

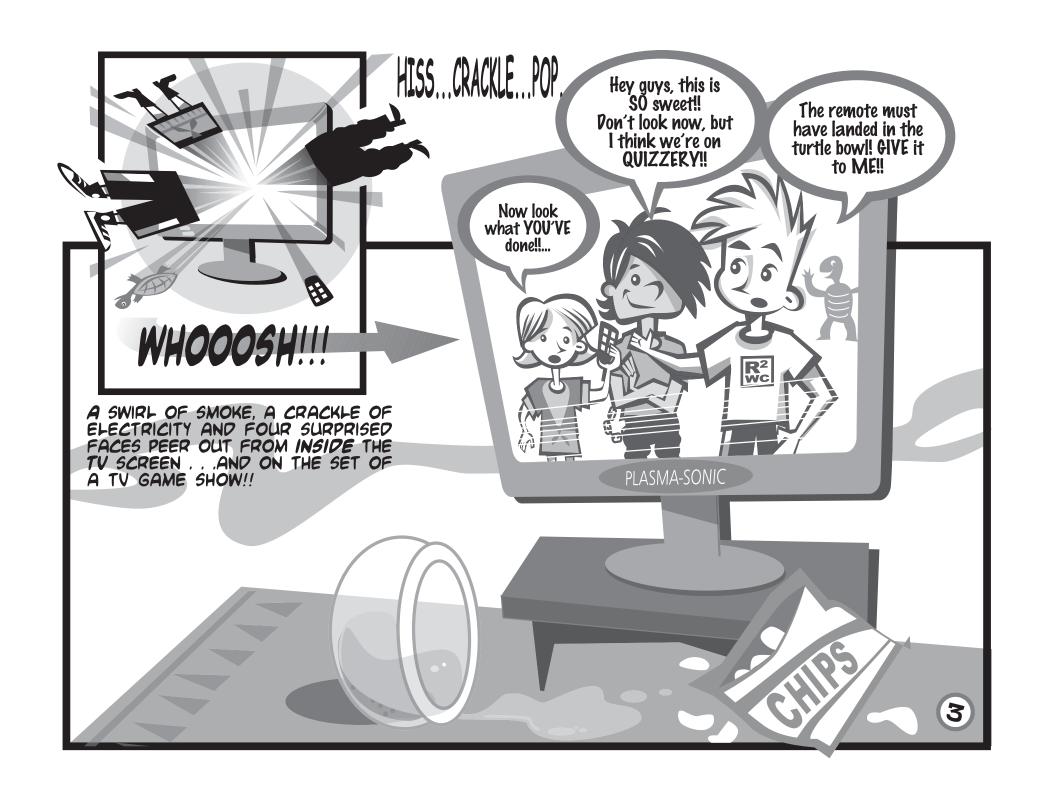


This is so stupid Zack...
I'm gonna tell Mom that you aren't doing your report!











NORMAN

Welcome to Quizzery!

I am your host, Norman the Turtle. Your category is "The Water Around Us." Uh-oh. I should've paid better attention in science class today.

Norman knows how to talk?

This is so cool! I can't believe I'm on a game show!







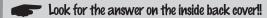




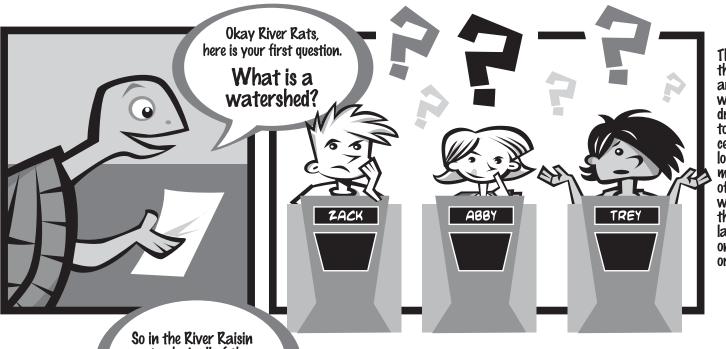


A Quizzery Question for You:

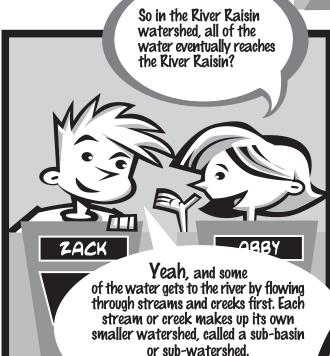
What towns in the River Raisin Watershed get their drinking water directly from the River Raisin?







No one knows? The correct answer is that a watershed is the area of land from which water drains to a central location. That means, all of the water that runs over the land eventually reaches one particular river, lake or ocean.



Here is your next question.TRUE or FALSE, everyone lives in a watershed?



TRUE. No matter where you live, the water has to eventually drain somewhere. BUT HOW POES THE WATER TRAVEL?

Let's change the channel with the remote and we'll find out.



POOF!

Now we can really see how water moves through the watershed, I hope you don't mind getting a little wet...

The endless circulation of water from the atmosphere to the earth and its return to the atmosphere through condensation, precipitation, evaporation and transpiration is called the hydrologic cycle. Heating of the ocean water by the sun is the key process that keeps the hydrologic cycle in motion. Water evaporates, then falls as precipitation in the form of rain, hail, snow, sleet, drizzle or fog. On its way to earth some precipitation may evaporate.

Water falls to the earth as **precipitation** -- rain, snow, sleet, or hail.



Percolation is when some of the precipitation and snow melts moving downward and infiltrating through cracks, joints and pores in soil and rocks until it reaches the water table where it becomes groundwater.

Water can move over the land as runoff and enter rivers, ponds or lakes becoming surface water. Or, it can soak into the soil through infiltration.



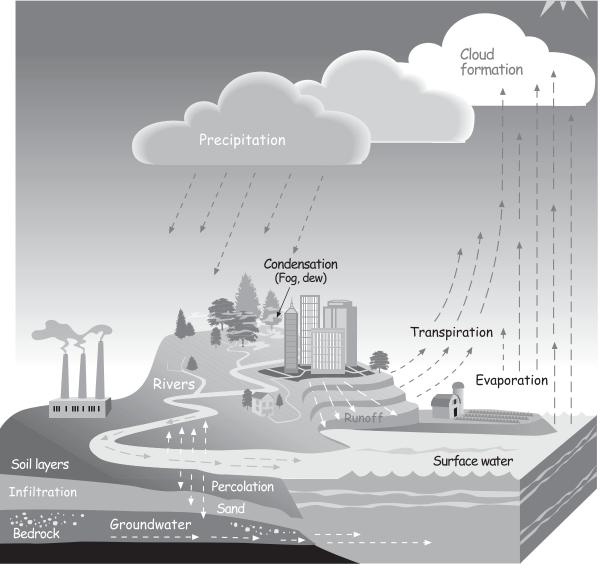


Plants absorb water through their roots and then give off some of that water vapor through the process called transpiration.

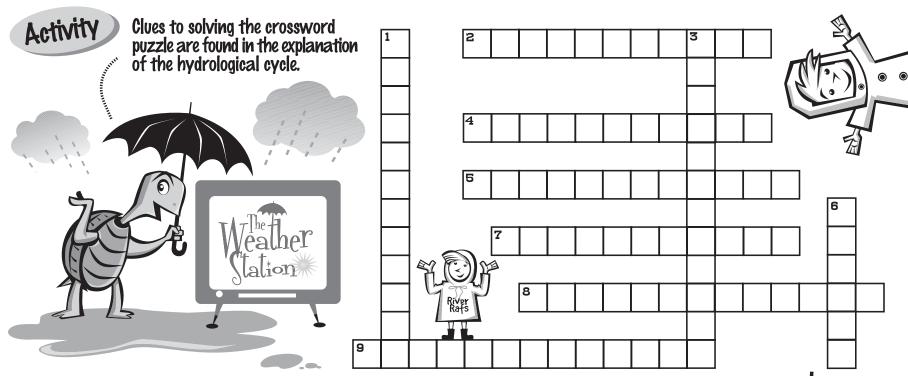
The Weather Station presents ... The River Rats in ...

THE HYDROLOGIC CYCLE





a HYDROLOGICAL CROSSWORD



Across

- **2.** Water travels under the ground by moving through spaces in between particles of soil
- 4. The process in which liquid water becomes vapor
- 5. The process in which water vapor in clouds turns into liquid water
- 7. Water that is stored underground below the water table
- **8.** When plants pull water in through their roots and give off some of the water through their leaves back into the air
- 9. Water that falls to the earth from cloud

Down

- **1.** Water that is stored above ground in lakes, ponds, rivers or streams
- 3. When water seeps into the ground
- **6.** When water moves over the land and can enter surface water

Look for the puzzle answers on the inside back cover!!





Welcome to Time Travelers!!

I'm your host, Ty Imell...and you're watching the only show that blasts you back and rockets you into the future!! The only show that makes learning about history fun and exciting!! Each episode. contestants vie for the chance to win the adventure of a lifetime a trip BACK TO THE DAWN OF TIME or into the SPACE AGE, A CHANCE to PINE with the PINOS or JAM with the JESTSONS!!! SURF the GALACTIC WAVES OF TIME in our very own ZX-INFINITI 3000 TIME TRAVELER MACHINE!!!!

Zzaap



River Rats, thanks for dropping in and CONGRATULATIONS!!

You have just won the chance to surf the galactic waves of time!





Jump in the machine and just enter the period and place you want to travel too!!

W00 H00!! This is T00 C00L!!! I want to go to Spain and sail with Christopher Columbus on his voyage to discover America!! NO WAY PUPE!! If we go sailing we are going in style...down the Nile with Cleopatra!!





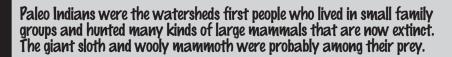


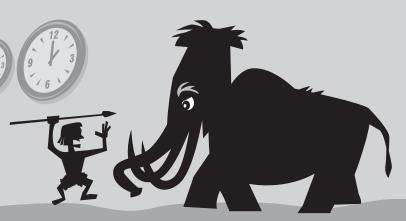




Within minutes the time machine propels the River Rats way back in time, giving them a front row seat for historical highlights of the River Raisin . . .

The River Raisin was formed by a glacier and our soils and landforms were produced and shaped by the ice and melted waters...





After the large mammals were gone, people used throwing sticks to hunt smaller game.



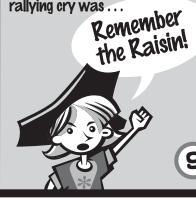
Columbus discovered America in 1492 and settlers began to settle in Southeast Michigan in the 1800s. Man brought many changes to the watershed. In 1842, Musgrove Evans became the first settler of Lenawee County.



The River Raisin was named by French explorers who saw Native Americans drying grapes along the river and called it the "River Aux Raisins," hence the name River Raisin.



During the War of 1812 a significant battle was fought on the banks of the River Raisin which saw the American troops facing off against the British and Native Americans. The Americans were greatly outnumbered and were massacred. In the spring the American troops regrouped and drove the British out of Michigan forever. Their famous rallying cry was ...







ACTIVITY: SPOT THE DIFFERENCE . . . A "riparian zone" is the space between land and a stream or body of water. Plant communities along the river margins are called riparian vegetation. Riparian zones are important to environmental management. They come in different forms such as grasslands, woodlands and wetlands. These are buffer zones between the land and water and are critical for improving water quality. They provide shade that reduces water temperature and filter out sediments and other contaminants. They protect fish habitats while providing aquatic foodwebs. Farmers and homeowners who own land along rivers and streams share an important responsibility to protect the water that flows along or through their property. Fertilizers, pesticides, nutrients, chemicals, detergents, household wastes, sediments or other forms of pollution that riparian landowners use end up in the adjacent water and can cause a variety of problems ranging from fish kills to nuisance plant growth and algae blooms. Look at the two pictures below of the same scene. Can you spot the differences between the one with a riparian buffer strip and one without?





The kids are about to discover another way in which human activity has affected nature...

through the woods. It's the The process of the perfect surface for racing earth being moved around on plus there's a great view is called erosion. Soil erosion is of the river. a natural occuring event that happens every day. It can come in different forms such as wind erosion and water erosion. Normally nature provides a covering called vegetation consisting of trees, shrubs, native grasses and any other plant life. The roots of these plants all help to act as fingers to help hold soil in place. As roots grow deep into the soil they also help aerate it, making it more porous so water can absorb quicker. When new development comes into an area, the vegetation is replaced with concrete and asphalt which increases the runoff, causing downstream erosion which can result in flooding. Often areas are bulldozed right up next to creeks, streams and rivers ... with the vegetation removed, soil and pollutants can easily wash into our waterways, negatively affecting our water quality and wildlife habitat around us. As the number of acres of land is converted to housing, the increased runoff and sediment loading into the River Raisin will continue to rise.

Wow! I dig this new asphalt bike path cutting through the woods. It's the perfect surface for racing on plus there's a great view of the river.

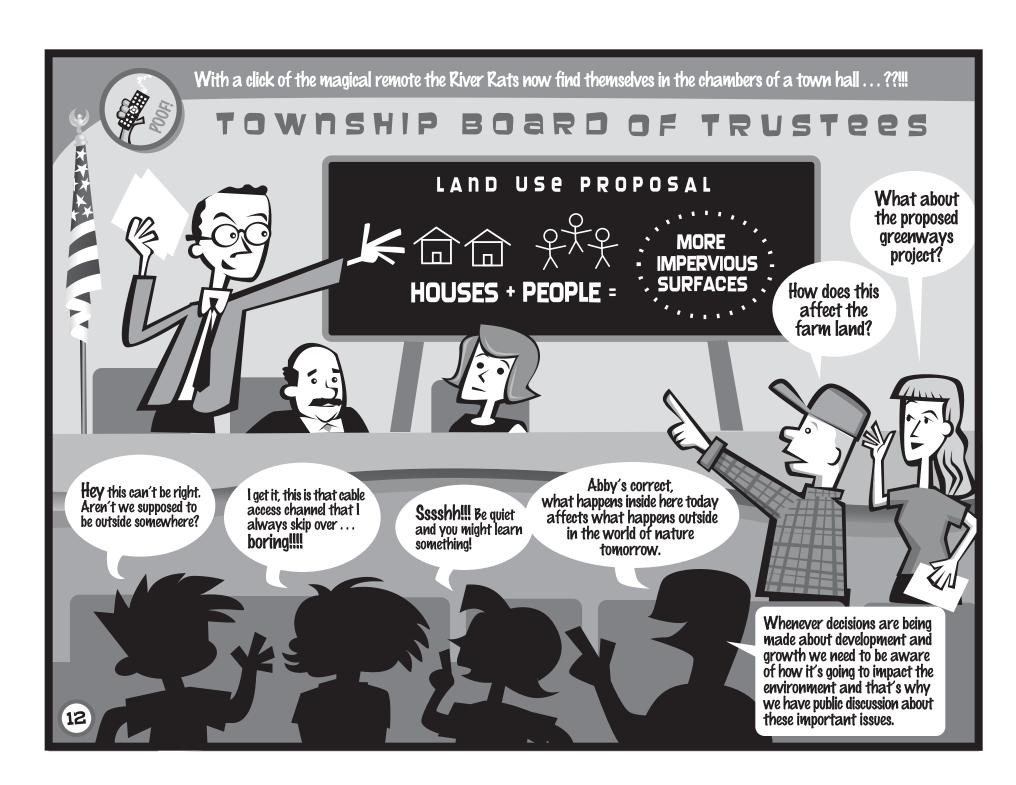
We interrupt this regularly scheduled broadcast to bring you this emergency broadcast message...



SUPPENLY...

A quick-moving storm has washed out all roads and trails within the listening vicinity...







and now it's time to for the popular quiz show ...

Water you know?

featuring questions about one of our most popular natural resources



- How much water does the average person use to brush their teeth? 2 gallons
- ■How much water is used to flush a toilet? 2-7 gallons
- ■How much water is used for a five minute shower? 25-50 gallons
- ■How much does an average dishwasher use to do one load of dishes? 9-12 gallons
- ■How much water does the average household use during a one year period? 107,000 gallons
- How much water does it take to process a quarter pound of hamburger? 1 gallon
- ■How much water does it take to manufacture one new car including tires? 39,090 gallons
- ■How much water does a person use everyday? 123 gallons
- How much of the earth's surface is water? 80%
- =How much of the earth's water is suitable for drinking? ONE, yes 1, percent!!
- ■How many miles of pipeline and aqueducts are in the US and Canada? 1,000,000 miles or enough to circle the earth 40 times!!
- How many community public water supply systems are there in the US? 58,900
- ■How much do these utilities process daily? 34 billion gallons of water
- •If all the communities water systems had to be replaced, what would it cost? In excess of \$175 BILLION!!



ho Wants to be a Tatural*st.

HEY THERE NATURE FANS.

Welcome to "Who Wants To Be A Naturalist?" Our first multiple choice question is: Which of the following occupations involve being a NATURALIST?

- A Biologist
- **B** Organic Farmer
- **6** Forest Ranger
- **1** Environmental Engineer
- **B** Solid Waster Manager

Pude, it's got to be the environmental engineer. Aren't they the ones that solve pollution problems and work at improving the environment?



Yeah, but check this, the organic farmer is working with the land and water in a positive way, growing food without chemicals that pollute soil and water. And the forest ranger is totally into the environment.

Yeah, I see your point.
Of course the solid waste
manager could totally be into
recycling and the biologist could
be researching and educating
people about the environment
and how to take care of it.

ABSOLUTELY CORRECT!!





So what's the answer?
ALL OF
THE ABOVE?



Folks, I think we have ourselves some winners. ALL of the occupations and many more can be used to help nature and improve the environment... and now it's time for the nightly news.

. Welcome viewers to the 6 o'clock watershed news report starring...tory Lee!!!!

GOOD Evening, I'm Tory Lee, and you're watching "Investigative Reports," the show that delves deeper and gets the facts so that YOU...'are IN THE KNOW!!!! Tonight we'll explore the wonders of wildlife in ways you probably never thought of before. We'll provide you with a different perspective in the hopes that you will do

in the hopes that you will do all you can to help preserve and protect the wildlife habitat in

YOUR WATERSHED!!!

Human beings have rejoiced in the splendors of the natural world since the dawn of time. We share a deep love and appreciation for wildlife. For many of us, wildlife has produced powerful images that have shaped our lives and defined our purpose. Wildlife inspires us with its majesty, enriches our lives and creates memories that last a litetime.

While we all enjoy viewing wildlife, have you ever really pondered the benefits humans derive from wildlife? There are important emotional and social reasons why humans need to experience wildlife and nature from time to time. We all need to get outside and breathe a little fresh air to relax, unwind, or recharge our batteries. What better place to experience and appreciate wildlife than in your own backyard...the River Raisin Watershed.

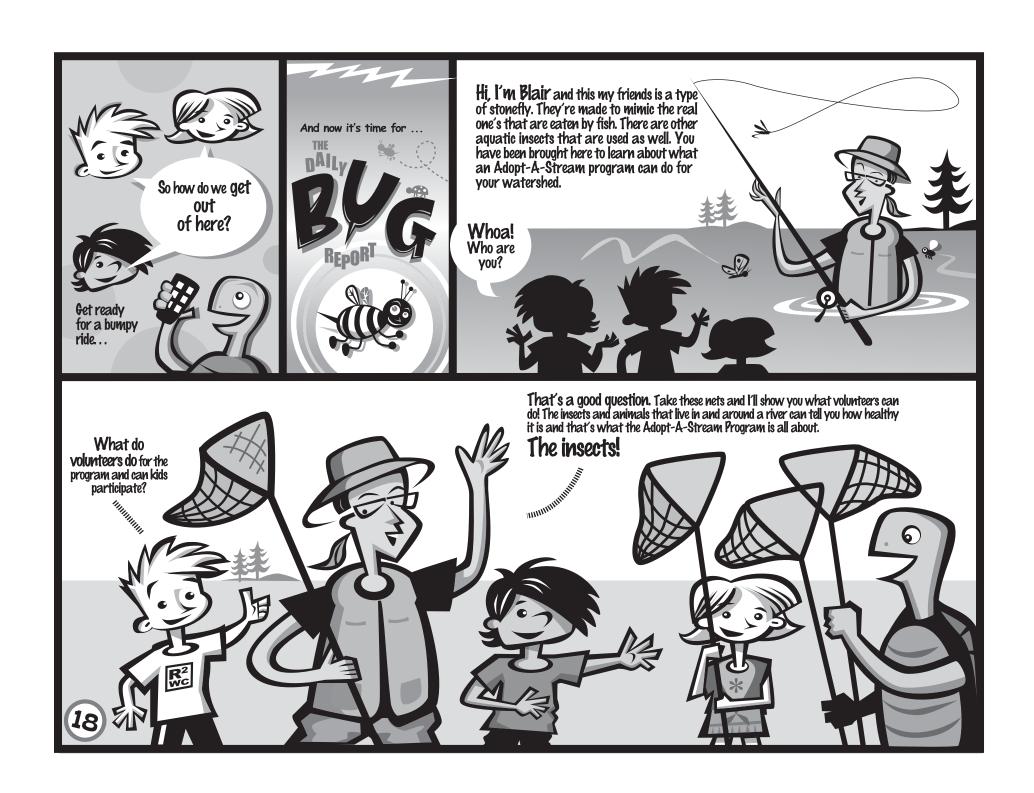
Wildlife is not merely a source of personal pleasure but provides an excellent indication of the health of the environment upon which we all depend. Healthy wildlife populations and habitat are important to our quality of life and economic wellbeing. A dollar amount can be attached to real estate, recreation, agriculture and industry among others that is directly related to the health and well being of the environment in which we all live, work and play.

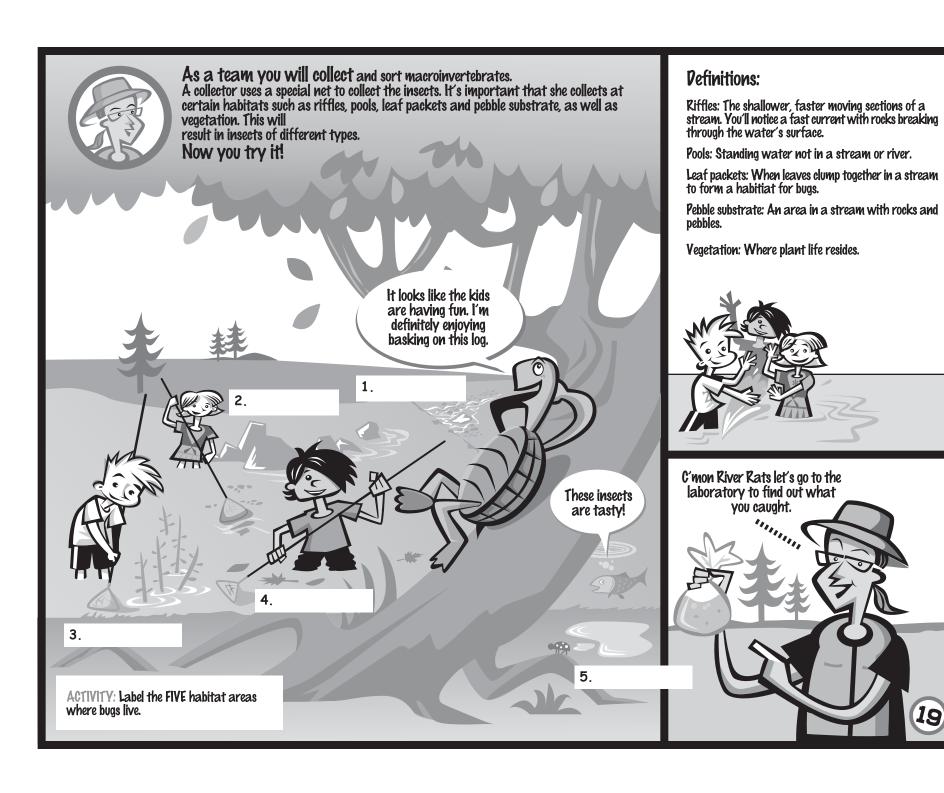
Wildlife and wildlife habitat play a vital role in the ecological and biological processes that are essential to life itself. Human life depends on countless interactions among plants, animals, and microorganisms. These ecological processes are essential for agriculture, forestry, fisheries and human health. Some of the biological processes in which wildlife play a key role are pollinization, germination, seed dispersal, soil generation, nutrient cycling, predation, habitat maintenance, waste breakdown, and pest control. These all have economic benefits. Wildlife and wildlife habitat are also important for the preservation of genetic diversity. Agriculture, forests, and fisheries all rely on crops that are adapted to local or regional conditions that can withstand pests, diseases, predators, pollutants, and other threats.

Each year, thousands of people visit parks, lakes and streams in the River Raisin Watershed. There are even some who come to view the migrating birds or visit local preserves in hopes of spotting an endangered or threatened species. Visitors spend money on accommodations, food, travel, entertainment and equipment. This influx of visitors creates seasonal job opportunities and benefits the local economy. The sheer scale of the benefits provided by wildlife in the River Raisin Watershed to individuals and the economy is one more compelling reason for maintaining and improving the watershed in which we live. ...

And now it's time for my INSECT colleague to bring us The BUG REPORT ...







The first thing we do is sort them by general appearance. This makes them easier to identify. I learned the levels by remembering King Phillip Came Over From Germany Swimming.

The phrase helps us **remember** the different classification levels

<u>K</u>ingdom

Phyllum

Class

Order

Family

Genus

Species



By knowing these levels we can learn about the importance of certain insects ...

Now let's take a look!

What do you mean sensitive?

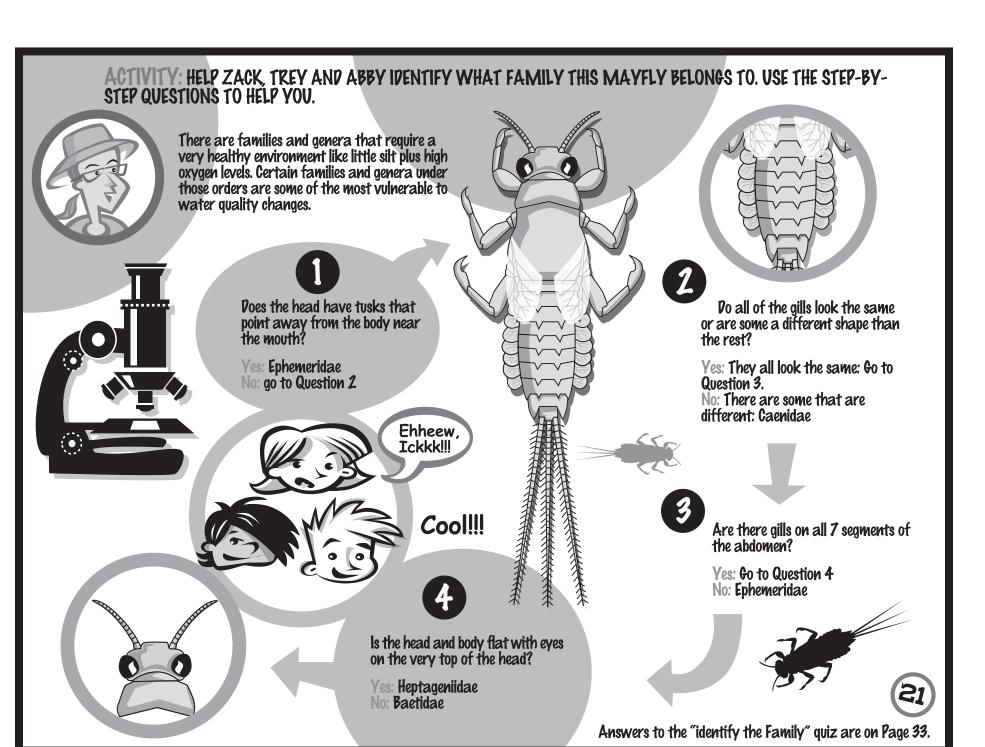


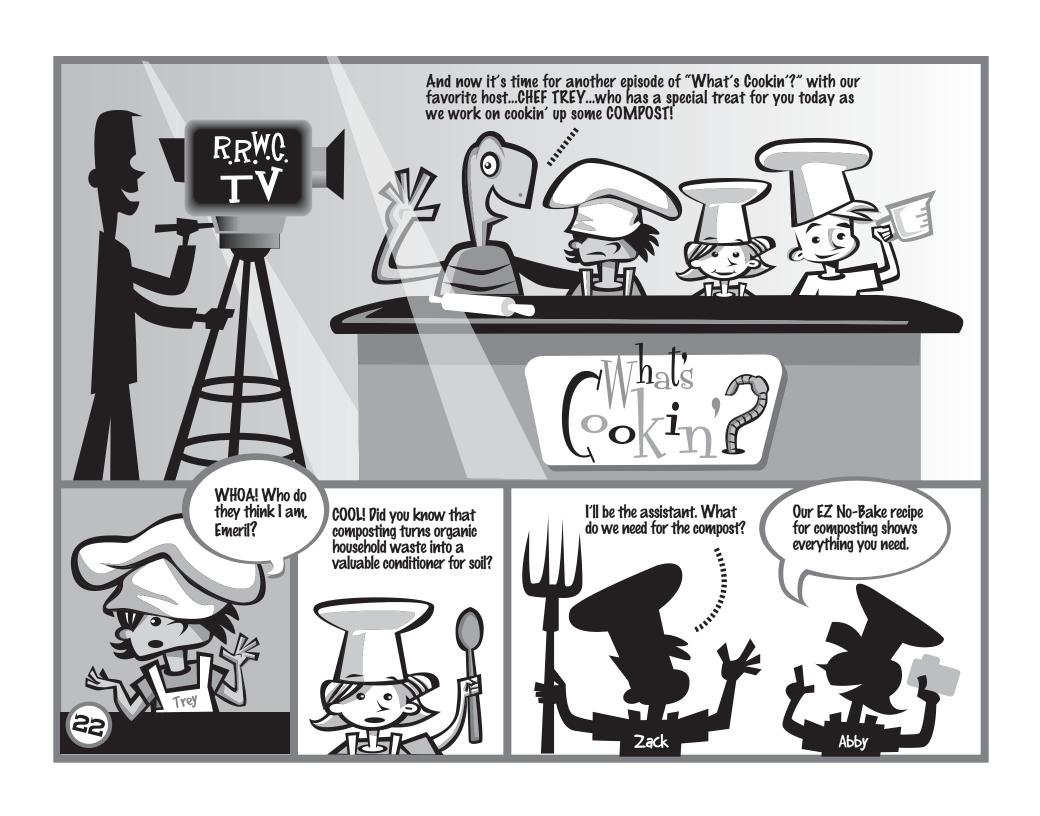


Well you do have quite a diverse collection...

I'll start with "sensitive" indicator orders of E.P.T.
(Ephemeroptera, Plecoptera and Tricoptera). I'll show them up close.









EZ-No Bake Recipe: Composting

Ingredients:

- Yard Waste (grass clippings, leaves, small brush & fwigs, weeds)
- Saw dust & wood chips
- Vegetable & Fruit peelings
- Coffee grounds

- Tealeaves
- Egg shells
- Clean wood ashes
- floor sweepings

Mix: Healthy portion of each together.

Layer: z inches of topsoil in between every 6 inches of the ingredient mixture.

Turn mixture occasionally (except in winter)



- Whole branches & logs
- Pet or human waste
- Charcoal briquette ash
- Sawdust from treated wood
- Meat scraps or grease



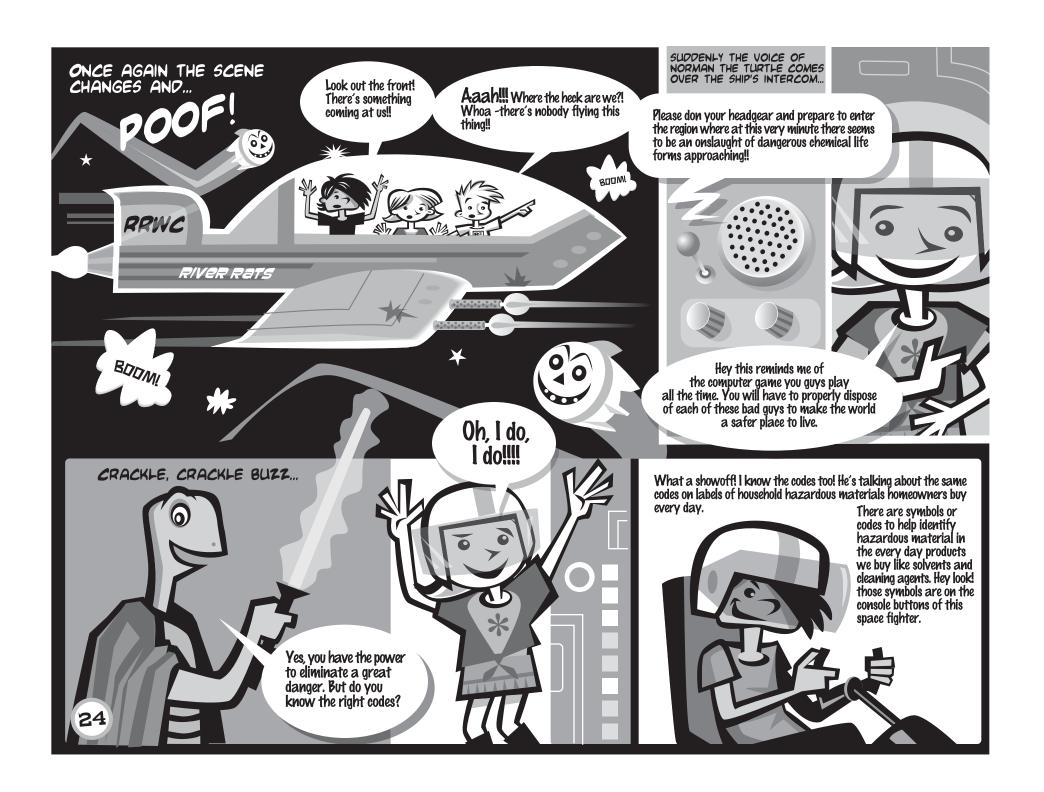
Yard waste used to make up over 30% of all household landfill waste until the 1995 law banning it from landfills and incineration. Throwing it in the landfill created more methane gas and leachate, which pollutes the air and local water supplies. Not only that, but trying to get rid

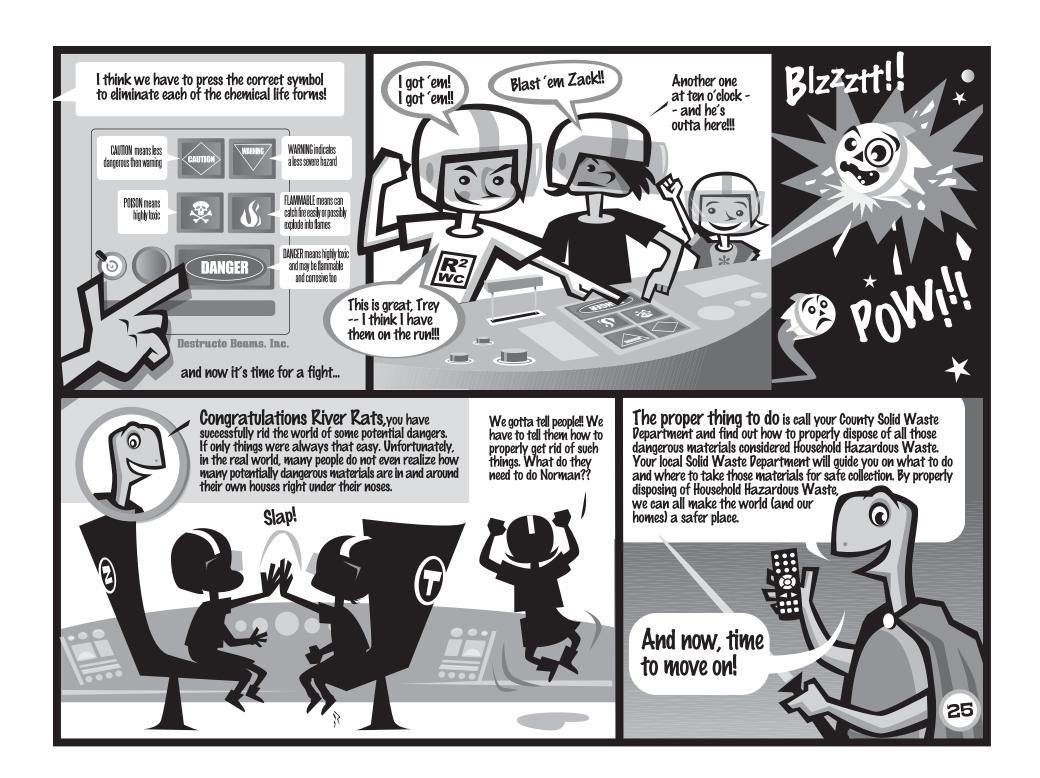
of yard waste by burning only creates more air pollution, not to mention a fire hazard and can be a nuisance to neighbors! That is why since 1995 in Michigan the open burning of grass clippings and leaves is prohibited in municipalities with 7,500 or more people.

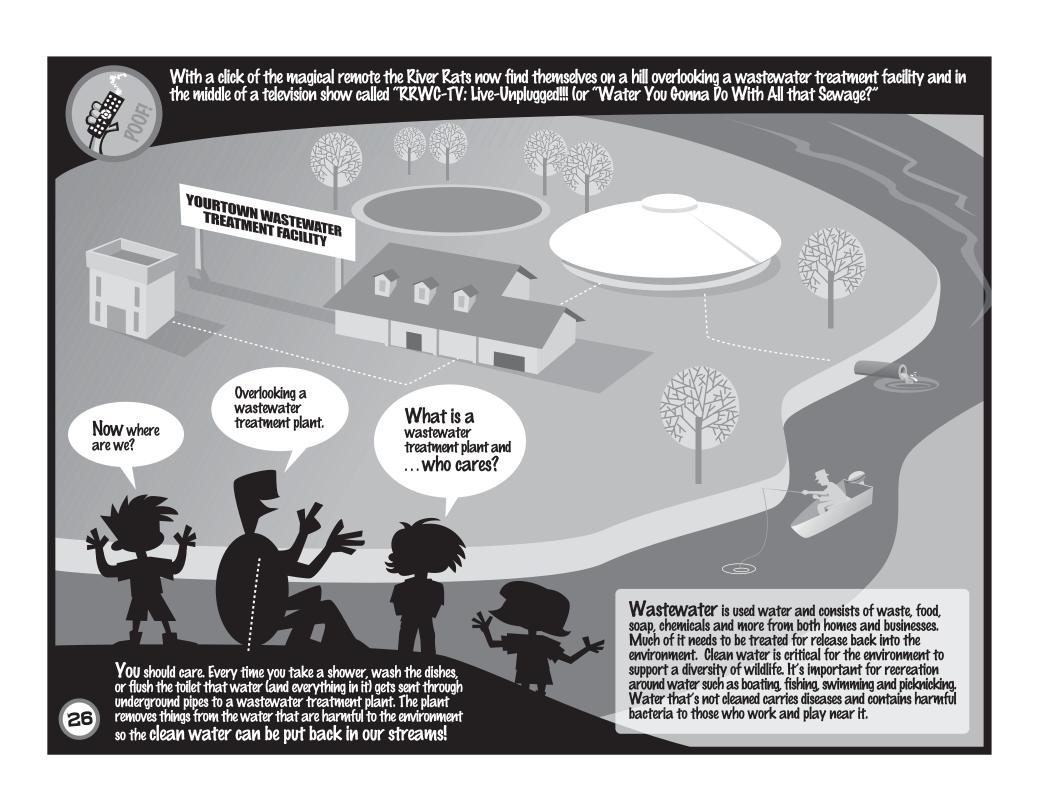


AND there are lots of ways to compost out there – from fancy rotating drums you fill, to a simple circle of chicken wire. You can get more info on composting by checking with your county Solid Waste Department of by visiting the Michigan **Pepartment of Environmental Quality** (MDEQ) website at: www.michigan.gov/deq











Activity: The following words are all associated with the wastewater treatment process. Can you find them in the word search?

Word Search

food soap chemicals nutrients waste garbage nitrogen phosphorus sediment water treatment homes businesses industry grease oil plastic bacteria pesticides fertilizer sewer AXE S NWK HOUSE HOUSE REVISE REDUCE REVISE VILLE

POOF!! With a change of channels the River Rats find themselves on the set of a new show called "R" House whose letters stand for Re-use, Reduce and Recycle.

Hello there, I'm Rachel and I run the recycling center. Recycling is helpful to the environment. Items brought into a recycling center are reprocessed into new useful things. For example plastic bottles can be re-made into rulers, or even playround equipment. Aluminum cans can be made into new cans, window frames or rain gutters. Glass bottles and jars can be used







Making a bird feeder

Recycling can even help out animals. Here's how to make a bird feeder out of a recycled milk jug.

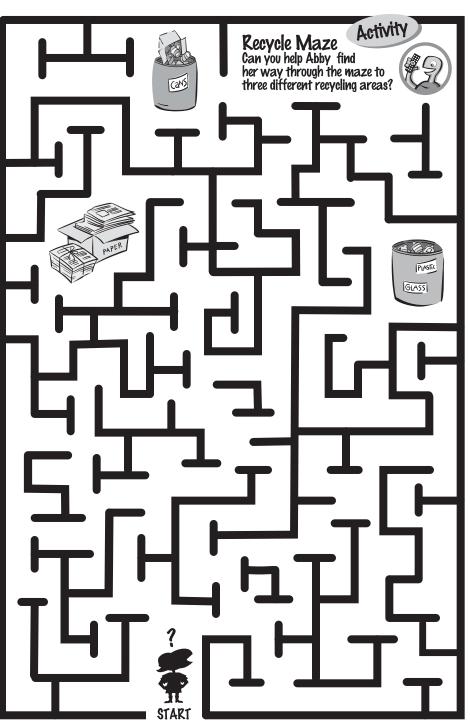
What you'll need:

- A gallon or half-gallon plastic jug
- A wooden dowel rod
- String

Cut two large holes on either side of the jug. Also make two small holes along the bottom directly across from each other. Slowly punch the dowel rod through and poke it through to the other side. This will be a place for the birds to sit and eat. Make a hole through the top of

the cap. Insert and tie the string through it. Fill the bottom of the jug with bird food through the larger holes and hang it in a tree.











Meanwhile back at the house, Zack & Abby's Mom isn't too happy with what she finds waiting for her...



I can't find the remote and the TV set doesn't seem to be working. I'll call the cable company to have them come out



Everythings reconnected ma'm. It seems a strong wind must have come along and knocked the cable line into some pond water. Your TV should be working fine now.



Suddenly a flash of light and small explosion appears in the family room and . . .



THREE WET AND VERY TIRED CHILDREN ARE TRANSPORTED BACK HOME ...

later

A few hours |

Wow! That was so cool! I can't believe how much I learned. I'm actually looking forward to working on my watershed report now...

Are you kids in there?! Where have you been hiding and Zack, don't you have a report due this week that you should be working on??!!



end end

##@##