SAVE THE EARTH!

1. If you like cold water to drink, keep a jar in the refrigerator instead of letting water run.
2. When you brush your teeth, just wet your brush and then turn off the water. Turn it on again when you need to rinse.
3. Think of other ways you can save water!

Easy, right? Not only will you save water, but you will also save the electricity it takes to run the pump to pump the water. Be sure to tell your family what you have discovered so they can be Water Wizards too!

DO YOU CARE ENOUGH?

The Clinch, Powell and Holston Rivers flow out of the rugged mountains of southwest Virginia into Tennessee. In Tennessee, all or portions of Claiborne, Grainger, Hancock, Hawkins, and Union Counties drain into these rivers. the Clinch and the Powell feed into Norris reservoir which was the first dam in the great Tennessee Valley system.

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____

somewhat effective _____

effective _____

ineffective _____

2. Please rate the difficulty level.

too advanced _____

appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____

no _____

4. Were the students motivated to learn more about the subject?

yes _____

no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____

no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____

Address (school) _____

Thank you for your help.

PLACE
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Clinch-Powell RC&D Council
Route 2, Box 423
Rutledge, TN 37861

TEACHER'S GUIDE

WATER WIZARDS

ACID RAIN

Review

Remind students of what they learned in the last activity.

Purpose

The purpose of this exercise is to show the student that gases dissolved in water can turn that water into an acid. Also, the student will learn that this acid is harmful to our environment.

Preparation

Review "Why Is This Important?" with students. Explain to the students that acid rain is a very real problem in east Tennessee. Gaseous pollutants (such as nitrogen oxide and sulfur oxide from auto and factory emissions) in the air, dissolve in rain as it falls. The resulting acid rain affects not only the plant life on earth but raises the acid level in lakes and in streams where it can be damaging to water life.

Materials

Small paper cups (enough for each child or divide into small groups)
Water
Red, blue, or green food coloring
Celery sticks (same number as cups, each stick 4-5 inches long).
Old white sock

Experiment for "Do This..."

Experiment #1

1. Give each student or small group a cup and fill with about two inches of water.
2. Add enough food coloring to produce a distinct color (explain this is acid water).
3. Make a fresh cut on each celery slice and put into water to represent plants and animals.
4. Let stand a couple of hours and then talk about the effects of acid rain on plants.

Experiment #2

1. Take class outside to see acid rain causing pollution at work. Place sock on the exhaust pipe of a car.
2. Explain that the sock will "catch" acid rain causing pollution from the car which enters the air as gas.
3. Turn on car and let run for one minute.
4. Carefully remove sock from pipe.
5. Turn sock inside out to see pollutants. If your exhaust system is working well, you won't see much on the sock. (That's good!) Encourage students to imagine this pollution going into our air from all the cars in your county, state, country, and our world!

Reinforcement in Can You Tell Me..."

Have students answer questions individually or as a group. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out and review "Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life. Let students share results in class.
2. Invite a forester or a wildlife officer to your class to talk more about the effects of acid rain on plants and animals.
3. Demonstrate the effects of acid rain (long-term) on limestone rocks and our buildings made from limestone products. For better illustration, shake enough gravel for each student in a bag containing half a box of baking soda. Give each student a rock and then let them use an eyedropper to sprinkle acid rain (half diluted vinegar) on their rock. Wow! Explain that this is what is happening to the Acropolis in Greece. Show students a picture of the Acropolis and point out where it is on the globe.

"Water Recycle"

YOU WILL LEARN...

***How the water cycle works.**

WHY IS THIS IMPORTANT

Water is recycled. Think about the water on the ground. The water on the ground evaporates when the ground gets warm. Think about the warm air rising. The air and water vapor expand and rise high. The air is cooled when it rises. When the air is cooled, the water vapor condenses make clouds. Cloud drops come together to make bigger water drops. The bigger drops are rain. Rain that falls on the ground is called precipitation. The water evaporates again. Some of the water seeps into the ground. This is called infiltration. The water left on the ground evaporates again. The vapor condenses. Rain falls to the ground. This is called the WATER CYCLE!

DO THIS...

Pay special attention to your teacher. Your teacher will make it rain right there in your classroom!

Complete the Water Wizard workout.

WATER WIZARD, CAN YOU TELL ME

- * Where rain comes from?
- * How clouds are made?
- * How plants affect the water cycle?

WATER WIZARD WORKOUT

Make as many new words as you can from the following word. Good Luck!

PRECIPITATION

WATER WIZARDS

"HOME BREW"

WATER RECYCLE

WATER WIZARD:

You learned a valuable lesson about water today. Share what you learned with your parents. Do you remember talking about these things?

1. How water from earth evaporates into the sky.
2. How the warm vapor condenses when it reaches the cool air.
3. How the condensed vapor falls back to earth as precipitation (rain or snow)
4. How the precipitation either infiltrates into the groundwater or runs off into the rivers and lakes.
5. This is called the Water Cycle.

MORE WIZARD THINGS TO KNOW!

1. Trees are our best friends when it comes to cleaning our air. They take in carbon dioxide (one kind of pollution) and use it to make oxygen which they release back into the air. What a Wizard trick!
2. It takes 500,000 trees to make the Sunday newspapers for just one Sunday in the U. S.!!
3. Rainforests are where most of our oxygen is produced and were half of the worlds different kinds of plants and animals live. Rainforests are very important in cleaning our air of pollution.
4. Rainforests are being destroyed at the rate of 100 football fields every minute! At this rate they will all be gone in your lifetime.

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Plant trees! Trees make oxygen, they provide shade and homes to animals and they are beautiful to look at.
2. Don't waste paper! It takes a whole tree to make a stack of paper four feet high. Each year our nation uses about 67 million tons of paper. That's 580 pounds per person!! Save trees by taking your old bags to buy new groceries. Write on both sides of paper. If your parents work in an office, ask them to save scrap paper with a blank side for you to use!
3. Tell your parents about the problems of the rainforests. Ask them not to buy products (except medicines) that come from destroying the rainforests. Some of your favorite fast-food restaurants use beef produced on destroyed rainforest land. Ask the restaurant manager (or get your teacher to help you write the President of the company and ask them) to buy American beef. Be sure to tell them why!

Take a deep breath Wizard, if you did these things there is more clean air to breathe!

DO YOU CARE-ENOUGH?

The Clinch and Powell Rivers played very important roles in our frontier history. They provided drinking water, fish, game transportation and fertile bottom land for growing crops for food and fiber. Daniel Boone even traveled these waters and forged trails for other early settlers.

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____ somewhat effective _____

effective _____ ineffective _____

2. Please rate the difficulty level.

too advanced _____ appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____ no _____

4. Were the students motivated to learn more about the subject?

yes _____ no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____ no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____ Address (school) _____

Thank you for your help.

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Clinch-Powell RC&D Council
Route 2, Box 423
Rutledge, TN 37861

TEACHER'S GUIDE

WATER WIZARDS

WATER RECYCLE

Review

Remind students of what they learned in the last activity.

Purpose

The purpose of this activity is to allow students to become familiar with the water cycle.

Preparation

Review "Why is This Important?" with students. Sketch on the blackboard a diagram of the water cycle. Discuss the diagram with the students.

Materials

water
hot plate
pan of water with lid
salt
small cup

Experiment for "DO THIS..."

1. Boil water in covered pot on the hot plate. Steam from the boiling water condenses when it hits the lid. The condensed water then falls back to be changed to steam again, completing the cycle. Relate what is happening to the water cycle of earth.
2. Add enough salt to make the briny. Relate to the oceans where most of earth's weather is formed. Let "rain" drip into cup. Let cool and then let a student taste to see if it is salty. Explain this phenomenon.

Reinforcement in "Can You Tell Me..."

1. Have students answer questions individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.
2. Have students construct a "water recycle" (terrarium) to take home.

Materials

clear, clean 2 liter plastic bottle with lid (label removed)
scissors
clear, wide packing tape
gravel
soils
peat moss
plants (ferns, mosses, etc.)
water

1. Cut bottles in half.
2. Cut two vertical slits (about 2" long) in top half so top can slide down inside or over bottom.
3. In the bottom of the container, put a 1-inch layer of gravel for drainage.
4. Add a layer of soil (about 3 inches).
5. Add a layer of peat moss.
6. Plant the plants, water lightly and replace top half inside bottom. Tape around the outside to hold together and make air tight.
7. Place in a sunny spot. (You should not have to add any more water). Tell students to watch for condensation over time as their water recycle grows.

Extension

1. Tear out and review "Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life. Let students share the results in class.
2. Invite a meteorologist to talk to the class about weather.
3. Watch "You Can't Grow Home Again" a 3-2-1 Contact video available in your Board of Education office.

"ACID RAIN"

YOU WILL LEARN...

- * How acid rain is made.
- * Where gases that pollute rain come from.
- * How acid rain is bad for our environment.

WHY IS THIS IMPORTANT?

All rain is not good for the earth. Acid rain can make trees, plants and aquatic life sick. If the acid is strong enough it may even kill the trees, plants and aquatic life. Acid rain is a problem in Tennessee.

What causes acid rain? Acid rain is created when rain falls through air pollution. The pollutants dissolve in the water and fall to the ground as acid rain. Plants and animals cannot stand too much acid. Our rivers and lakes are being damaged by acid rain.

What causes the air pollution? Much of it comes from the exhaust of automobiles and trucks. The exhaust turns into gases that float up into the sky. Some industries and manufacturing plants give off pollution too. Have you ever seen smoke come out of a smoke stack? This smoke adds to the air pollution.

Do you know someone who burns wood or coal to heat their home? This is also air pollution. Air pollution is a big problem. We can control acid rain by reducing air pollution.

DO THIS...

Pay close Water Wizard attention to your teacher and follow her directions.

WATER WIZARD, CAN YOU TELL ME...

- * What acid rain is?
- * What causes acid rain?
- * What acid rain could do to rivers, plants, fish and people?
- * Two ways that people can solve the problem of acid rain?

COMPLETE THE WATER WIZARD WORKOUT WATER WIZARD WORKOUT

ROCK
ACID RAIN
ATMOSPHERE
GASES
GARDENS
VINEGAR
BUILDINGS
VINEGAR
BUILDINGS
POLLUTION

O	T	R	O	G	N	Q	F	R	P	P
V	K	U	E	A	A	E	W	L	B	O
B	N	M	A	R	Z	Y	V	W	O	L
U	B	D	M	D	H	L	I	Q	E	L
I	R	I	V	E	R	S	N	R	X	U
L	S	A	K	N	B	X	E	O	I	T
D	J	T	D	S	E	H	G	C	K	I
I	D	C	L	E	P	D	A	K	V	O
N	Z	T	Q	S	U	F	R	U	M	N
G	C	E	O	A	C	I	B	V	A	G
S	J	M	S	G	C	P	H	G	S	Z
I	T	O	H	J	N	G	A	W	Y	P
A	C	I	D	R	A	I	N	R	F	X

Find the words listed above and circle them. Words may be upside down, diagonal or even backward! You can use each letter more than once. The first one is done for you.

WATER WIZARDS

"HOME BREW"

ACID RAIN

WATER WIZARD:

You learned a valuable lesson about water today. Share what you learned with your parents. Do you remember talking about these things?

1. How acid rain is made.
2. Where gases that pollute rain come from.
3. How acid rain affects plants and animals.

MORE WIZARD THINGS TO KNOW!

1. It takes about 400 pounds of coal to keep a single 100-watt light bulb burning for twelve hours each day for one year.
2. Burning the coal to make the energy to light the bulb makes about 90 pounds of pollution that causes acid rain.
3. It costs about \$39.00 to light the bulb for a year at 8.8 cents per kilowatt hour.
4. Ask a parent to explain these things to you. Then count all the light bulbs at your house (don't forget the porch). Multiply the number of lights times 90 pounds of pollution caused from lighting your house for one year. WOW!

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Turn the lights off when you leave the room.
2. Use daylight when possible. Sit by the window to get more light.
3. Use fixtures that use only one bulb. One 100-watt bulb uses less energy and gives off 20 percent more light than two 60-watt bulbs.
4. Encourage your parents to switch to new fluorescent light bulbs which will fit regular light fixtures. One 18-watt fluorescent bulb provides the light of a 75-watt incandescent bulb. Even though they cost more, it lasts ten times longer and a single bulb will keep more than 80 pounds of coal in the ground and out of the air. Ask your parents to help you understand this.

Your work is awesome!

DO YOU CARE-ENOUGH?

The Clinch and Powell Rivers are very important to everyone in East Tennessee, even those who don't live directly in the drainage basin. The rivers are recreation areas which provide important living conditions for many kinds of wildlife.

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____

somewhat effective _____

effective _____

ineffective _____

2. Please rate the difficulty level.

too advanced _____

appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____

no _____

4. Were the students motivated to learn more about the subject?

yes _____

no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____

no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____

Address (school) _____

Thank you for your help.

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Route 2, Box 423
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TEACHER'S GUIDE

WATER WIZARDS

"WATER STOPPERS"

Review

Briefly remind students what they learned in the last lesson.

Purpose

The purpose of this activity is to show the student that different soils affect the movement of water.

Preparation

Before doing this activity, review "Why Is This Important?" section with students. Be sure to include a discussion of types of soils, and how water is absorbed into the soil and moves, with time, around the soil particles. Let students feel, smell, and describe how they are alike and how they are different.

Materials

3 large paper cups	sand or loose soil
3 coffee filters	clayey soil
3 glass quart jars	gravel
rubber bands	measuring cup
water	scissors
thumbtack	
watch or clock	

Experiment for "Do This..."

Let students help with this activity as much as possible.

1. Using the thumbtack, punch several holes in the bottom and around the lower part of each cup
2. Place a square filter over the bottom of each cup so it covers all the holes. Secure the filter with a rubber band.
3. Place each cup in a jar. Label the cups A, B, and C.
4. Fill Cup A half full of dry sand, Cup B half full of clay, and Cup C half full of a mixture of sand, gravel, and clay. Pack.
5. Pour 100-ml of water into each cup. Record the time when the water was first poured into each cup.
6. Record the time when the water first drips from each cup. Note the appearance of the water.
7. Allow the water to drip until finished. At the end of this time, remove the cups from the glass jars. Measure and record the amount of water in each jar. (During waiting time, let students complete the workout.)

8. Fill out the following chart on the board with students. Discuss the results.

CUP	TIME		OBSERVATIONS
	WATER IN	WATER OUT	
A			
B			
C			

Reinforcement in "Can You Tell Me..."

Have students answer question individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out and review "Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life.
2. Have a soil conservationist visit your class to learn more about soils and how they are formed.

WATER STOPPERS

YOU WILL LEARN...

- * How to tell the difference between three types of soil.
- * How water moves through soil.
- * How to measure water.

WHY IS THIS IMPORTANT?

Have you ever thought about the soil you walk on in your yard? How does it feel when you squeeze it? Is it different from the soil at your school?

Soils are like people, they are all different. In the United States there are more than 70,000 different kinds of soil. Soils are made of three kinds of soil particles, sand, silt and clay. Water is also an important ingredient in soil. The water holds the soil particles together.

When it rains, water moves through the air spaces between soil particles. If a soil has many air spaces then the water drains quickly. If the air spaces are very small, the water drains very slowly.

DO THIS...

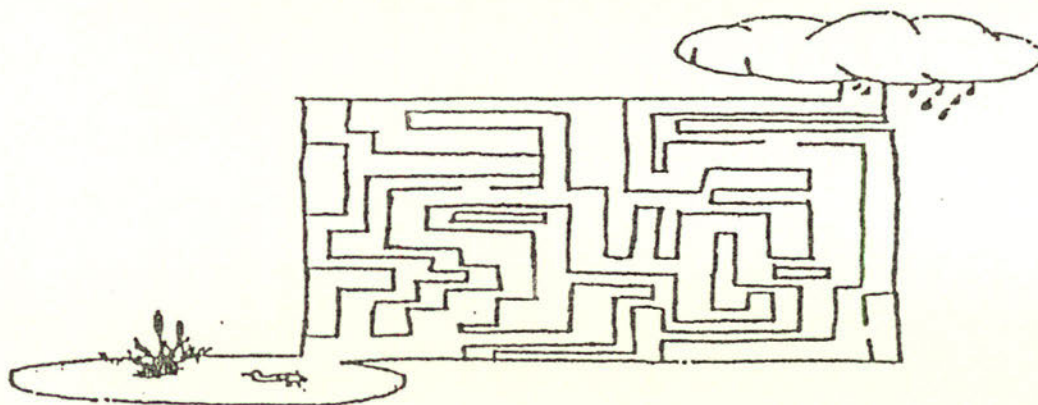
Pay close attention to your teacher. Your teacher will show you how water moves through soil. You are going to enjoy this!

WATER WIZARD, CAN YOU TELL ME...

- * How soils are like people?
- * What the three kinds of soil particles are?
- * If your yard stays muddy for a long time after it rains, what kind of soil is it?
- * What three types of soil look like?
- * What three types of soil feel like?

WATER WIZARD WORKOUT

Help the rain from the cloud get to the duck pond.



WATER WIZARDS

"HOME BREW"

WATER STOPPERS

WATER WIZARD:

You learned another valuable lesson about water today. Share what you learned with your parents. Do you remember talking about these things.

1. The different kinds of soils.
2. How water moves through soil.
3. How to measure water.
4. How water is an important ingredient in soil.
5. The experiment you conducted.

MORE WIZARD THINGS TO KNOW!

1. Tiny leaks can waste a lot of water. A dripping faucet will waste thousands of gallons of water in a year.
2. Twenty out of every hundred toilets in America are leaking water right now. In a year that is enough water to take three baths every day (22,000 gallons).
3. Look out your window the next time it rains hard. Where does the water go that falls on your driveway? Where does the water go that falls on the grass? How long does it take your yard to dry out? Do you think your soil has more clay or more sand in it? Ask your mom if she knows!

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Investigate all the faucets at your house (don't forget outside) to check for drips. Tell your parents what you find. Leaky faucets can be easily fixed and you will save thousands of gallons of water.
2. Ask your parents to help you check the toilet for leaks. Remove the lid from the toilet tank, drop about 12 drops of food coloring into the tank and replace the lid. Wait 15 minutes and then look in the toilet bowl. If colored water shows up you've found a leak! Be sure you don't flush the toilet while you wait. Tell your parents what you've found and ask them to fix the leak.

DO YOU CARE-ENOUGH?

The Clinch River contains many different kinds of shellfish and nearly 50 kinds of mussels. Some of these are endangered. Mussels die easily when the rivers and streams become polluted. The Clinch River is known worldwide for its wealth of mussels. A long time ago buttons were made from mussel shells and wood before plastic was invented.

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____ somewhat effective _____

effective _____ ineffective _____

2. Please rate the difficulty level.

too advanced _____ appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____ no _____

4. Were the students motivated to learn more about the subject?

yes _____ no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____ no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____ Address (school) _____

Thank you for your help.

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TEACHER'S GUIDE

WATER WIZARDS

AWESOME FILTER

Review

Remind students of the last activity and what they learned. Recall the movement of water around the sand, clay, and mixture.

Purpose

The purpose of this activity is to show students that filtration is a way water can be purified.

Preparation

Review "Why Is This Important?" section with students. Be sure to explain to students that this is one process which purifies groundwater naturally. Filtration is used by some cities as a water treatment process.

Materials

- 1 large glass or plastic funnel (or cut an empty milk jug in half and cut a hole in the lid).
- small pebbles
- coffee filter
- soil
- fine sand
- clean water
- muddy water
- narrow mouth glass jar

Experiment for "Do This..."

Let students help as much as possible with the activity.

1. To a large plastic or glass funnel add a coffee filter, a layer of small pebbles, then a layer of soil, and finally a layer of fine sand.
2. Pour some clean water through the funnel to allow the layers to settle and pack together.
3. Place the funnel in a narrow-mouth glass jar and pour some muddy water into the funnel. The layers will filter the mud, and clear water will pass into the jar.
4. Relate this to natural occurrence and to waste treatment plants. Explain that soil layers are nature's filter and are very important in recycling water and making it clean.

Reinforcement in "Can You Tell Me..."

Have students answer questions individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out and review ""Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life.
2. A water-treatment plant might be visited, or a worker might be invited to visit the class.

"AWESOME FILTER"

YOU WILL LEARN...

- * How water can be cleaned through filtering

WHY IS THIS IMPORTANT?

Can polluted water be turned into clean water? Yes, but it isn't easy. A process called filtration is used to remove the pollution from the water.

Filtration is a process where polluted water is poured through filters. As the water trickles through different layers of soil, the pollutants become attached to the soil particles. The water keeps draining and is clean after it moves through all the layers.

Many cities use filtration as a water treatment process. Water is used in homes and then goes into a sewer system. The sewer system takes the water to the waste water treatment plant. Chemicals are added to the water to kill all the bacteria. Then filtration is used to finish cleaning the water.

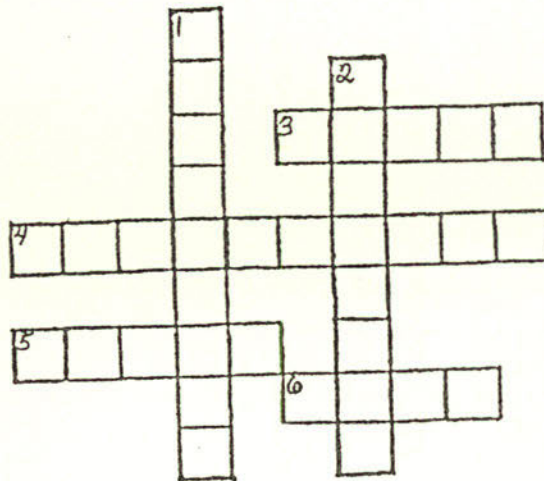
DO THIS...

Pay attention as your teacher shows you how water can be cleaned by filtering. Complete the Water Wizard Workout.

WATER WIZARD, CAN YOU TELL ME...

- * The meaning of the word filtration?
- * How cities can use filtration as a water treatment process
- * What a sewer system does?

WATER WIZARD WORKOUT



Across

3. We need clean _____ to drink.
4. A process called _____ is used to remove pollution from water.
5. A _____ system takes dirty water to the waste water treatment plant.
6. Chemicals _____ the bacteria in the water.

Down

1. A waste water _____ plant turns dirty water into clean water.
2. Chemicals are added to polluted water to kill _____.

WATER WIZARDS

"HOME BREW"

AWESOME FILTER

WATER WIZARD:

You learned a valuable lesson today. Share what you learned with your parents. Do you remember talking about these things?

1. How water can be cleaned through filtering.
2. How filtering is used in waste water treatment plants.

MORE WIZARD THINGS TO KNOW!

1. Ask your parents where the waste water from your home goes. If it goes to a septic tank, ask how it works.
2. The water you flush down the toilet starts out as clean drinking water. Each time you flush, you use five to seven gallons of fresh water!
3. A bath uses twice as much water as a shower. A five minute shower uses about 25 gallons of water. How much water does a bath use?

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Ask your parents for permission and help with this project. Wash out an empty plastic jug and put some rocks in the bottom. Fill it with water and set it in the toilet tank. Now your toilet will save between one and two gallons of water when you flush it! Make sure your jug fits without getting in the way of the arm and chain.
2. Take showers instead of baths, they use half as much water and they are quicker!
3. Tell your parents about "low-flow" shower heads. These shower heads add air to the water so it cuts the amount of water used and feels great. The next time they need to replace the shower head they might want to consider buying a "low-flow" head.

Keep up the good work Water Wizard, you're no drip!

DO YOU CARE-ENOUGH?

Sport fishing is the most popular outdoor activity in East Tennessee. Over 30 percent of the people who live here fish regularly. Each fisherman spends an average of \$220 per year fishing. That means that the Clinch and Powell Rivers bring MILLIONS of dollars into our local economy. That is another good reason to protect the quality of water in the Clinch and Powell Rivers.

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____

somewhat effective _____

effective _____

ineffective _____

2. Please rate the difficulty level.

too advanced _____

appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____

no _____

4. Were the students motivated to learn more about the subject?

yes _____

no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____

no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____

Address (school) _____

Thank you for your help.

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TEACHER'S GUIDE

WATER WIZARDS

DEADLY WATERS

Review

Remind students of what they learned in the last activity.

Purpose

The purpose of this activity is to allow students to become familiar with different kinds of pollution that can effect water, as well as animals and plants that live in water.

Preparation

Review "Why Is This Important?" with students. Tell the students that they are going to be divided into research teams and given a river to analyze for pollution (can be done individually).

Materials

- 10 different colors of construction paper (3 sheets each)
- writing or graph paper (in workbook)
- glue
- 1 teaspoon

Experiment for "Do This..."

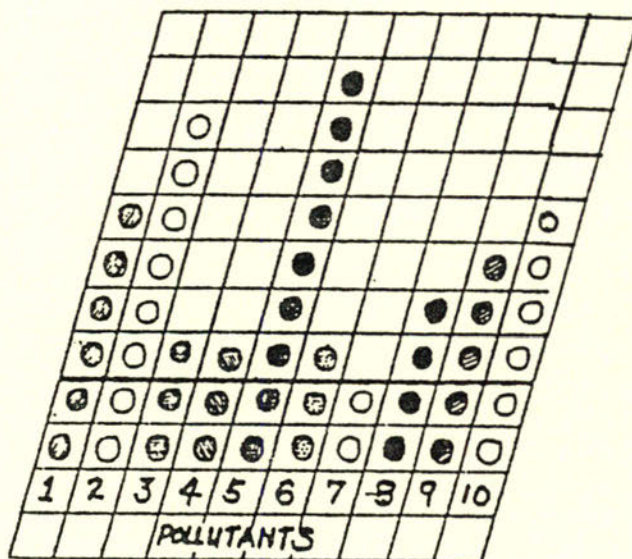
1. Make 100 tokens of each of the 10 colors of construction paper (1/2" squares). Put all the tokens in a container. This is pollution.
2. Cut out explanation of each kind of water pollutant and glue to a different color construction paper. These will be the pollution keys. Tape each key to the wall or blackboard at a level where students can read them.
3. Divide students into groups of three. Explain that they are scientists who are going to determine how polluted a river is. Explain that the graph represents a river. Have them name the river and list the names of the scientists who investigated the rivers.
4. Give each research team a teaspoon of pollution (construction paper). Each team will need access to a glue stick or glue.
5. The teams should separate the colored tokens into piles and then glue all squares of the same color in a row on graph paper to make a bar graph.
6. Have teams come one at a time to the pollution keys and read out loud about the biggest pollutant in their river. All the pollutants should be discussed by the end of the activity. Have teams label each pollutant on their graph.
7. When they have the bar graphs completed and have compared the team's results, tell them that any quantity above two units of each kind of pollutant is considered damaging to wildlife habitat. In their hypothetical rivers, what pollutants would be likely to cause the most damage to wildlife and wildlife habit. Give examples and discuss the kinds of damage that could be caused.
8. Post "rivers" in the hall or bulletin board so students can see how each river is polluted differently.

Reinforcement in "Can You Tell Me..."

Have students answer questions individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out and review "Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life. Let students share results in class.
2. Have water pollution specialist visit the class or have the class Adopt-A-Stream near school.



DEADLY WATERS

YOU WILL LEARN...

- * About different kinds of water pollution
- * How this polluted water affects the animals and plants that live in water.
- * Some ways that this pollution can be stopped.

WHY IS THIS IMPORTANT?

Did you know that all the water that will ever be on earth is on earth right now? All the rain and snow that falls on the land either soaks into the ground or is carried to the sea. All along the way, water evaporates or finds its way through plants and transpires back into the atmosphere to make clouds and precipitate again.

We know how important water is to living things. It is what keeps us alive. But each day humans damage the water supply by polluting it. This polluted water causes illness and death in wildlife. It can also cause illness and death in humans.

Many things can get into water and cause it to become polluted. Most of the pollution is caused by people being careless and not knowing the damage they are causing.

DO THIS...

Listen carefully to your teacher for instructions. You are going to be a scientist.

WATER WIZARD, CAN YOU TELL ME...

- * Five kinds of pollution that affect our water?
- * Five things you can do - starting today- in your own life to reduce the number of pollutants you add to the environment?

WATER WIZARD WORKOUT

P	A	Z	D	H	U	M	A	N	S	X
R	E	K	L	S	Z	P	F	Z	L	T
E	P	V	E	W	Y	R	I	E	A	R
C	R	Q	A	N	S	Z	L	P	M	A
I	D	M	R	P	N	A	P	O	I	N
P	H	B	T	L	O	I	Q	L	N	S
I	Z	U	H	U	W	R	S	L	A	P
T	O	I	R	P	A	P	A	U	N	I
A	G	V	X	S	M	B	I	T	Q	R
T	X	E	J	R	D	G	B	E	E	E
E	Y	T	A	B	Z	Y	A	P	U	S

Find these words and circle them. Words may be upside down, diagonal or even backward! You can use each letter more than once. The first one is done for you.

Snow	Evaporates	Animals	Earth
Precipitate	Pollute	Transpires	

WATER WIZARDS

"HOME BREW"

DEADLY WATERS

WATER WIZARD:

You learned a valuable lesson today. Share what you learned with your parents. Do you remember talking about these things?

1. The 10 different kinds of water pollution.
2. How polluted water affects the plants and animals that live in water.
3. Some ways that pollution can be stopped.

MORE WIZARD THINGS TO KNOW!

1. It is very easy to pollute water. For example, a gallon of paint or a quart of motor oil can seep in the Earth and pollute 250,000 gallons of drinking water. A spilled gallon of gasoline can pollute 750,000 gallons of water.
2. Litter and garbage often find their way into rivers and lakes and pollute the water.
3. Deer and other animals often cut their tongues on open cans. Animals are sometimes hurt when they eat cigarette butts, plastic wrappers or styrofoam.
4. When your parents were young they didn't worry about saving the environment because they didn't know it was in trouble. They developed some bad habits. They made as much garbage as they wanted, they wasted energy whenever they wanted and they used up the earth's resources very fast. Today they know better, but they still have a lot of bad habits. That's because it's hard to break bad habits.

WATER WIZARD WAYS TO SAVE THE EARTH!

1. If you know a farmer, ask him to please be careful when he throws away chemicals he uses. Even empty containers are dangerous, especially if they get in the water.
2. Be a nice neighbor. Pick up litter and throw it in the trash and definitely don't litter yourself. Keep our rivers and lakes clean enough for swimming!
3. Ask your family about adopting a stream. Your teacher can find out more about it.
4. Ask your grandparents what it was like to go shopping when they were kids. How is it different now? Which way is better for the environment?
5. Gently tell your parents about your concern for the environment. Don't bug them, but tell them how important it is to take care of the Earth so it will be healthy when you grow up.

DO YOU CARE-ENOUGH?

Water quality in streams and rivers depends on the actions of humans who live or play around them. Farming, timber cutting and mining for coal are practices which can kill a river. If these practices are done carefully using good conservation methods they will not harm the rivers.

Suppose that the number of people who are infected by the disease is given by the function $f(t) = 1000 - 100t + 10t^2$, where t is time in days. How many people are infected on day 10?

[illegible]

10

Pollutants

KINDS OF WATER POLLUTANTS

SEDIMENTS

Tiny pieces of soils wash from land and paved areas into creeks and streams. When a lot of pieces get into water, they are called pollutants. Sediments come from places where buildings are being built or where farmers are growing crops. Sediments can kill fish by covering fish nests and clogging the gills of some fish.

PETROLEUM PRODUCTS

Oil and other petroleum products like gasoline and kerosene get into water from ships, automobile service stations, and streets. Oil spills kill animals that live in or near water. Birds can not fly when oil covers their feathers. Fish are poisoned. Oil is very hard to clean up.

ANIMAL WASTE

Flooding or barnyards or stock pens can cause animal waste to flow into our streams and rivers. Not only does the water look ugly and smell bad, but it is also harmful to our wildlife.

MUNICIPAL WASTE

Human wastes that are not properly treated at a waste treatment plant may have a lot of germs in it that will make people sick. This usually happens when sewage gets into water. Normally sewage, or water and waste from toilets, is stored in a septic tank. Sometimes septic tanks fill up and sewage runs out into our water.

HOUSEHOLD WASTE

Detergents and pesticides can get into our water system. Many of these can kill fish and make humans sick. They cause water to taste and smell bad.

MINING WASTE

Some pollutants from farms is fertilizer. These pollutants cause streams to stay dirty. They also kill fish and plants that live in water.

FERTILIZERS

The main pollutant from farms is fertilizer. When it rains, the fertilizer is carried into streams and rivers. It uses up all of the oxygen in the water. Then the animals in the water die.

HEATED OR COOLED WATER

Electric power plants use a lot of water. They often return heated water to streams. This heated water has less oxygen in it, so it kills fish and other animals that live in water. Water that is colder than normal can also harm wildlife.

ACID RAIN

Animals and plants that live in water like clean water. When water gets too much acid in it, fish and plants die.

PESTICIDES

Farmers sometimes spray chemicals on weeds or bugs to kill them. Rain carries these chemicals into our streams, rivers, lakes and oceans.

WATER WIZARDS

ACTIVITY EVALUATION

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very effective _____ somewhat effective _____

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too advanced _____ appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

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4. Were the students motivated to learn more about the subject?

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5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

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6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____ Address (school) _____

Thank you for your help.

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TEACHER'S GUIDE

WATER WIZARDS

NATURAL FACT

Review

Remind students of what they learned in the activity.

Purpose

The purpose of this activity is for students to identify natural and man-made objects in the environment.

Materials

two signs labeled "natural" and "man-made"
samples of natural and man-made objects (leaves, sticks, soil, pebbles, feathers, cotton balls, shells, dried flowers, sandpaper, toothpicks, bottle caps, buttons, paper, plastic straws, styrofoam, pencils, pine cones, sponges, salt, etc.)
construction paper

Experiment for "Do This...?"

1. Place the "natural" sign and all the objects on one table and the "man-made" sign and man-made objects on another table.
2. On the chalkboard, make two columns labeled: "natural" and "man-made." Ask students to list some characteristics they can expect to observe from each object (i.e., hard soft, sharp, furry, smooth, shiny, scratchy, brown, red, green, blue, smelly, sweet, etc.).
3. Divide the class into two groups and let them handle the objects from the tables, one group handling only natural objects and the other group handling only man-made objects. Encourage them to touch and smell each object. Have students decide whether each object was made by nature or if someone made it. Explain to students that man-made objects that came from a natural objects. Ask students, if they can identify any man-made objects that came from a natural object and, if so, name them.
4. Ask students to name characteristics they observed. First, ask students to name characteristics of the natural objects and then name characteristics of the man-made objects. Add these characteristics to the list on the chalkboard. Discuss whether these characteristics show if an object is man-made or both and if some traits are common to both.
5. Repeat the procedure with the groups switching tables.

Reinforcement in "Can You Tell Me..."

Have students answer questions individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out and review "Water Wizard Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life.
2. Have students draw their left and right hands onto two pieces of construction paper or cardboard. Have them glue five man-made objects to one hand and natural objects to the other. Label, collect and display.

"NATURAL FACT"

YOU WILL LEARN...

- * The difference between natural and man-made objects in the environment
- * How to define an unsafe and a safe way to dispose of garbage.

WHY IS THIS IMPORTANT?

Most Tennesseans understand that natural resources are growing more scarce. The "ecological movement" that began in the 1960's began a far-reaching attempt to conserve what was given to us when earth was created. Nonrenewable resources such as oil and minerals are used to produce millions of products. Even renewable resources such as trees are carelessly wasted. When products are "thrown away", they are buried in landfills, ending the cycle and availability of renewable and nonrenewable resources.

Tennesseans "throw away" an average of six pounds per person per day. Of this six pounds of trash and garbage, about 40% is made from nonrenewable resources. Another 35% is made from paper which comes from trees (a renewable resource).

DO THIS...

Follow your teachers instructions. Put your thinking caps on!

WATER WIZARD, CAN YOU TELL ME...

- * Name five toys you have at home made from paper, plastic or metal
- * Name five toys you have at home made from natural materials.

WATER WIZARD WORKOUT

Make as many new words as you can from the following phrase. Good Luck!!!

RENEWABLE RESOURCES

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

WATER WIZARDS

"HOME BREW"

NATURAL FACT

WATER WIZARD:

You learned a valuable lesson today. Share what you learned with your parents. Do you remember talking about these things?

1. The difference between natural and man-made.
2. The difference between renewable and non-renewable resources.

MORE WIZARD THINGS TO KNOW!

1. Batteries that are thrown away contain mercury which is very bad for the earth and water.
2. Americans throw away 25 billion styrofoam cups every year. That's enough to circle the earth 436 times! Many styrofoam cups get into rivers and lakes where the fish may be harmed by eating them.
3. Many six-pack rings wind up in the water. Why? Sometimes careless people leave their garbage after picnicking, or camping or boating. Sometimes the wind blows them from the garbage to the water. Fish easily get caught by trying to swim through the holes. In the ocean, turtles eat them and then die because they look like jellyfish.

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Ask your parents to consider buying rechargeable batteries and a recharger. They are more expensive but they will last much longer.
2. Just say no to styrofoam. If you have a choice between styrofoam and paper, always choose paper. At least it is recyclable.
3. Before you throw away a six-pack ring, snip the circles so that no animal can get caught in it. Pick up any rings you see and do the same thing.

Your fishy friends will thank you for your good work Wizard!

DO YOU CARE-ENOUGH?

Our rivers and streams are important natural treasures. Without these natural waterways, the cost of getting water to our homes, farms and factories would be very expensive. Clean, running waters are necessary for good fishing, hunting, swimming, boating, camping, nature study and wildlife.

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____

somewhat effective _____

effective _____

ineffective _____

2. Please rate the difficulty level.

too advanced _____

appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____

no _____

4. Were the students motivated to learn more about the subject?

yes _____

no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____

no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____

Address (school) _____

Thank you for your help.

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Clinch-Powell RC&D Council
Route 2, Box 423
Rutledge, TN 37861

TEACHER'S GUIDE

WATER WIZARDS

SHOPPING FOR THE ENVIRONMENT

Review

Remind students of what they learned in the last activity.

Purpose

The purpose of this activity is to encourage critical thinking skills and demonstrate real life choices based on concern for the environment.

Materials

Items listed on teacher's product list (or substitutions as desired). Many stores will let you "borrow" the items for class so that no purchase is necessary. Student shopping list is in the student workbook.

Experiment for "Do this"

1. Lay out products on tables.
2. Direct students to make product choices they think are "best for the environment" and write their choice in the second column. They are not to write in the third column yet.
3. Encourage students to read labels to look for clues, but warn them this may not be enough to make an informed choice. They will need to rely on their knowledge and common sense.
4. Students should be encouraged to talk to others about their choices while they are shopping.
5. Shopping will take 20-30 minutes for most students, then the remainder of time can be used for discussion.
6. Score using summary.

Reinforcement in "Can You Tell Me..."

Have students answer questions individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out review "Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life. Let students share results with the class.
2. in another class period show "Bottom of the Barrel" 3-2-1 Contact Videotape (should be available in your Board of Education office).
3. Take shopping field trip. Visit a grocery store or toy department and let students make shopping choices based on amount of packaging, natural or man-made products, reusability, renewable/nonrenewable resources and amount of trash generated.

TEACHER'S PRODUCT LIST

<u>ITEM</u>	<u>PRODUCT CHOICE</u>
apples	canned applesauce - fresh apple
light bulbs	75 watt - 40 watt
candy	large bar, paper wrap - bag of small bars, foil wrap
snacks	large bag of chips - box of assorted individuals
bug killer	aerosol spray - fly swatter
soda pop	can - glass bottle - plastic
laundry detergent	large size - individual packages
milk	plastic jug - paper carton
picnic plate	paper - foam
napkins	cloth - printed - white
diapers	cloth - disposable - ultra thin disposable
dolls	all plastic body - Cabbage Patch or cloth body
matchbox cars	multi-pack - individual packaged car
batteries	rechargeable - single use
notebook paper	recycled notebook - unrecycled paper
sandwich container	sandwich bags - plastic sandwich box - wax paper
popcorn	microwave bags - large bag
fast food	paper wrap - styrofoam box
clothes	100 % cotton shirt - synthetic fabric garment (with label)
barbies	new barbie - new outfit
toy	battery operated - non-battery operated

PRODUCT DISCUSSION:

<u>ITEM</u>	<u>CHOICE</u>
apple	choose the fresh apple which requires much less energy to bring to you. score canned +2 fresh +1
light bulb	choose the 40 watt bulb which uses less energy. score 75 watt +2 40 watt +1
candy	choose the paper wrap which is biodegradable. score foil +2 paper +1
snacks	choose the large bag of chips which has less packaging. score individuals +2 large bag +1
bug killer	choose the fly swatter which may be reused many times and is not hazardous. score aerosol +2 swatter +1
soda pop	choose the bottle which may be reused many times or recycled. The aluminum can is from more scarce and expensive resource. The plastic bottle is the worst of all because it is very hard to recycle, uses oil to produce and is not biodegradable. score plastic +3 can +2 glass +1
laundry detergent	Choose the large size because there is less waste packaging and less energy to produce. The individual packages are the worst. Look for large boxes made from recycled paper (Proctor & Gamble products). score packets +2 large size +1
milk	Choose the paper carton because it is biodegradable. score plastic jug +2 paper carton +1

picnic plates	Choose the paper because it is biodegradable and does not use oil to produce. score foam +2 paper +1
napkins	Choose the cloth napkins because they are made from natural products and can be used over and over. White paper napkins are better than printed because the dye will pollute the water. score printed +3 white +2 cloth +1
diapers	Choose cloth because they can be used over and over without adding garbage. Ultra-thin disposables are better than disposables because they make half as much waste, but the plastic still uses oil in manufacturing. score regular disposable +3 ultra-thin +2 cloth +1
dolls	Choose cloth body doll because of energy required in plastics. score plastic +2 cloth +1
matchbox cars	Choose the multi-pack because of less packaging per car. score individual +2 multi +1
sandwich containers	Choose the wax paper because it is biodegradable. The box is better than bags because it can be used over and over. score bags +3 box +2 paper +1
popcorn	Choose the large bag because of less waste and energy to package. score microwave +2 bag +1
clothes	Choose the cotton garment because it is from a natural product and does not use oil. score synthetic +2 cotton +1
barbies	Choose the outfit because you probably already have the doll and she is plastic. barbie +2 outfit +1
toy	Choose the non battery toy to save energy and waste. score battery operated +2 non battery +1

SCORE:

The best score is the lowest.

None of the products were given an eco rating of 0 because they all require resources and energy to deliver them to you, so they all have some environmental cost.

"SHOPPING FOR THE ENVIRONMENT"

YOU WILL LEARN...

- * How to select products which are the least damaging to the environment.

WHY IS THIS IMPORTANT?

When choosing what to buy at the store, people make choices for many different reasons. Some always choose the least expensive item, while others (for whatever reasons) always choose the most expensive. Some look for the best value, some a certain brand, and still others will consistently choose the blue one.

It takes a lot of water to make natural and man-made products. But the water in man-made processes makes it very polluted. One of the biggest man-made products in our lives is plastic. It takes a lot of water and oil to make plastic. Oil is a nonrenewable resource buried deep in the earth. It took millions of years to make oil and when it is all used up it will be gone forever.

We use oil to make most of the things we use in our life. Plastics are in your toys, clothes, cars, food containers and the packages they come in. Plastics make our life convenient, but they are creating a terrible environmental problem. When we throw plastics away they don't go away. Scientists estimate that it will take a million years to evolve microorganisms capable of breaking down plastic.

Water Wizards can make a difference. You can learn how to make shopping decisions which are "best for the environment" and teach your family and friends how to do it too. It isn't always easy. Items which are best for the environment, are not always the "coolest" or "prettiest", so your decision may be difficult to make.

DO THIS...

You are going shopping to choose items "best for the environment." Listen to your teacher for instructions.

WATER WIZARD, CAN YOU TELL ME...

- * Five things made from or with oil?
- * Two ways to use less plastic
- * How does it feel to make a choice "best for the environment" if it is not the product you really want.

WATER WIZARD WORKOUT

CIRCLE THE HIDDEN WORDS.

T Z S E M Y R P P O H S
S U A A C W I Z A R D O
E N V I R O N M E N T N
B P E E U D N Q F A G O
C T O Y S C T S V T W I
H A I W E H R N E U B S
O P L A S T I C K R L I
O X I T R Z J N T A V C
S M O E O W D U M L I E
E P E R E G A K C A P D

BEST
STOP
PLASTIC
OIL
SAVE
WIZARD
TOYS

CONSERVE
ENVIRONMENT
NATURAL
CHOOSE
WATER
PACKAGE
DECISION

WATER WIZARDS

"HOME BREW"

SHOPPING FOR THE ENVIRONMENT

WATER WIZARD:

You learned a valuable lesson about water today. Share what you learned with your parents. Do you remember talking about these things?

1. Shopping Decisions affect the environment.
2. Plastic is one of the biggest man-made products in our life.
3. Oil is a nonrenewable resource used to make plastic.

MORE WATER WIZARD THINGS TO KNOW!

1. Oceans cover two-thirds of the earth's surface and produce most of the weather systems.
2. The dyes used to color paper towels, napkins, and toilet paper can pollute the groundwater.
3. Plastic and foam picnic items do not decompose when you throw them away. They can be bad for the environment. It takes a valuable resource called oil to make plastics and foam. We need to use oil wisely.

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Ask mom to buy plain white paper products like paper towels, napkins and toilet paper to keep dyes out of the groundwater. Better yet, use cloth napkins!
2. Ask mom to use reusable items for picnics. You can help by offering to help wash them!
3. Choose your fast-food wisely. Does the hamburger come packaged in paper or styrofoam? Paper will decompose and takes up less space in the landfill. Ask your parents or teachers to help you write a letter asking restaurants to use paper instead of styrofoam. The food tastes the same!!

Pat yourself on the back Water Wizard! If you did these things you are helping to keep our water cycle clean.

DO YOU CARE-ENOUGH?

Many things are damaging the water in the Clinch and Powell and other rivers of our area. You have learned about some of those in Water Wizards. Pollution caused by soil washing into the streams, chemicals getting in the water acid from air pollution, fertilizers, animal wastes, untreated sewage, oil, gas and coal mining wastes are choking the life out of the streams and rivers. People are causing these things to happen and people can stop them.

STUDENT SHOPPING LIST

SHOPPING FOR THE ENVIRONMENT

NAME _____

ITEM	YOUR CHOICE	ECO-RATING
APPLE		
LIGHT BULB		
CANDY		
SNACK		
BUG KILLER		
SODA POP		
LAUNDRY DETERGENT		
MILK		
PICNIC PLATE		
NAPKIN		
DIAPER		
DOLL		
MATCHBOX CAR		
BATTERY		
NOTEBOOK PAPER		
SANDWICH CONTAINER		
POPCORN		
FAST FOOD		
CLOTHES		
BARBIE		
TOY		
TOTAL SCORE		

WATER WIZARDS

ACTIVITY EVALUATION

We are interested in your opinion! Evaluate this activity and return by folding in half, staple and mail. We will use your comments to review and revise the Water Wizards program.

Activity Title _____

1. Please rate the overall effectiveness of this activity as an overall teaching tool.

very effective _____

somewhat effective _____

effective _____

ineffective _____

2. Please rate the difficulty level.

too advanced _____

appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____

no _____

4. Were the students motivated to learn more about the subject?

yes _____

no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____

no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____

Address (school) _____

Thank you for your help.

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TEACHER'S GUIDE

WATER WIZARDS

WICKED WASTE

Review

Remind students of what they learned in the last activity. Recall the many difficulties fish must avoid to survive.

Purpose

The purpose of this activity is to show the student how a landfill can pollute groundwater.

Materials

A clear, flat-bottomed pan or box (a deep baking dish, shoe storage box, clear loaf pan work well). Four or five sponges to cover the top, a water can, flour, clear jars, red and blue food coloring, a meat baster, and two quarts of sand. Note: The sand will need to be replaced each time the demonstration is repeated so figure total amount.

Experiment for "Do This"

To help you students visualize underground water and the problems with leaching landfills, try the following demonstration.

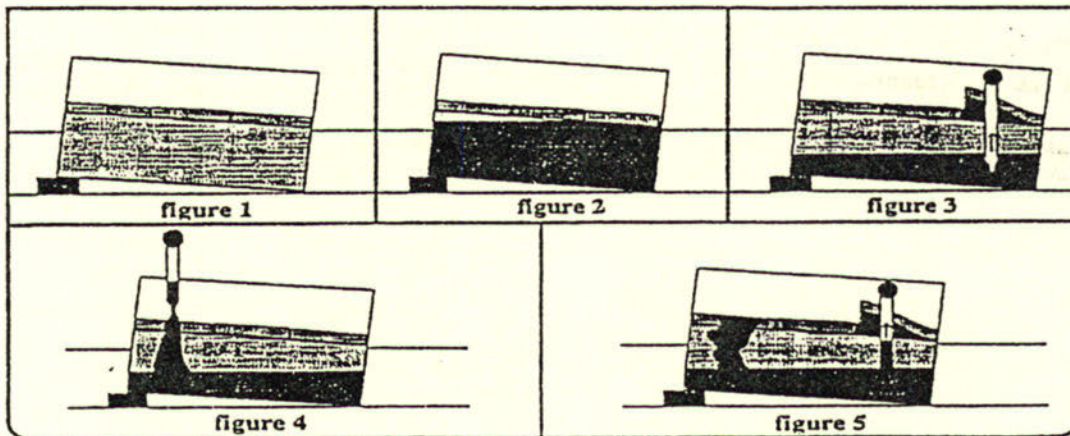
1. Fill clear container two-thirds full of sand. Place a layer of sponges top of sand to represent top soil. Soil is not used because it will discolor the water and prevent the food coloring from being usable. Elevate one end of the box to create a slope (see figure 1).
2. The layer of sand represents subsoil and the bottom of the pan represents bedrock. Use watering can to sprinkle a few cups of "rain" into the model. Note how the "topsoil" becomes saturated and then how the water percolates down to the underground water table (where sand and pan meet). Continue the "rain" until the model is saturated, but not standing in water (see figure 2).
- 2). Ask students why groundwater is not visible. (It is stored between the pore spaces in the sand.)
3. Use a meat baster at the lower end of the model to stimulate the pumping of water from a well. Pump some of the water and place in a clean jar. Some sand will also come up, but will settle to the bottom (see figure 3).
4. Designate the elevated end of the model as a town's landfill. Mix approximately 10 drops of red and blue food coloring separately in two jars with 1/4 cup of water. These solutions will represent some pollutants. Use the meat baster to drop samples of food coloring onto the landfill. As you add up each drop, you can incorporate a little humor by referring to familiar products which end up in landfills. You could mention the half-used you tossed out because you didn't like the color, or the triple strength spot remover which worked so well it made a hole in your shirt. Encourage the class to join in as you alternate red and blue drops onto the landfill (see figure 4).
5. Simulate rain by pouring water over the surface. As the food coloring soaks through the topsoil suggest that the rain is washing the pollutants away. Ask students where "away" is. Then use the baster to pump water from the well again. What has happened to the groundwater? Keep pumping water out of the well until the well runs dry. then add more rain to see if the water is purified when it is pumped from the well again. It will still be polluted. Make the point that once groundwater is polluted it is very difficult to clean it up (see figure 5).

Reinforcement in Can You Tell Me..."

Have students answer questions individually or as a group. Encourage creativity. Let students complete Water Wizard Workout as time allows.

Extension

1. Tear out and review "Water Wizards Home Brew" for students to take home. Encourage students to share with their parents and incorporate activities into their daily life. Let students share results with the class.
2. If a little landfill was made on the school grounds at the beginning of the year, dig it up and make observations.
3. Watch "The Rotten Truth" 3-2-1 Contact videotape (should be available at the Board of Education Office).



"WICKED WASTE"

YOU WILL LEARN...

- * How precipitation on a landfill can leach chemicals into the groundwater contaminating wells, ponds, and streams
- * How to define an unsafe and a safe way to dispose of garbage

WHY IS THIS IMPORTANT?

Where does your trash go after you throw it in the can? Does it magically disappear? No! After trash leaves your house, it goes to a landfill. A landfill is a very large place where all the garbage is buried in the ground. After it is buried in the ground do you think the garbage decomposes? Some of it will, but most of it won't. It just sits there and never goes away. The milk carton you threw away at lunch will still be the same and be in the landfill when you are an adult and have a child in the third grade!

When it rains on the landfill, the water travels down through the soil and the garbage, and becomes polluted water called leachate. Leachate is very dangerous to people and animals. The leachate usually stays in the ground but sometimes comes out on the ground surface. It is very important to keep leachate away from people and animals.

Landfills are safe places for garbage when they are operated correctly. It is very expensive to operate a good landfill, so we need to reduce our garbage so they don't fill up as fast.

Dumps are also places where garbage goes, but dumps are very bad for the environment. They pollute the water, they breed germs and diseases which can make people and animals sick and they attract rats which can carry diseases. Dumps are against the law and they are very bad. Water Wizards need to do their best to teach others not to dump illegally.

These are ways we can reduce the amount of garbage being buried in the landfill. We can reduce the amount of garbage we make by buying products which have less packaging or are made from all natural materials. We can reuse items instead of throwing them away. We can recycle items so that they can be processed into other goods we can buy again. When we do these things we will save landfill space and save precious natural resources and be good friends to the earth.

DO THIS...

Your teacher will help your class build a model of a landfill, so you can see how the groundwater becomes contaminated. Give your teacher all of your Water Wizard attention.

WATER WIZARD, CAN YOU TELL ME...

- * Where trash goes after it leaves your house?
- * What leachate is?
- * What happens when it rains on a landfill?

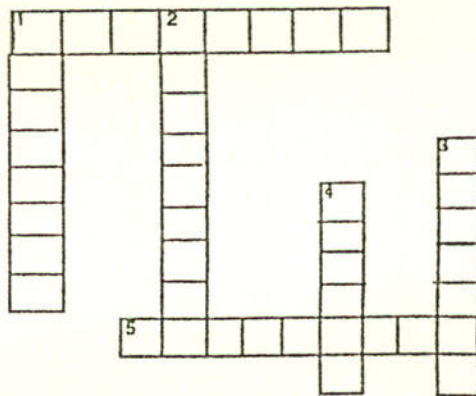
WATER WIZARD WORKOUT

Across

1. A _____ is where garbage is taken and buried in the ground.
5. We can reduce garbage by _____ aluminum cans and other products.

Down

1. _____ is a very polluted liquid which flows out of landfilled garbage.
2. Garbage takes many years to break down, or _____ after it is buried.
4. _____ are the biggest polluters.



WATER WIZARDS

"HOME BREW"

WICKED WASTE

WATER WIZARD:

You learned a valuable lesson today. Share what you have learned with your parents. Do you remember talking about these things?

1. How precipitation on a landfill can leach chemicals into the groundwater and pollute wells, ponds and streams.
2. The difference between a landfill and a dump.
3. What kind of things decompose and what kind of things don't.

MORE WIZARD THINGS TO KNOW!

1. Recycling is a very good way to reduce the amount of garbage we throw away.
2. Recycled products are made from products which were used before.
3. Sometimes you pay as much for the package your new toy comes in as you do for the toy!
4. Each year, Americans throw away 18 billion disposable diapers, 1.7 billion pens, 2 billion razors and blades and 220 million tires. Enough aluminum is thrown away to rebuild the entire U. S. commercial airline fleet every three months. Ask your parents to read and think about this with you.
5. Disposal of plastic waste is one of the biggest problems. It doesn't decompose and it takes up valuable landfill space. It also can't be easily recycled. Plus, it is made from oil, a decreasing and very valuable resource.

WATER WIZARD WAYS TO SAVE THE EARTH!

1. Ask your parents to help you start a recycling program at home. Products which are easily recycled are aluminum, glass and cardboard. One recycled can may save enough energy to power your television for three hours. One recycled glass jar will save the energy to burn a light bulb for four hours.
2. Encourage everyone you know to buy recycled products like recycled paper and aluminum cans. These products may be hard to find and a little more expensive, but remember you are saving the earth. When more people buy recycled, the price will go down.
3. Don't judge a toy by its wrapper! Choose the one with less garbage to be thrown away. It's probably cheaper too! Ask you mom to do the same thing.
4. Try to buy and use fewer disposable items. Buy products in recyclable containers and then recycle them.
5. Try to use plastic wisely. It is a very valuable and useful product, but we are literally burying our planet in it. Why not use more paper milk cartons? And returnable soda bottles? Ask your grocery store manager about this!

You did it Water Wizard! You have started doing some things to save the environment. You should feel very proud. Keep up the good work and keep telling others what you have learned. Mother Earth says thank you Water Wizard!!

DO YOU CARE-ENOUGH?

Tell others about the value of the Clinch and Powell and other rivers. They may not realize just how special and important they are. Watch out for the rivers and do your part to take care of them. If you see people dumping garbage or littering, ask them nicely not to and explain why. Each one of us can make a big difference!

WATER WIZARDS

ACTIVITY EVALUATION

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Activity Title _____

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very effective _____ somewhat effective _____

effective _____ ineffective _____

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too advanced _____ appropriate _____

too easy _____

3. Were the materials presented in an appropriate format?

yes _____ no _____

4. Were the students motivated to learn more about the subject?

yes _____ no _____

5. Did the experiment illustrate the lesson appropriately and did it produce the results expected?

yes _____ no _____

6. Please make any suggestions you have to make this activity more effective or comment on the value of the lesson.

Name _____ Address (school) _____

Thank you for your help.

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GLOSSARY

Aquatic - Growing or living in water.

Bacteria - A large group of one-celled plants which may cause disease.

Condense - To become smaller.

Decompose - To rot or decay.

Drought - Dryness, a bad need of water.

Evaporate - To escape as a vapor.

Evolve - To develop by the use of natural resources.

Filtration - A process where polluted water is poured through filters to clean it.

Infiltration - To pass through or into as in filtering.

Leach - To percolate through something.

Leachate - Fluid which has percolated through something, especially garbage.

Microorganisms - Very small organisms, sometimes hard to see with the naked eye.

Natural Resources - Materials and energy resources not made by man.

Nonrenewable - Not capable of being restored because they are replaced more slowly than they are used.

Oil - A nonrenewable natural resource taken from deep in the earth. Very valuable in making products such as gas and plastics.

Precipitate - To condense vapor and fall as rain or snow.

Recycle - To separate material from waste so it can be used again.

Reduce - To make smaller, as in making smaller amounts of garbage through careful product buying.

Renewable - Capable of being restored and can be replaced.

Reuse - To use again or find another use for.

Transpire - To evaporate from plant cells.

Water Cycle - The recycling process water goes through from the sky to the earth and back to the sky.

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We wish to gratefully acknowledge the materials listed in the reference section in the back of the student workbook. Project C.E.N.T.S. includes many of these and other materials used for in-service training to teachers through the Tennessee Department of Education.

Special thanks to Lorie Whitt, Betty Sorrell, Pat Cumby and Duane Burks for their suggestions and assistance in the development of this project.

1994 Water Wizards curriculum revisions were completed by the AmeriCorps Environmental Educator.

"All programs and services of the Clinch - Powell RC&D Council are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status or handicap."

The Tourist

May 1995

A Publication of

Volume 1 Issue 2

AmeriCorps and Clinch-Powell Resource Conservation and Development Council

AmeriCorps Team Finalizes TN Wilderness Route

Profit From Your History

Tourism professionals from the Clinch-Powell region met recently to discuss further plans in the development of the Tennessee Wilderness Road driving tour. AmeriCorps members of the Clinch-Powell Specialty Recreation and Tourism Initiative hosted their

"The main trail will attract visitors here initially, and offshoots from the trail will get them into surrounding counties."

fourth committee meeting, at the historic Grainger County Jail in Rutledge on March 29. The featured speaker was Lee Curtis,

Director of Heritage & Community Development for the Tennessee Department of Tourist Development. She emphasized the importance of taking a regional approach to tourism. "Tourists don't recognize county lines as much as regions," she said. She stated that the payoff for towns with a "good neighbor" policy is much higher than for towns or counties that compete for tourists. The planned Tennessee Wilderness Road map follows this approach, as

it covers all counties in the Clinch-Powell area. "The main trail will attract visitors here initially, and offshoots from the trail will get them into surrounding counties," said Lindy Turner, Project Director of the Clinch-Powell Resource Conservation & Development Council.

The Wilderness Road is a multi-state concept, based on the historic routes followed by the pioneers. Kentucky, Virginia, and North Carolina also have developed sections of the Road, making it important to work with these states in the promotion of the driving tour, and in the coordination of road signs. Dan Kidd, Kentucky Coordinator of Cultural & Heritage Tourism for the Kentucky Department of Travel Development, was a second speaker at the meeting. He presented slides on the Daniel Boone Heritage Trail, which focuses on the contributions of pioneer Daniel Boone and his travels through Kentucky. The Tennessee Wilderness Road will trace historic pioneer paths that follow today's U.S. Highway 11-W and 25-E. The map is being done by the AmeriCorps tourism initiative team, and will be ready for printing in

(continued on page 3)

The Clinch-Powell Regional Historical Society Seminar was held on

March 24, 1995 in Rutledge. Speaker Billie McNamara, an expert in genealogical research, discussed numerous ways to assess and utilize a county's historical resources. These resources are a key factor in attracting the tourist who is visiting an area to look up family roots.

A good index of county genealogical resources is an important tool for providing the tourist with a clear idea of available information. "A cross-county index is more marketable," McNamara said. "It should include all counties in the area. A good index of contents in the guide is also important, especially one that cross-references the information well."

The following should be included in a good county historical index:

- 1) A brief history of court records
- 2) A brief history of the region, and of each county, to show how counties are interrelated historically.

(continued on page 3)

Dates of Interest

June 10-11- "Cumberland Gap Folk Fest & Heritage Days," (For more information- 626-7887)

June 10-11- Greater Tri-Cities Area All American Soap Box Derby- Mt. Carmel (Information- 357-7311)

July 4th Celebrations- Rogersville (For more information- 272-7497) and Surgoinsville

July (last weekend)- Grainger County Tomato Festival and Mt. Carmel Block Party

Recreational Resource Guide Map Planned

A comprehensive natural and recreational resource guide map is being developed by the Clinch-Powell AmeriCorps Tourism Team as part of an initiative to increase the visibility of tourism resources within the region. The guide map will include a locational index that will aid visitors in identifying general features of interest such as rivers, lakes and campsites, but will also feature specialty recreation information for target audiences such as spelunking, fishing, mountain biking and photography clubs. To date, most marketing campaigns have focused primarily on historical attractions with the result that many of the region's natural resource opportunities have gone virtually unnoticed. The Clinch-Powell Resource Conservation and Development Council has recently completed the task of compiling a comprehensive nature-based and recreational resource inventory which has proven instrumental in identifying the wealth of such resources within the region. The design and publication of a regional natural and recreational resource guide map will greatly increase visitor awareness of these opportunities and serve to generate additional tourism revenues for the region. The Clinch-Powell Specialty Recreation and Tourism Initiative has recently been approved for a United States Forest Service Economic Recovery Grant in the amount of \$1500.00 that will be used to help cover expenses associated with map layout, design and project administration costs. TVA's Community Development Division has tentatively agreed to assist in the future printing of this important resource. The guide map should be printer ready by July 1, 1995 and is an important step towards the development of a sustainable nature-based tourism industry for the region.

GRAINGER * COUNTY



TOMATO FESTIVAL

AmeriCorps Works on New Logo for Tomato Festival

AmeriCorps members from the Clinch-Powell RC and D Council have been serving as members of the Grainger County Tomato Festival Committee. The members have been working with Sarah Fennell of the Grainger County Chamber of Commerce to improve the marketing/promotion and create a new logo for the festival.

The festival will be held the last weekend in July and will feature music, crafts, games, a beauty pageant, and the Great Grainger County Tomato Wars.

AmeriCorps and Historic Society to Restore Hancock Old Jail

The Clinch-Powell Resource Conservation and Development Council AmeriCorps Tourism Development Team have partnered with the Hancock County Historical Society and Chamber of Commerce to restore the Hancock County Olde Jail in Sneedville, TN.

The architectural redesign plans for the building will be done by AmeriCorps Vista members from the East Tennessee Community Design Center. Grantwriting and technical resource assistance for the project is being provided by the Clinch-Powell AmeriCorps Team.

The project is expected to be completed by the spring of 1996 in time for the 1996 Summer Olympic Games in Atlanta and the Tennessee Bicentennial. The restoration of the old jail is part of the Wilderness Road development plan for the Clinch-Powell Region.

Technological Approaches to Tourism Marketing- 25E

The 25E Tourism Committee held a meeting on Tuesday, May 9 at Walter State Community College to discuss current developments within the field of computer technologies and their potential applications in the marketing of rural tourism. Representatives from US. Internet were on hand and discussed the advantages of marketing the 25E region by establishing a home page on the World Wide Web. A home page would allow an estimated 48 million Internet users to access information on the region in their search for potential vacation destinations. The advantage of advertising using the Internet is related to its increasing popularity as a source for travel and destination information and the ability to rapidly update information in a more timely and less capital intensive manner than traditional marketing methods such as brochures, magazines advertisements etc. Concerns were expressed by some committee members as to the effectiveness of using a home page to market the region and the difficulties in measuring returns and target audience participation. Other topics of discussion included current developments in the field of video-conferencing and the installation of computers in the region for automated tourism information distribution.

The 25E Steering Committee is comprised of public and private entities interested in tourism along the 25E corridor. Representatives are from Claiborne, Hamblen, Grainger, Hancock, and Jefferson Counties. The 25E steering committee is working in partnership with the Clinch-Powell Specialty Recreation and Tourism Initiative to develop and promote sustainable economic development throughout Middle East Tennessee.

Restoration of Speedwell Academy Underway Profit...

Speedwell Academy, a 19th century schoolhouse located in southeastern Claiborne County, is currently undergoing historic restoration thanks to the efforts of the Speedwell Academy Board of Trustees and concerned citizens. The academy was built in 1827 by George Shutter, a German native who migrated to Tennessee from Pennsylvania in the early 1800's. The two story Barrochial structure was originally founded as the Powell Valley Male Academy and served as a college preparatory school for area males who would provide labor on the Shutter Farm in exchange for tuition and board. The name of the institution was later changed to Speedwell Academy and during the course of its rich history has served as schoolhouse, church, Confederate headquarters and Civil War hospital. By the 1970's the building had become vacated and fell into disrepair. Restoration of the structure began in 1993 due to the concerns of the Academy's Board of Trustees and area citizens. The East Tennessee Community Design Center has performed extensive historical studies on the structure and has helped to

formulate restoration plans for the project. James Adams, an architect from Middlesboro, KY whose grandmother attended the Academy, has graciously donated his time and services, providing much needed assistance to the restoration. The Academy was placed on the National Register of Historic Places as of February 16, 1995, thanks to the persistence of Ms. Wilma Rogers, the Speedwell Board of Trustees, and Kim Murphy of the East Tennessee Community Design Center. Restoration work is proceeding at a breakneck pace thanks to the dedication of all involved. Individuals and/or organizations interested in donating time/resources should contact Ms. Wilma Rogers at the following address:

**Speedwell Academy
c/o Wilma Rogers
Old Highway 63
P.O. Box 67
Speedwell, TN 37870.
Phone- (615) 562-1280 or
(615) 869-3414**

3) Maps, both old and new, to reflect the changes that have occurred in an area. Also include maps that show changes in county lines. This informs the researcher to look at records in nearby counties, because records may shift to other counties when county lines change.

4) An inventory of photos available in each county, and their location.

5) Inventory of county-related records located elsewhere, because few counties have all their records, due to fires, changing county lines, etc.

"Anything you can do to make their research easier, even when research is done from a distance, will encourage the researcher to write and thank you. This in turn can lead to a correspondence in which you can tell them what other resources are available in the county. In this way, you become a promoter of your county. 'If they come in for a hamburger, sell them fries as well.' Letting them know what other resources are available can encourage sales of those items."

Wilderness Road...

June, 1995. It will include area shopping, food, lodging, and recreation opportunities. Other committee members present included Marvin Jeffries of the Union County Business and Professional Association, Kevin Collins, Grainger County Historical Society, Kay Aker, Hancock County, Carolyn Elder, Rogersville Chamber of Commerce, Don McLain, 25-E Steering Committee, Agnes Gorham, Director of the Middle East Tennessee Tourism Council, Beulah Ferguson, of the First Tennessee Development District, and Claudia Moody, Director of the North East Tennessee Tourism Council.



For more information, call 357-7311.

Last Weekend in June:

Annual Ice Cream Supper.

Surgoinsville. Surgoinsville Elementary School. Saturday night- 5:30 to close. Local bands, clogging, dunking machine, food and drinks, cake walks.

For more information, Hugh Jarvis 345-3585 or Mercel Carpenter 345-2907.

July:

Rogersville Independence Day Celebrations- July 4th

Mt. Carmel Block Party- July 21st

Grainger County Tomato Festival and Tomato Wars- last weekend in July

Area Festivals and Celebrations

Second Weekend in June:

Cumberland Gap Folk Festival and Heritage Days.

For more information, Pam Atwood at 626-7887.
Greater Tri-Cities Area All American Soap Box Derby.

Mt. Carmel at East Main Street. All day Saturday.

Cultural and heritage tourism key to economic development

A number of factors combine to make history "hot" in the gigantic tourism industry. A national travel survey found that visiting historic sites was the fourth most popular activity of families on trips. Only visiting scenic areas, swimming, and hiking rank higher, but that's changing: with all the publicity about exposure to ultraviolet radiation and ozone depletion, visitors may not want to spend all their vacation at the beach or outdoors. Activities are now likely to include indoor pursuits, such as those afforded by visiting museums and other types of historic sites.

The most important factor influencing cultural participation, affluence and travel is level of education, which is steadily rising. The so-called "baby boomers" are at the height of their earning power and want their children to experience cultural advantages offered by museums, historic houses and sites, etc.

In addition senior citizens—who, to a certain extent, have lived some history—likewise appreciate the same kind of attractions.

International Tourists

Historic places hold strong appeal for international visitors, who are tending — more and more— to avoid places where they feel endangered. Significantly, it is anticipated that tens of thousands of foreign visitors to the 1996 Olympics in Atlanta will be fanning up throughout the southeastern United States— more likely in search of rural Americana instead of seeking pastimes such as nightlife in large cities.

Simultaneously, the two-week, American family vacation is no longer a standard thing— especially with both spouses working and kids involved in a host of extra-curricular activities. Rather, many Americans are taking shorter trips ("mini-vacations") closer to home through-

out the year, with historical attractions fitting in very well with their plans. This is also true of metropolitan dwellers seeking a weekend escape from time to time.

Travel industry experts regard the surge in heritage tourism as here to stay, and that's important since this type of traveler, being more upscale, tends to stay longer, spend more money (\$62 more a day than other types of travelers), and return more often.

Heritage tourism presents challenges, but developing and marketing a heritage attraction or program is worthwhile due to the high stakes. Indeed, tourism experts report that attendance at historical attractions is growing by leaps and bounds from coast to coast.

(Excerpts from the May 1995 Monthly newsletter of the KY Association of Counties. Article by Daniel Kidd- KY Dept. of Travel Dev.)

The Tourist

Clinch-Powell Specialty Recreation and
Tourism Initiative
Clinch-Powell RC & D
Rt. 2 Box 423
Rutledge, TN 37861



Date of Next Meeting

The next meeting of the Clinch-Powell Specialty Recreation and Tourism Initiative Advisory Committee will be meeting June 6th, 1995 at the Grainger County Historic Jail. The meeting will begin at 10am and focus on the review of the Tennessee Wilderness Road Interpretive Guide and Map.



Ecotourism in the Clinch-Powell Region: Opportunities and Constraints

Definition of ecotourism and its application in the Clinch-Powell Region as a means of stimulating economic development

Although numerous definitions abound, nature-based or ecotourism can primarily be defined as a form of responsible travel where the focus of activity is on the natural resources, ecology and cultural history of a region.

Outdoor recreation and historical-based tourism play significant roles in revenue generation for Claiborne, Grainger, Hancock, Hawkins, and Union counties, Tennessee. The vast majority of visitor activities currently center around Cherokee Lake, Norris Lake, Historic Rogersville and Cumberland Gap. However, with an overwhelming abundance of unique natural and cultural resources, unrealized potential exists for the development and packaging of the Clinch-Powell region as a competitive ecotourism destination. While ecotourism is not a "miracle cure" for the region's economic woes, it can become a healthy component of the regional economic base. For the Clinch-Powell region ecotourism should include relatively small groups of people visiting on a year-round basis to enjoy and learn about the natural and cultural resources of the area through a variety of recreational and educational activities. In order to ensure that both community values and the environmental integrity of the region are safeguarded, development should be carefully managed by local governments, existing development organizations and community groups.

Trends Toward Ecotourism

There are three primary factors influencing the demand for nature-based or ecotourism: overall growth within the tourism industry, growth in specialty recreation and travel, and an increasing awareness and concern for the natural environment. Tourism is expected to experience growth rates on the average of 4% annually over the course of the next decade due to such factors as population increases and rising incomes. Increasing emphasis on outdoor recreation, health and physical fitness is fueling the demand for specialty recreation and recreational-based travel. A growing public awareness of environmental issues and the perceived need for education and protection are the key factors driving the interest in ecotourism. The following figures emphasize the importance of the nature-based segment within the travel industry:

- **Between 4-6 million Americans travel overseas for nature-oriented tourism annually.**
- **A survey by the U.S. Travel Data Center determined that nearly 7% of U.S. travelers, or 8 million Americans, report having taken an eco-trip.**

- Nature tourists take longer trips and spend more money. A survey conducted by Discover America for a "Tourism and Environment" report estimated an average expenditure of \$264.00 per day.
- A survey by McKinsley & Company indicates that there are 275 nature tour operators in the U.S. who serve 108,000 travelers each year. Total revenues for 1991 were \$95 million. Their study further reported that 7 million American tourists are willing to pay \$2,000 to \$3,000 for a nature related tour.
- More than 76 million adults enjoyed non-consumptive wildlife recreation in 1991, such as feeding, observing and photographing wildlife.
- The Anderson Group, a Minneapolis tourism consulting firm reports that "ecotourism is the travel industry's most explosive growth area."
- Attendance is down 9-17% within national parks. "People are tired of going to overcrowded parks" and are seeking nature-based opportunities in less crowded, less developed areas.

Traditional Vs Ecotourism

Traditional tourism support facilities are contrasted below with those that are more resource oriented and heritage sensitive, and thus appealing to nature-based tourism markets.

<u>Traditional</u>	<u>Ecotourism</u>
Hotel	Bed and Breakfast
RV Campground	Primitive Tent Sites
Chain Fast Food	Family Style Restaurants
Shopping Malls	Artisan Craft Fairs
Supermarket	Farmer's Market
Highways	Rural Roads
Recreational Parks	Nature Trails
Water Parks	Rivers, Lakes and Streams
Man-made Attractions	Natural Features (caves etc.)

Profile of the Ecotourist

Recent studies have identified ecotourists in terms of their demographic, economic, sociological, psychological and geographical characteristics (Source: Partnership for the Sounds).

Affluent - averaging over 58,000 per household

Educated - most have graduate school

Experienced - most took more than 7 airline trips last year

Mature - over 30 with a mean of 37

Environmental - nearly all voluntarily recycle

Physical - vigorous outdoor activity oriented

Inquisitive - interested in intellectual and cultural discovery

Focused - travels more frequently and longer distances, visitations longer

Opportunities for Ecotourism in the Clinch-Powell Region

The Clinch-Powell region in northeast Tennessee is strategically located and blessed with an abundance of natural, aesthetic and cultural resources which reflect its unique position in the history of our nation and offers numerous opportunities for ecotourism and specialty recreation. Located within an hours drive of two of the nation's busiest travel corridors (I-75 and I-40) and with millions of tourists visiting east Tennessee annually, the area is prime for promotion. Proposed ecotourism activities will center around, but not be limited to, the following resources (see inventory for specifics):

- **Appalachian cultural history and human ecology**
- **Berry Island State Natural Area**
- **Blackwater E & W Spring**
- **Buffalo Springs Wildlife Management Area**
- **Cumberland Gap National Historic Park**
- **Cumberland Mountain**
- **The town of Cumberland Gap**

- **Cherokee and Norris Lakes**
- **The Clinch, Powell and Holston Rivers**
- **Chuck Swan Wildlife Management Area**
- **Comby Ridge State Natural Area**
- **Numerous caves throughout the region (including Indian Cave)**
- **Clinch Mountain**
- **Ebbing and Flowing Spring**
- **Elrod Falls**
- **Fall foliage**
- **Unique geologic features and geologic history of the region**
- **Hemlock Bluff Small Wild Area**
- **History of mining and quarrying activities (coal, marble etc.)**
- **John Sevier Wildlife Management Area**
- **Local artisans, musicians, crafts and home products**
- **Monks Corner Small Wild Area**
- **The Melungeon Cultural Heritage**
- **Phipps Bend Waterfowl Refuge**
- **Historic Rogersville**
- **Rural lifeways and pastoral scenery, including working farms**
- **Stiner's Woods State Natural Area**
- **Unique plant and Animal species**

While this list is not exhaustive it does provide an overview of some of the region's assets that could form the infrastructure for a thriving ecotourism industry. Through a cooperative and coordinated planning effort a number of educational and recreational activities could be developed that would maximize the economic value of these resources to the regional economy, while at the same time increasing both the quality and quantity of recreational opportunities available to local residents.

Potential Ecotourism Activities in the Clinch-Powell Region

A tentative list of ecotourism activities focusing on the natural and cultural resources of the Clinch-Powell region that could be developed include the following:

1. Driving tours

- A. Small tour buses and vans with local guides focusing on individual or a combination of themes (historical, geological, caves, plant and animal life, rivers, rural lifeways etc.)
- B. The proposed Wilderness Road (see handout).
- C. Heritage shopping tours focusing on local artisans, crafts and home products (self-guided or group tour with maps).
- D. Regional historical tours focusing on the history of human settlement in the region (self-guided or group tour with maps).
- E. Fall foliage tours (self guided or group tours with maps).
- F. Individual or combination natural resource tours focusing on the region's rivers, lakes, geology, caves and wildlife (self guided or group tours with individual maps).
- H. Photography tours concentrating on natural and cultural resources (self-guiding or group with individual maps).

2. Walking on backroads and hiking trails to enjoy and learn about:

- A. Nature and wildlife habitat
- B. History and cultural heritage
- C. Archeology, caves and bluff shelters
- D. Genealogy, including gravestone rubbings
- E. Geological formations

3. Educational/Interpretive programs

- A. Special seminars on natural sciences, river and forest ecology
- B. Interpretive programs on the history of human settlement in the region and interactions with the natural environment
- C. Interpretive programs on the history of mining and quarrying activities in the region, including visits to abandoned mines/quarries and TN. Luttrell
- D. Botanical and wildlife habitat excursions
- E. Tours of working farms
- F. Tours focusing on the region's tobacco industry including visits to a tobacco auction

4. Outdoor recreational

- A. Camping/backpacking
- B. Horseback riding and group campouts
- C. Canoeing on the Clinch, Powell and Holston Rivers (self-guided or with guide)
- D. Spelunking

- E. Hunting (self-guided or guided)
- F. Rock climbing/rappelling
- G. Fishing
- H. Mountain biking/bike touring

5. Special events

- A. Regional music festival showcasing local talent
- B. River festivals focusing on the ecology of the Clinch and Powell
- C. Fishing contests on Cherokee and Norris lakes
- D. Arts and crafts festivals focusing on traditional Appalachian products
- E. Farm festivals focusing on the agricultural heritage of the region
- F. Photography workshops and contests

This list provides specifics in terms of the types of activities that can be developed or expanded upon to both increase visitation to the region, and improve the quality of visitor experience. Many of the above mentioned activities already exist in some form and currently provide the focal point of experience for a number of visitors to the region. For the majority of these activities the necessary infrastructure is already in place, and it is merely a matter of coordinating and packaging existing resources to meet consumer demand. Where development is necessary, the required investment capital is relatively modest when compared with traditional tourism facilities development.

Current Needs/Constraints

While the basic components of a successful ecotourism industry in the Clinch-Powell region are already in place, there are certain needs/constraints that should be addressed prior to its implementation and/or promotional/marketing efforts. They include the following:

A. The lack of a cohesive regional identity to lure visitors. The development of a thematic concept for the Clinch-Powell region would greatly increase its attractiveness and visibility to potential visitors and would make marketing/promotional efforts more successful. The theme for the Clinch-Powell region should build upon its natural, cultural and historical character.

B. A lack of facilities to accommodate visitors for overnight or multiple day stays. The quantity of current accommodations is inadequate to support overnight and multiple stays for visitors to the region. This results in the loss of much needed revenues to the local economies and prevents visitors from experiencing all that the region has to offer. Development in this area should concentrate on less capital intensive operations such as bed and breakfasts and rental cabins which are more in line with the character of the region.

C. A lack of designated hiking trails. Although the region has excellent potential as a hiking destination, there are very few designated public access hiking trails. With the exception of Union and Claiborne counties, no public access hiking trails exist.

D. A lack of primitive camping facilities. Backpacking, river and lakeside camping all have great potential in the Clinch-Powell region but the availability of primitive facilities is almost non-existent with the exception of Cumberland Gap National Historic Park. Although there are numerous RV campsites along Cherokee and Norris Lakes, they have limited appeal to those individuals seeking a "wilderness" experience. The Clinch and Powell Rivers have excellent potential for multiple day floating and fishing trips but the lack of primitive camping facilities precludes such activities.

E. A lack of public canoe access sites on the Clinch and Powell Rivers. As mentioned above, the Clinch and Powell Rivers offer excellent opportunities for fishing and floating but a lack of public access sites currently inhibits such activities. Although two access sites have been developed in Hancock county at Kyles Ford and Sneedville, no facilities exist between the latter and 25E. No public canoe access sites exist on the free flowing sections of the Powell River within Tennessee.

F. The need for a long term strategic ecotourism plan for the region. Proper planning is essential to the success of a unified regional ecotourism endeavor. A blueprint for action should be developed prior to any capital dependent ventures and/or marketing efforts. Such a plan should include: resource identification and a map of regional assets, the identification of both short term tasks and long term actions, economic development strategies, an examination of potential environmental and social impacts, including carrying capacity analysis, and a comprehensive marketing plan.

Potential Economic Impacts

- While ecotourism will not serve as a "panacea" for economic growth in the region, it has the potential to become a healthy component of a diversified economic base and to distribute tourism revenues more evenly throughout the region. Many of the areas within the Clinch-Powell watersheds have poverty levels which exceed national averages, and through the proper utilization and development of local resources these numbers could be markedly reduced. Some of the potential economic benefits of an ecotourism industry would include:
- **Increased jobs and career opportunities within the local communities**
- **Incremental improvements in per capita income**
- **Increased educational opportunities for the region**

- **A more diversified tax base less susceptible to national recessionary downturns**
- **Increased entrepreneurial opportunities for local citizens**
- **Spin off business development and multiplier effect**

Potential Environmental Impacts

Increased visitation and utilization of the region's natural resources has the potential to adversely affect sensitive and biologically critical wildlife habitats. A number of currently endangered and threatened animal species inhabit the biomes of the Clinch and Powell Watersheds. Certain stretches of the Clinch River within Hancock county have been designated as either globally outstanding or significant with respect to their aquatic biodiversity, and together the Clinch and Powell rivers remain as the greatest freshwater mussel sanctuary on the planet in terms of their species diversity. A number of rare and endangered cave species are also found throughout the watersheds and protection remains a critical issue. In order to ensure that ecotourism activities do not have a negative effect on the ecology of the region, and that visitors do not "love " these precious resources out of existence, an environmental impact analysis (EIA) should be conducted to determine the potential effects of each recreational or nature-based activity to be developed in critical wildlife habitat areas. Once carrying capacity analysis of specific eco-systems has been identified, development can proceed according to established guidelines. As a result, certain areas may in turn be designated as "off limits" due to their inability to absorb sustained human activity.

Ecotourism may also have the result of positively affecting the region's natural resources. The realization of economic benefits, as a direct result of increased visitation and use by tourists, may in turn serve to instill a conservation ethic in local citizens. An increased awareness of the economic value of the region's natural resources will only help to improve and protect both the quality and quantity of these environmental assets.

Potential Sources of Technical and Financial Assistance

The development of a successful ecotourism industry in the Clinch-Powell region will necessarily require technical assistance and cooperation from various federal, state and local agencies. The following is a list of potential sources of both technical and financial assistance that are available :

Federal Agencies

A. The Clinch-Powell Resource, Conservation and Development Council. The RC & D could potentially serve as the administrative body and planning agency for the

development of ecotourism activities. Such duties would fall under the auspices of the Americorps sponsored Specialty Recreation and Tourism Initiative. The RC & D also provides assistance in the areas of community development, environmental management, solid waste assistance, and environmental education and might be able to provide assistance and guidance in specific project development.

B. Natural Resource and Conservation Service (NRCS). Could provide both technical and financial assistance for specific project development and supply trained consultants for environmental risk studies as they relate to project development.

C. The National Park Service (NPS). Could develop additional ecotourism activities (educational programs etc.) at the Cumberland Gap National Historic Park to help increase regional offerings.

D. United States Forest Service (USFS). The USFS could provide financial and technical assistance for forest-based recreational activities in the region such as the development of hiking trails and primitive campsites.

E. National Endowment for the Arts (NEA). The NEA could provide funding for the documentation of folklife traditions and funding rural arts initiatives for various pioneer and heritage-based museums.

F. Tennessee Valley Authority (TVA). Could provide land grants and technical assistance for the development of various recreational activities such as increasing canoe access sites on the Clinch and Powell Rivers and the development of hiking trails.

State Agencies

A. The Northeast Tourism Council (NETA). NETA will serve as the primary marketing agency for the promotion of ecotourism and specialty recreation activities in Hancock and Hawkins counties. NETA will play a key role in both the planning and development of any such activities.

B. Middle East Tourism Council (METC). METC will serve as the primary marketing agency for the promotion of ecotourism and specialty recreation in Claiborne, Grainger and Union counties. METC will play a key role in both the planning and development of any such activities.

C. First Tennessee Development District (FTDD). FTDD will play an integral role in coordinating the planning and development of an ecotourism industry in the Clinch-Powell region within the context of existing roles.

D. East Tennessee Development District (ETDD). ETDD will play an integral role in coordinating the planning and development of an ecotourism industry in the Clinch-Powell region within the context of existing roles.

E. Tennessee Department of Tourism Development. Could offer technical assistance to aid in the development of specific ecotourism projects as defined by the roles and objectives of The Community Development Assistance Program. Will serve as a primary sponsor of the Wilderness Road driving tour.

F. Tennessee Department of Environment and Conservation (TDEC). TDEC could aid in the development and administration of regional ecotourism activities. TDEC could provide technical assistance in preparing EIA's and monitor ecotourism activities to ensure compatibility between human use and conservation.

G. Tennessee Wildlife Resources Agency (TWRA). TWRA could provide both financial and technical assistance for specific project development such as public access site acquisition and development as well as monitor activities impacts, aid in EIA preparation and provide qualified biologists for educational programs.

H. Tennessee Historical Commission. The Tennessee Historical Commission could provide funding and technical assistance to aid in the preservation of state identified historical structures that would serve as focal points for the historical components of an ecotourism industry.

Local agencies

A. Individual County Governments. Individual county governments within the Clinch-Powell Region will help to garner support for the development of ecotourism activities. Will assist in the upkeep and preservation of nature-based recreational sites.

B. Individual County Chambers of Commerce. Local chambers will serve in a consultation capacity and act as a liaison for individuals/organizations interested in investing in local ecotourism projects.

C. Individual County Service Organizations. County service organizations such as the Lion's Club, Rotary Club etc. could provide a community support base for activities such as beautification projects and community fundraising heritage festivals, which are an integral part of an ecotourism industry.

D. Friends of the Clinch and Powell Rivers. This group could provide assistance in preparing EIA's and developing recreational and educational activities in the Clinch-Powell Watersheds.

Private businesses

Private business groups and organizations could assist in financing and developing nature-based tourism opportunities within the Clinch-Powell Region.

Private Foundations.

A. The Nature Conservancy. The Nature Conservancy could provide technical assistance in the preparation of EIA's and serve in a consultation capacity for the development of ecotourism activities. The Nature Conservancy could also assist in the development of educational programs and provide qualified individuals to serve as instructors.

B. The Conservation Fund. The Conservation Fund has expressed an interest in sponsoring an ecotourism pilot project within our region and could provide much needed assistance in the areas of strategic planning and specific project development.



THE WILDERNESS ROAD

A Draft Outline for the Development of the

TN Wilderness Road.

DOCUMENT OBJECTIVE

The object of this document is to provide background information, potential economic impacts, possible cooperative and funding opportunities, and a draft proposal for the development of the Wilderness Road within the Clinch-Powell Watershed.

BACKGROUND

Few names in American history evoke as distinct an image as the name Daniel Boone, the lone leader of thirty axmen dressed in a coon skin hat carving the path for American settlement with nothing more than his ax, gun, and a will to survive. It is this legend of the American pioneer spirit who is credited with forging what is now termed then "Wilderness Road."

This former Athawominee Indian trail, originally known as the "Warrior's Path," was made more accessible to travel by Boone and opened up the only natural pathway for settlement through the Allegheny Mountains. For 200 years these mountains formed the western edge of settlement and restricted expansion beyond the thirteen seaboard colonies. Once opened by Boone to settlement travel, the Wilderness Road served as the main artery for western expansion, handling 375,000 people from 1775 to 1830.

Frederick Jackson Turner wrote over 90 years ago, "Stand at the Cumberland Gap and watch the procession of civilization marching single file-- the buffalo following the trail to the salt springs, the Indian, the furtrader and hunter, the cattleraiser, the pioneer farmer-- and the frontier has passed by." Today, the route is mimicked by the modern day roadway system. Interstates and highways trace the historical trail from its beginnings in the Shenandoah Valley and forking down into Kentucky and Tennessee to ultimately meet in Cumberland Gap before heading north towards the Bluegrass Area of Kentucky.

A Current History: 1984 - 1994

Public Law 98-405 passed by Congress in 1984 authorized the National Park Service (NPS) to provide recognition to the regional significance of the contributions of Daniel Boone. The route and sites associated with Boone's travels were to be marked with a distinctive logo using the standard NPS informational sign colors of brown and white (Figure One). Unfortunately, there was no provision made for federal funds to mark the trail, but Congress did authorize the Park Service to accept donations for erecting signs. As of 1990, approximately \$2,900 in donations had been collected for signage in the states of North Carolina, Virginia, Kentucky, and Tennessee. Wallace H. Jones of the NPS southeast region stated about implementation of signage, "because of minimal donations from North Carolina and Tennessee, only highways in Virginia and Kentucky will be marked in this initial marking program."

The initial route for the Wilderness Road differs significantly from the accepted historical route (Figures Two and Three). Of particular interest is the NPS's elimination of the

southern route of the trail which runs from Bristol through Bean's Station and up to Cumberland Gap. It is conceivable that the lack of donations for signage from the State of Tennessee is a reflection of this omission. It is this historically significant route which will likely be the focus for the Tennessee Wilderness Road efforts in the Clinch-Powell Region.

PROPOSED DRAFT FOR THE DEVELOPMENT OF THE WILDERNESS ROAD

Program Description

The Wilderness Road will be a historically-based interpretive auto trail centered on the contributions of Daniel Boone. It will be complemented with both a series of secondary driving, heritage shopping, and photographic tours and a nature-based and specialty recreation industry.

Program Outline

The development of the Wilderness Road will be a multiphase program.

Phase One- The formation of a cooperative coalition to direct strategic planning and solicit/administer funding for the project.

Phase Two- The development of the Wilderness Road route, identification of historically significant sites, and the design of interpretive signage.

Phase Three- The development of both supplementary auto driving tours, heritage shopping tours, and photographic tours and the creation of historic cultural museums and heritage festivals to complement attractions along the route.

Phase Four- Provide technical assistance in the form of educational training, planning development, and fund acquisition to local business and community groups. Additional assistance will be provided to public and private historic attractions and various support businesses in how to better provide tourism-related services and maximize generated revenues.

Phase Five- The development of a complementary nature-based tourism and specialty recreation industry. This will include biking, hiking, hunting, camping, canoeing, fishing, boating, and ecotours.

Phase Six- The development of a five year marketing and promotional plan for the Wilderness Road.

Phase Seven- The implementation of the five year marketing and promotional plan.

Phase Eight- A periodic refinement and evaluation of the marketing, promotion, attraction development, and funding sources for the Wilderness Road.

Elements of Program Outline

Phase One-

A cooperative coalition consisting of federal, state, and local organizations, community groups, private business, private foundations, and individual citizens must be formed to direct the strategic planning for the Wilderness Road. This group will additionally be the primary body to solicit and sponsor fund acquisition for the development, marketing, and promotion of the road. The proposed organizational structure will consist of an advisory body sponsored by the Clinch-Powell Resource Conservation and Development Council. Normal operation and duties for the trail will be shared by the Tennessee Department of

Tourism Development, local county governments, and the Clinch-Powell Specialty Recreation and Tourism Initiative.

Phase Two-

The development of the Wilderness Road route will be based on the contributions of Daniel Boone. The exact geographic path for the trail will be loosely dependent on various historic interpretations and the current highway and secondary road network. The identification of historically significant sites will, again, loosely be based around, but not necessarily limited to the history of Daniel Boone. Other historically significant sites that served an integral role in the development and cultural heritage of the area should be included. The format of the road should be a self-guided driving tour with posted interpretive literature and signage, however, the development of commercial bus tours and expeditions should be strongly encouraged.

Phase Three-

A series of supplementary self-guided historic and scenic driving tours will be created to help promote areas and attractions not directly served by the route. These tours will include, but not be limited to a Melungeon heritage and scenic driving tour of Hancock County and a series of recreational-based tours of Grainger and Union Counties. Each tour will be accompanied by a list of photographic opportunities along the routes. A series of heritage shopping tours will additionally be developed to promote regional arts and crafts. Tours will include descriptions of the artisan, original methods of manufacturing, and individual products explanations, for items such as quilts, honey/foodstuffs, and woodcrafts. Hours of operation, specific location maps, and other pertinent information will be included in the tours. Commercial tours and expeditions for these tours should be strongly encouraged.

Phase Four-

A partnership will be developed between those governmental agencies, including the Tennessee Bicentennial, Tennessee Department of Tourism Development, Northeast Tourism Council, Middle East Tourism Council, County Extension Services and the Clinch-Powell RC & D to provide technical assistance in the form of educational training, development planning, and fund acquisition for local businesses, county governments, and community groups. The focus of the educational training will include, but not be limited to museum design, hospitality training, small business development, festival design and operation, maximizing tourism generated revenue, and individual marketing of historic and nature-based attractions. The educational role of before mentioned groups will be vital in the development of regional entrepreneurship.

Phase Five-

A nature-based and specialty recreation industry will be developed to complement the natural resources of the region and specifically assist those areas not directly served by the route of the Wilderness Road. A variety of activities will be researched and developed including biking, hiking, canoeing, camping, boating, fishing, hunting, and ecotours based on species diversity. These activities will be realized through partnerships with the

Tennessee Valley Authority, United States Forest Service, Natural Resource Conservation Service, Tennessee Department of Environment and Conservation, Tennessee Wildlife Resources Agency, National and Tennessee Park Services, The Nature Conservancy, The Conservation Fund, Friends of the Clinch and Powell Rivers, and the Clinch-Powell Resource Conservation and Development Council. For more information on potential nature-based tourism opportunities, economic and environmental impacts, and resource assessments, please refer to the Clinch-Powell Specialty Recreation and Tourism Initiative's, Strategies for the Development of Nature Oriented Tourism and Specialty Recreation in the Clinch-Powell Region.

Phase Six-

A marketing and promotion plan will be developed by a coalition sponsored by the Tennessee Department of Tourism Development, Northeast Tourism Council, Middle East Tourism Council, private business interests, and the Clinch-Powell Specialty Recreation and Tourism Initiative. The plan will incorporate strategies for the marketing and promotion of the Wilderness Trail its related nature-based tourism opportunities. Additional planning will be developed for the recruitment of new business and entrepreneurs associated with growth in tourism potential.

Phase Seven-

The implementation of the marketing and promotional plan will be administered by private business interests, Northeast Tourism Council, Middle East Tourism Council, and the Tennessee Department of Tourism Development. The Clinch-Powell Specialty Recreation and Tourism Initiative will serve only to assist in a complementary role with the before mentioned organizations in the evaluation and future refinement of marketing and promotional planning.

Phase Eight-

The periodic evaluation and refinement of development strategies, market and promotional plans, and funding sources is necessary for the continued success of tourism in the region. The evaluations will be conducted by a partnership of all participating actors and will be administered by the Clinch-Powell Specialty Recreation and Tourism Initiative, Northeast Tourism Council, and the Middle East Tourism Council.

POTENTIAL ECONOMIC AND CULTURAL IMPACTS

The development of the Wilderness Road in the Clinch-Powell Region presents a variety of economic and cultural opportunities to the area. Economically, the road offers the potential for the development of a heritage-based tourism industry, various small business developments, and economic stimulation through a diversification in the economy. Culturally, the route should increase public awareness in the area's frontier history through genealogical links and the preservation of historically significant structures. Finally, a cooperative development and marketing effort with the Tennessee Bicentennial activities presents the opportunity to promote the historical role of the area to a larger statewide and regional audience.

Current and Potential Economic Impacts

The socio-economic situation of the Clinch-Powell Region, like much of Appalachia, is well below national averages. Hancock County, the poorest of the five county region, has some 75 percent of its population dependent on some form of government aid or subsidy. Chronic poverty in the rest of the region, although not as severe as Hancock County, is not substantially better. Much of the economic woes of this region are attributable to underemployment and a dependency on subsistence agriculture. Although agriculture has always been, and will continue to be the primary economic driver in the region, there is great potential and need to develop alternative economic opportunities. Issue papers and studies by various agencies indicate little chance for economic development through traditional industrial recruitment. The small nonagricultural economy present in the area is predominantly centered around textiles and wood-based industries which are hypersensitive to a recessionary economy. Existing employment opportunities are primarily minimum wage, low skill, and have little job security.

There are chronic problems with "brain drain" in the region. The high school drop-out rate ranges from 27-40 percent. These students are the citizens and leaders of tomorrow and the up-and-coming local work force. The best and brightest go to college and then take their talents to regions with high-tech, high-paying, white collar jobs. According to the 1990 Census, the region lost population to the nearby cities of Morristown, Knoxville, and Kingsport. The result is a smaller, more elderly, more unskilled, and more uneducated population to share the ever increasing tax burden of the area. As a result, the region continues to suffer under the burden of a growing number of second and third generation welfare-dependent families. A clearer picture of the socio-economic conditions of the region is illustrated in the selected statistic below.

Category	Selected Statistics	
	Statistic	Notes
1. Population	111,526	
2. Largest City	4,500	
3. Average Unemployment Rate	5.2%	
4. Housing	25% in mobile homes	
5. Education	49% of population below 12th grade education	
6. Per Capita Income	Average- \$10,500	41% below national average
	Low- \$8,160	
7. Persistent Poverty Counties	4 of 5 in region	
8. Population Living in Poverty	26%	One county high of 40%
9. Minority Population	<1%	
10. Agriculture Based Employment	40%	One county high of 77%

The development of the Wilderness Road could potentially address many of the region's socio-economic problems. The road would offer the opportunity for the creation of a regionally-based tourism industry. The route could be constructed to pass through at least a part of each county in the region. Unlike traditional forms of economic development, tourism allows for the diversification of a local economy and has proven to be less affected by recessionary shifts in the regional or national economy. From the standpoint of employment, a larger tourism industry requires less specialized training for a majority of the workforce, while concurrently fostering a positive environment for future entrepreneurship. A partnership with the Tennessee Department of Tourist Development and the Tennessee Bicentennial could result in a series of educational seminars and direct technical assistance which would aid in formation of these types of activities.

The potential economic impact of the Wilderness Road would be felt throughout the region and in a variety of economic sectors. Although the exact extent of the economic impact of the Wilderness Road is unknown, the potential economic revenues of the route on the local economies of the region can be estimated. For example, a three percent (3%) increase in tourism revenues from 1993 would result in a direct economic impact of an extra \$1,030,000 for the region, while a ten percent (10%) increase would result in an extra \$3,434,000 for the area. These estimates are conservative and do not take in account tourism's expected natural growth increase based on the performance of the region over the past five years. Additionally, these estimates do not account for the indirect multiplier effect of increased revenues created by businesses purchasing goods and services from local supplies or induced economic impacts created a result of the employees of those businesses and suppliers spending part of their earnings on goods and services in the area.

Table One
Tourism's Potential Contribution to a Local Economy in the Clinch-Powell

Business	Percent of Income from Tourism
Motel/Hotel	94.5%
Restaurants	49.4
Taverns/Bars/Liquor Stores	34.8
Amusements	33.1
Gasoline Stations	31.5
General Merchandise	18.6
Auto Dealers and Garages	15.8
Food (Retail)	13.8
Apparel and Accessories	13.6
Lumber, Hardware, and Building Material	13.1
Furniture and Furnishings	12.1
Other Retail	12.2
Drugs	11.4
Farm Supplies and Agricultural Products	8.5

The additional revenues earned from the a growth in the tourism industry will be distributed among a variety of economic sectors. A study by the U.S. Department of Commerce revealed tourism's potential contribution to a local economy, the results of that study are summarized in Table One. Although the current socio-economic situation of the Clinch-Powell Region is below national averages, tourism and specifically the Wilderness Road offer an excellent opportunity for a more nontraditional form of economic development.

Potential Cultural Impacts

The creation of the Wilderness Road offers opportunities for the region and individual counties to discover the area's pioneer history and traditions. The material culture and attitudes of the people of the Clinch-Powell Region are, however, intricately linked to its Appalachian and frontier history. These traditions may act as a potential barrier to tourism development in the region. The primary cultural impact and challenge for this project will be to maintain and strengthen the trust of local community groups. This essential bond can be forged only by a dedication to work within the framework of the local community. Tourism by its very nature involves change. It entails contact with persons from outside the region who may not be empathetic to the long established Appalachian belief systems of the area. It is vital, therefore, not to push the region into any endeavors that may detrimentally affect the region's heritage and quality of life.

The increased awareness of the region's heritage presents the opportunity for the development and preservation of historically significant sites. Buildings, museums, and other such structures should be able to more easily receive federal, state, and private foundation funding due to a stronger regional and cooperative coalition. From an educational standpoint, the Wilderness Road can serve a hand's-on learning tool for children of the area to more easily discover their region's role in Tennessee and national history. These types of educational program may help to curb the future "brain drain" of the best and brightest students of the area by instilling a sense of regional and community pride. Last, the road will open markets for regional arts and crafts. This should help to both stimulate the regional economy and promote the rich cultural heritage of the area.

POTENTIAL COOPERATIVE AGENCIES AND FUNDING OPPORTUNITIES

The success of the Wilderness Road project will be dependent on an effective coalition comprised of local, state, and federal agencies, community groups, private business, private foundations, and individual citizens. The following is a list of potential key actors and their possible role in the development of the Wilderness Road. It is important to note that this list is not exhaustive, nor is it a contract for services by the listed organizations and groups. For further information, please consult the Clinch-Powell Specialty Recreation and Tourism Initiative.

Federal Agencies

The Clinch-Powell Resource Conservation and Development Council- (RC & D)

The RC & D will act as the local administrative body for the Wilderness Trail providing technical, marketing, and planning assistance to all persons of the region. Duties will fall under the auspices of the AmeriCorps sponsored Specialty Recreation and Tourism Initiative (SPTI).

Natural Resource and Conservation Service- (NRCS)

The NRCS will be an integral source of funding and technical assistance in the development of projects associated with nature-based tourism along the Wilderness Road.

The National Park Service- (NPS)

The NPS will continue to their role of providing and overseeing signage for the Daniel Boone Heritage Trail per Public Law 98-405. The NPS will additionally provide technical assistance and possible funding opportunities for historic structures on park land which fall along the route of the road.

United States Forest Service-(USFS)

The USFS will be an integral source of funding and technical assistance in the development of forest-based recreational activities associated with the Wilderness Road.

National Endowment for the Arts- (NEA)

The NEA will be an integral source of funding for documenting folklife traditions and funding rural arts initiatives for various pioneer and heritage-based museums.

Tennessee Valley Authority- (TVA)

TVA will serve as a partner in providing small grants for marketing of heritage based attractions and land grants for additional access sites along waterways and reservoirs to be used in the development of nature-based recreational activities.

Cooperative Extension Service- (CES)

The CES will continue to provide and help sponsor educational programs to help foster small business development.

State Agencies

The Northeast Tourism Council- (NETA)

NETA will continue to act as the primary marketing agency for Hancock and Hawkins Counties. They will continue to work with the SRTI to coordinate the development of nature-based activities.

Middle East Tourism Council- (METC)

METC will continue to act as the primary marketing agency for Claiborne, Grainger, and Union Counties. They will continue to work with the SRTI to coordinate the development of nature-based activities.

First Tennessee Development District- (FTDD)

FTDD will continue to work with the SRTI to coordinate the development role of tourism in the Clinch-Powell Region within the context of the First Tennessee Development District.

East Tennessee Development District- (ETDD)

ETDD will continue to work with the SRTI to coordinate the development role of tourism in the Clinch-Powell Region within the context of the East Tennessee Development District.

Tennessee Department of Tourism Development- (TDTD)

The Community Development Assistance Program will help coordinate the development of the Wilderness Road. TDTD will act as one of the two primary development agencies at the state level. The agency will additionally act as a primary sponsor for the funding a regional technical assistance program and the acquisition ISTEA grants.

Tennessee Bicentennial (TN200)

TN200 will help coordinate the development and signage for the Wilderness Road. The organization will work in coordination with TDTD and SRTI to provide technical assistance and will be a primary sponsor for ISTEA grant acquisition. TN200 will act as the second of two primary development agencies at the state level.

Tennessee Department of Environment and Conservation- (TDEC)

TDEC will work with SRTI in the development and administration of many of the regions nature-based tourism activities. The TDEC will provide much of the enforcement to ensure a continued environmentally conscience ecotourism industry.

Tennessee Wildlife Resources Agency- (TWRA)

TWRA will work with TVA and SRTI to help develop water access sites within the watershed. The organization will additionally provide technical monitoring of potential impacts of a ecotourism industry and provide educational training on sustainable tourism development.

The University of Tennessee and Walter's State Community College- (UT & WSCC)

UT and WSCC will provide needed technical assistance and possible funding opportunities for the study and development of the Wilderness Road. Technical assistance could include architectural design assistance, marketing design, and regional promotion.

Tennessee Historical Commission

The Tennessee Historical Commission will provide funding and technical assistance associated with the preservation of state identified historical structures along the Wilderness Road.