

OUR ENVIRONMENT

Level - III
(16 to 19 years of age)



Reduce
Reuse
Recycle



Hendricks County

Our Environment

4-H Project Requirements

Level I - 10 to 12 years of age

Level II - 13 to 15 years of age

Level III - 16 to 19 years of age

Level I

- Complete at least two (2) activities each year in the manual
- Read all information sheets in the manual
- Prepare exhibit for 4-H Fair
- Gain knowledge in:
 - Environmental Awareness
 - Natural Resources
 - Basic Recycling Techniques

Level II

- Complete at least two (2) activities each year in the manual
- Read all information sheets and definition pages
- Prepare exhibit for 4-H Fair
- Gain knowledge in:
 - Composting
 - Home and school recycling and purchasing awareness

Level III

- Complete at least two (2) activities each year in the manual
- Prepare exhibit for 4-H Fair
- Gain knowledge in:
 - Community Environmental Awareness
 - Regulations
 - Hazardous Waste

EXHIBIT:

A person may enter an article in one (1) of the following categories:

- a. Clothing items (woven or knitted)
- b. Furniture items
- c. Bottles or cans
- d. Discarded mechanical parts and equipment
- e. Miscellaneous

Ideas for obtaining recycled articles: magazines, books, stores, friends, neighbors, etc.

Examples for each category:

- a. Clothing - hats and purses from blue jeans
- b. Furniture - Coke cases made into end tables, etc.
- c. Bottles or cans - canister set
- d. Discarded mechanical parts and equipment - Model race car from old bolts
- e. Miscellaneous - greeting cards as baskets, etc.

Exhibit will be judged by the following guidelines:

Originality of 4-H exhibit
Choice of materials
Workmanship
Usefulness
Creativity of project

OUR ENVIRONMENT

LEVEL III

16 to 19 years of age

Complete a minimum of two (2) activities each year.

1. Road side survey
2. Garbage Fact sheet, garbage story
3. Supermarket sweep
4. Oil effects on environment
5. Get the lead out
6. What is a hazard -
Collect some information on hazardous wastes (leaflets & other information)
7. Indiana waste management regulations/state & local programs -
(reuse it)
8. Incinerator
9. Composting -
(If first time in project, more composting information in second manual - please refer to Recycling manual)
10. Clean up campaign -
Use your ingenuity to develop a program in your community to clean-up an area (city park, roadside, etc.) or initiate a recycling program.

ACTIVITY 1

Informal Roadside Litter Survey

Time length: 2 months



Measure how much litter there is in your community. Follow these basic steps:

1. Choose the area you want to survey. It may be only a rural road, a state highway, a residential area, a business district or a combination of them all.

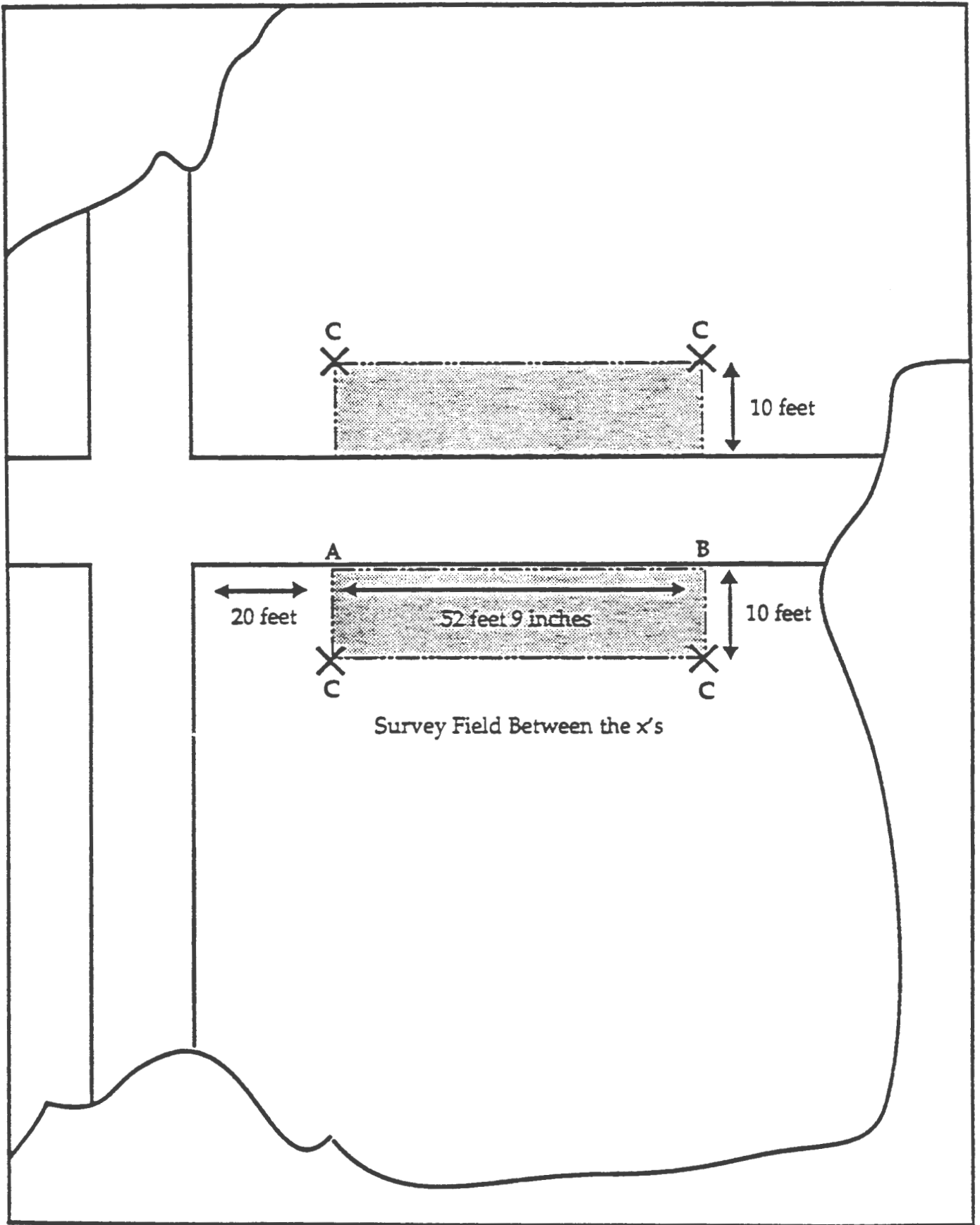
2. Determine which roads you will survey. Use at least three. If it's a combination, do at least two for each of the areas you will be studying. The roads should not be next to each other or intersect near the points of the study.
3. Prepare a survey sheet for the area you are going to examine. You can use the attached sheet or make your own.
4. Using a measuring tape or a yardstick, mark off 20 feet from the curb intersection (A). Starting at that mark, measure 52 feet, 9 inches along the road (B). Mark this. Measure 10 feet behind the berm or curb on both sides of the road (C). Between these points is your survey field.
5. Using plastic or metal buckets, gather all the trash within the survey field. Do not go beyond the survey area or onto the road.
6. Separate the trash into separate piles of cans, bottles, paper, fast food containers, etc. Count all the pieces of trash you have gathered and record the information.
7. Do steps 4, 5, and 6 for each area to be surveyed.
8. Total the number of cans, bottles, etc.
9. Divide the total of each column by the number of areas you surveyed. (That should be three or more)
10. Multiply each answer by 100.

This is an approximate average of how many pieces of trash (litter) there are per mile in the area you surveyed.

Decide with your advisor how to distribute the results. You may wish to send them to your mayor, city councilman or township trustee. You might even want to prepare a report for your local newspaper. Be sure you state where you took the survey, when you did it, who you are (your 4-H club), why you did it (to see if your community needs to be more aware of litter, to see how severe the litter problem is, etc.) and what can be done about it.



Setting Up A Survey Site



Informal Roadside Litter Survey Sheet

Survey Area	Cans	Bottles	Pieces of Paper	Fast Food bags, cups, hold- ers, etc.	Large Trash boxes, mufflers, tires, etc.	Small Trash pop can tabs, bottle caps, etc.
1						
2						
3						
etc.						
Subtotal Divide by the number of areas surveyed						
Total Times 100	<u>x100</u>	<u>x100</u>	<u>x100</u>	<u>x100</u>	<u>x100</u>	<u>x100</u>
Average Pieces Per Mile						

Safety Procedures to Follow

1. Contact local officials.
 - a. Determine a location. Depending on where the road is located, this could be the township trustees, county highway department or county engineer, Indiana Highway Department, mayor or street department, sheriff, local police or the Indiana State Police. These officials can advise and assist you in planning and carrying out a safe project.
 - b. Discuss safety procedures. Do the local officials suggest a car follow each group with hazard lights? Do they have special "crew working" signs to put on each road? Do they have safety vests for your club to wear? It might be good for everyone to wear gloves.
2. Before you are ready, make sure everything is definite and nothing is left to chance.
 - a. The adult responsible for the activity may want to have each participant, or parent or guardian of a participant, sign a written waiver or release form prior to the project. A letter to the parents or guardians explaining the project is also suggested. See Activity 10.
 - b. The adults responsible for the activity may wish to carry a first aid kit with them for any minor injuries.
3. You may want to consider short-term activity insurance. This is typically available for 15 to 20 cents per person per day. For information, see your County Extension Educator.

Litter Talks

One of the best ways of sharing information is by talking, anything from giving a formal speech to a casual conversation with friends. In the following activities, your club can earn points for doing "Litter Talk".

To My Club

A short talk or report on a litter subject can be given by members of your club to the rest of the club. A two minute report on local litter events, recycling centers or a talk on something they read is fine. The idea is for each person to share information that the rest of the club might not know. Perhaps a different person could give a talk at each club meeting!

To Other 4-H Clubs

This is a little harder because the talk will be much more difficult to give to other groups (see hints). Everyone knows 4-H'ers in other clubs and these 4-H'ers can have their advisors set up dates and times for you to speak to their clubs.

Other Public Talks

Service and social groups in your community are always looking for "guest speakers". If a club member has a good talk and does it well, talking to these other groups might be a way to "spread the word" on litter control and recycling or a possible way to get support for a specific activity your club is doing. Scouts, Rotary, church groups, Lions or any local group is a potential audience.

County Public Speaking Contest

This is a public speaking contest that is set up by the county. Contact your 4-H Extension Educator for guidelines, date, time, etc. for this contest.

Hints for Your Talks

1. Make a list of things relating to litter or recycling. Now look at the list. What are some ideas you know something about or you would like to learn? Choose one idea - that is your topic.
2. Find out more about your subject. Talk to knowledgeable people. Read. Anything related to your subject can give you a better understanding of what you will talk about.
3. Write the three most important points (ideas) you want to get across. This will be the main part of your talk (the body). Connect the points with related ideas.
4. You will need an introduction. A good way to start is with an attention-getter: a quotation, a statistic, a humorous (but related) story or a recent event are all good. After you have their attention, you should very briefly tell the audience what you will be speaking about.
5. Follow the introduction with the body of your talk. Make each point and then follow it with extra information. Try to let the ideas flow like natural conversation.
6. Finally you need a conclusion. This should briefly summarize your talk and end with something to think about.
7. Don't forget to practice! The more you practice, the easier it will be to talk and the better you will do.
8. Most important of all, smile.

**Do the
Right Thing**



ACTIVITY 2

GARBAGE STORY

The Great Garbage Story

Garbage is a problem. People try to solve this problem. They call garbage by a special name - solid waste. Solid waste won't go away by itself. It can't disappear into water or air. Picking it up and taking it away is one the most important jobs that city workers do.

Solid waste wasn't always such a big problem. People in the "olden days" didn't have so much to throw away. They grew their own fruits and vegetables. They killed animals for meat. They didn't shop in stores, so they didn't have a lot of packages.

Then people made their own containers out of clay and plants. AThey used them over and over. They made simple, sturdy furniture to last for a long time. Worn out clothes were made into rugs and quilts. Leftover food was eaten by the animals. People long ago had no need for huge garbage cans.

But some things were thrown away. For example, when clay bowls broke, they became solid waste. They were thrown away in open dumps. At first, dumps were small but as people settled down and built towns and cities, dumps became larger and larger. The first garbage men began to go from house to house with carts and horses. Solid waste began to be a real problem.

Today each of us throws away about four pounds of garbage every day. That adds up to 400,000 tons a day in the whole country. Almost all of our garbage is dumped in the same way it was in the "olden days", only our dumps are much bigger. There are many more people today and each of us throws away more and more garbage each year.

**DON'T LET IT ALL
GO TO WASTE!**



ACTIVITY 2 (continued)

ENVIRONMENTAL AWARENESS

Solid waste is another name for garbage. Solid waste is also one kind of pollution. People are becoming concerned about pollution. They are trying to do things that will make our environment cleaner and a better place for all living things.

Here are some ways we are helping our environment. Put *yes* in front of the ones that will help. Put *no* in front of the ones that are foolish and unreal.

- _____ Young trees are being planted as old trees are cut down.
- _____ Polluted air is being trapped and put into balloons. These balloons will be sent to Mars.
- _____ Litter laws remind people to keep their environment clean.
- _____ Scientists are working to find new ways to kill insects. They are looking for ways which won't harm birds and other animals.
- _____ Students are planting toothpicks in the school yards. This will help save our trees.
- _____ Consumers are buying products that can be used again instead of disposable products like plastic spoons and cups.
- _____ Engineers are working to design car motors that won't poison the air.
- _____ Many people are riding buses or bicycles. That means fewer cars on the streets.
- _____ Farmers are planning to grow tomatoes on the moon where there are no insects.
- _____ Shoppers are buying more products that do not have extra packaging.
- _____ More and more factories are taking the poisons from their smoke and cleaning their used water.
- _____ Scientists are planning to send rockets to the sun to collect solar energy.
- _____ City planners are working to beautify the cities. They are also trying to save open spaces for parks.
- _____ Many people recycle or reuse things they buy. This helps get rid of trash and waste.

ACTIVITY 2 (CONTINUED)

A WALKING TOUR

A walking tour is a chance to see firsthand the various types of litter and where they come from. The tour involves going through different parts of your community, noting what litter you see, where you see it and what source left it there.

Sources of Litter	Types of Litter
<i>Pedestrian</i> - Litter dropped by people walking in or through the area	<i>Paper</i> - Any paper products
<i>Motorist</i> - Litter thrown from cars	<i>Cloth, clothing</i> - Discarded rags, etc.
<i>Open Trucks</i> - Litter blown off uncovered trucks	<i>Metal Cans</i> - Pop can tabs, etc.
<i>Commercial Refuse</i> - Trash from business waste receptacles	<i>Plastic</i> - Jugs, pieces of plastic, etc.
<i>Household Refuse</i> - Litter from improperly covered household trash cans	<i>Styrofoam</i> - Cups, foam boxes, fast food, etc.
<i>Loading/Unloading</i> - Litter blown from docks while trucks are being loaded and unloaded	<i>Glass</i> - Bottles, pieces of glass
<i>Construction</i> - Trash from construction projects	<i>Rubber</i> - Tires, toys
	<i>Miscellaneous</i> - Litter that doesn't fit into any of the above groups

How To Do It

1. Your club can go in one large group or you can divide into smaller ones. If you are in smaller groups, assign each one a section of the community to walk through; if your club stays together, decide where your walk will be.
2. Walk! Look for litter and take notes. Decide where the litter came from (source) and what type of litter it is. Write those ideas down along with where the litter was seen (corner of building, sidewalk, parking lot, gutter, alley, etc.).
3. When everyone is back together again, talk about what everyone saw. Determine if a pattern is there: are there certain types of trash only in certain areas? Is the source different in different areas? etc.

If your club is planning a walking tour, keep these ideas in mind:

1. Dress according to the weather.
2. Take paper and pencils. (Don't leave them anywhere!).
3. Be prepared to talk about what you see!

ACTIVITY 2 (continued)

GARBAGE FACT SHEET

How much "garbage" does your community throw away? How much does it cost and where does it go? The following questions will help you find this out. Once you have the answers, you may wish to write an article for your local newspaper on what you have found.

1. What is the population of your community (town, township, city, etc.)?

Name of town, township or county _____

How many families are there in the community? (See census data at your local library.) _____

Average size of family (population of community divided by number of families).

2. How many tons of garbage does our community dispose of

each day? _____ each week? _____

(This information may be obtained through the local Department of Public Works, the Department of Sanitation, the County Commissioners' office, Township Trustees, the landfill operator or the collection hauling company.)

3. Does this amount really show how much garbage our community generates or is some of it burned, dumped in open dumps or taken directly to the landfill by local residents? (Which if any?)

4. Where is our city or county sanitary landfill?

5. How many pounds of waste are disposed of by each person in our community every day?

(Multiply tons per day - see question number 2 by 2,000. Divide the total by the number of people in the community, question number 1.)

ACTIVITY 3

REDUCTION

Have you ever heard the phrase "convenience packaging"? This refers to all those items we buy because they are easy to use or are handy. Frozen foods, packaged goods, fast foods are all convenience items. One problem with them is that they are designed for easy use, so they come in a separate, disposable package. This is not necessarily bad - sometimes there is a definite need for packaged, convenience items. However, the disadvantage is that the excess packaging created by convenience packaging not only increases waste, but sometimes increases the cost of items we buy. How can convenience packaging be dealt with? We can become selective in our purchasing. Try the "Supermarket Sweep" on the next page.



Reduction: Supermarket Sweep

Next time you go to the store with one of your parents, take this chart along and fill it out.

Find items that you can buy either prepackaged or not. Compare the prices for similar amounts (16 oz. = 1 pound; 8 oz. = 1 cup). Remember that fresh produce prices vary depending on the season.

Packaged or Unwrapped	Packaged	Price	Unpackaged Price (similar quantity)
1.			
2.			
3.			
4.			
5.			

Product	Weight/Volume	Fresh Price	Canned Price	Frozen Price
1.				
2.				
3.				
4.				
5.				

Do you see anything that could be bought in less packaging?

What?	Describe Package	How Could It Be Better?
1.		
2.		
3.		
4.		
5.		

After completing this activity, you may want to follow up by writing a letter to various companies to find out why they package their products the way they do.

ACTIVITY 3 (continued)

PACKAGING

An additional aspect of packaging that has become common and necessary is seen in the use of *safety-sealed* containers.

What are different ways that packages have been sealed?

1.		
2.		
3.		
4.		

Do you know what *safety sealed* packages are? If yes, describe or list some products that are safety sealed and tell why safety sealing is used.

Reduction and Containment

What are some ways we can reduce the amount of trash that becomes litter? One way is by providing enough trash cans in enough places. This is called containing the trash properly or containment. Where are places that you find a lot of litter?

Are there trash cans at these places? Put a check by those you just named where there are no trash cans.

We know certain things about what helps make people want to use trash cans:

1. They blend in with the environment
2. They are easily visible
3. They are unique
4. Concrete, wood or stone containers with removable linings are preferred

5. Hinged doors are best.
6. Green is the favorite color.

Choose one of the places from your list. In this space, design a trash can that makes use of the ideas concerning trash cans.

Another way we can help reduce litter is to clean up litter already on the ground. This is called collection. Certainly, collection will make the area look better. But clean up may have a positive effect on people who pass through the area. People are less likely to litter in an area that is clean than in a place where there is already trash thrown out.

ACTIVITY 3 (continued)

REDUCTION/CONTAINMENT

Reduction through Reuse

After an item is used for its original purpose, it can be reused either for the original purpose or for a purpose different from the original. This is called **reuse**. Antiques, items purchased at a yard or garage sale, and crafts constructed from trash are all examples of reuse.

Is this the same thing as recycling? No. Why do we separate **reuse** from **recycle**? Let's figure it out.

If an item is **recycled**, we mean that it saves natural resources. This is possible because the used item is actually broken down or melted and remade into a new one. On the other hand, when an item is reused, it is **not** remade into a new one.

Let's look at an example of an item used both ways. Say you have an empty peanut butter jar. You decide to use it as a pencil holder. In this case you are reusing the jar. On the other hand, if you decide to buy another jar of peanut butter, the product has to be purchased in a "new" jar. If you had recycled the original glass jar, it could have become that new jar. This new jar made from the melted down, reblown glass of the old is a recycled jar. When you reuse something, you have to buy a new product to replace the item now being reused for some other purpose. When you recycle, the old could become the new.

List some of the things you and your family reuse.

Does your list include hand-me-down clothes? Old games you give away? Bed sheets used for rags?

A lot of reuse seems "natural" to us. Much of our American heritage is based on reuse. Quilts were made from old scraps of cloth; toys were created from bits of wood, corncobs and rags. And we are still reusing today! You can see just how much reuse we do without even looking very hard.

So why is reuse important? If we are careful to reuse what we can, we can reduce our waste. Look back to your chart now on amount of waste. Can you guess how much of that could have been reused?

ACTIVITY 4

SPECIAL WASTES

When people think about recycling, they usually think about such conventional materials as aluminum, steel, glass and paper. However, there are other materials, usually called "special wastes", that can be recycled as well. These include motor oil, tires, spent solvents and auto and household batteries.

Few recycling centers are equipped to handle such special wastes; most are collected by specialty firms who pick up these materials at auto and truck service centers and industrial sites.

Motor Oil

About 67 gallons of crude oil are needed to produce one gallon of refined oil. By comparison, two gallons of motor oil can produce one gallon of re-refined oil.

Approximately 1.2 billion gallons of used oil are generated annually - the equivalent of 78,000 barrels a day. About 33 percent was dumped - usually by do it yourself oil changers.

One quart of oil can contaminate 250,000 gallons of water - more water than 30 people can drink in their lifetimes. For this reason, Indiana prohibits the use of used oil as a dust suppressant on roadways.

Oil is a non-renewable resource which never wears out - it just gets dirty. Yet only 5 percent of our annual consumption is re-refined. Most used oil is reprocessed with water, its particulates are removed, then it is burned as fuel.

Motor oil that meets EPA testing standards for flashpoint and heavy metals is called specification fuel. This oil is environmentally safe to burn in any boiler that allows easy ash removal. Used oil is also used to fuel asphalt plants and cement and lime kilns.

Other uses for used oil are as a fuel for commercial space heaters and a lightener for the bunker fuel used on large ships. Without used oil, bunker fuel will not flow properly in cold weather.

Twenty years ago, most used oil was re-refined for automotive use. New additives introduced since then make re-refinement difficult for that purpose.

Scrap Tires

Despite their recyclability, relatively few old tires are recycled. At present only 4 percent of American tires are recycled, and an estimated one billion tires are stockpiled across the country, according to Keep America Beautiful, Inc.

Abandoned tires are particularly difficult to dispose of. Some states ban them from landfills because they cannot be compacted and frequently rise to the surface. Where they can be landfilled, landfill owners often require that they be shredded or split; some add a tipping surcharge for each tire.

Compounding the problem are the dangers abandoned tires pose to health and their potential for contaminating ground and surface water. Because they catch water and provide shade, old tires provide an ideal harborage for mosquitos. Should a stockpile of tires ignite, the fire is particularly difficult to extinguish, pollutes the air with thick, acrid smoke, and the rubber changes into an oil-like liquid that can contaminate surface and ground water. Legislation adopted in 1990 may motivate tire recycling. It sets storage requirements for used tires and creates a fund to clean up old tire piles.

Steel-belted radial tires resist recycling efforts, but conventional tires can be recycled through various means:

Retreading

This process bonds a new tread onto a worn tire. If the bead is straight and the sidewall is free of punctures or obvious physical damage, the tire can be retreaded. The process is frequently done on truck, off-road vehicle and farm tires, usually because the cost of new replacements is so high. The price of a retreaded tire is between 50 - 70 percent of a new one, and with proper inflation, should last just as long. About 600 million pounds of tread rubber is used by the retread tire industry annually.

Reclaimed Rubber

About 10 million tires are ground, shredded and pulverized each year, then formed into sheet rubber. This material is sold in bales to producers of molded materials and semi-pneumatic tires.

Unfortunately, the capacity for this material currently surpasses market demand. Falling oil prices have made it difficult for recyclers to effectively compete with producers of virgin rubber.

Crumb Rubber

Ground or shredded rubber can be added to other materials to manufacture new products. One particular result of this process - asphalt rubber - offers the greatest potential for using scrap tires in an economical, energy-efficient manner.

Adding rubber to asphalt greatly enhances the material's cold temperature characteristics. In road construction, this material serves as stress absorbing membrane, surface treatment or inner layer. Asphalt rubber compounds can also be used as crank and joint filler. Non-highway applications include water retention liners for ponds and landfills, and as a cover for landfill areas containing semi-toxic materials.

Asphalt rubber is also being tested as a roofing material.

Artificial Reefs

To reduce coastal erosion, scrap tires are being strung together with non-corrosive cable and sunk off ocean shorelines.

Other uses for scrap tires are pyrolysis and alternative energy fuels for electric utilities.

Spent Solvents

Such solvents as turpentine, paint thinners, perchloroethylene and methylene chloride can have a negative effect on the environment. Carelessly discarded flammable solvents have caused sewers to explode and garbage trucks to burn. Municipal waste water treatment plants can be damaged by these materials.

These materials are often incinerated, but they can be recycled in much the same way as motor oils. To dispose of them properly, contact your local solvent distributor and arrange for a pick up or a drop off.

Lead Acid Batteries

According to a report released by the EPA, two thirds of all lead in municipal solid waste comes from automobile batteries. This figure is relatively surprising, since lead acid batteries have one of the highest recycling rates of all recyclable materials.

An average battery available for recovery weighs 36 pounds, half of which is recoverable lead. It contains about one gallon of sulfuric acid, three pounds of polypropylene casing, about three pounds of polyvinyl chloride (PVC) separators, and another three pounds of sulfates and oxides that bind the lead.

Some communities have drop off sites for spent batteries. Milwaukee, Wisc., maintains six battery disposal sites specifically for its retailers and citizens. Collected materials are sold to a processor.

The 1990 Indiana General Assembly adopted a law making it mandatory for a retailer to accept a used battery for every new one sold. These returned batteries must be sent to a reclamation center.

Household Batteries

Eight major metals are used in batteries: mercury, cadmium, lead, lithium, manganese dioxide, silver, nickel and zinc. All pose significant environmental hazards.

When incinerated, discarded batteries release pollutants into the air, and the resulting ash can be highly toxic.

To reduce the number of landfilled and incinerated batteries, consumers are encouraged to purchase rechargeable nickel cadmium batteries whenever possible. Modern rechargers are inexpensive and easy to use, and the batteries themselves can hold up to 1,000 charges.

Markets also exist for purchasing and recovering the mercury commonly found in watch, camera and hearing aid batteries. In addition, manufacturers are looking for ways to reduce the mercury content in them.

Waste metal dealers may also accept other battery metals for separation from their cases.

Road Pavements

Although beyond the scope of most recycling centers, old road pavements, such as concrete and asphalt, are commonly reprocessed into new aggregates. Common in Europe for decades, new processing technologies and equipment are making recycling a cost efficient alternative to buying virgin materials and landfilling.

Concrete is pulverized in jaw and cone crushers; asphalt is compacted to break the bond between the stones.

Some construction companies are purchasing portable crushing equipment for operation at job sites and gravel pits. The cost for a concrete crusher is high - nearly \$1 million for a complete system - but it can recycle up to 150 tons of concrete per hour.

Recycled asphalt has largely replaced liquid asphalt for most road applications. Since 1973 the cost of liquid asphalt has jumped from \$20 per ton to about \$200 per ton. The recycled product provides a reasonably priced, alternative to the virgin materials.

Appliances

Many old appliances contain materials that are considered hazardous to the environment, including chlorofluorocarbons (CFC), mercury and PCBs. Some scrap dealers refuse to accept old appliances, primarily because of the liabilities in handling these materials.

Some specialized processors are able to properly recycle CFC and mercury and properly dispose of PCBs, so certain recycling centers accept them. Usually such services are only available in major metropolitan areas. However some processors will make special trips to other areas to pick up truckload lots.

ACTIVITY 4 (continued)

Oil With Plants Worksheet

- Directions:
1. Put several drops of oil on the plant.
 2. Describe what happens.
 3. Check the plant in a few hours.
 4. Check the plant again in a few days.

Oil With Soil Worksheet

- Directions:
1. Put several drops of oil on the soil.
 2. Describe what happens.
 3. How would you get the oil out of the soil?

Oil With Water Worksheet

- Directions:
1. Put several drops of oil in a glass of water.
 2. Describe what happens.
 3. Mix the oil in the water.
 4. Describe what happens.
 5. Would you drink the water? Why or why not?
 6. How could you get the oil out of the water?
 7. Can you remove the oil completely from the water?

ACTIVITY 5

GET THE LEAD OUT!

Complete Two Word Puzzles

Script:

What wakes you up in the morning? An alarm clock? Your parents or brothers or sisters? Do you need to eat a nutritious breakfast before your brain starts working? Have you ever wondered what starts the car or bus that takes you to school?

Most cars and buses need a spark of electricity to ignite or explode the gasoline or diesel fuel that makes the pistons move and the wheels turn. The thing that provides the energy to make the spark in the spark plugs is the battery. Many years ago, an Italian scientist named Volta discovered that you could transform chemical energy to electricity by placing two different kinds of metals in an electrolyte solution. In today's car batteries, the electrolyte solution is sulfuric acid and the two metals are lead and lead oxide. When the car starts, it uses the electricity from the battery. While the car is running, there are special gadgets under the hood that help the car produce its own electricity from the fuel burning engine. When the car is running, the battery is recharged for its next start up. It usually takes a long time for the car battery to run down or lose its chemical energy.

This is terrific! Somebody's car or motorcycle or a school or city bus takes you where you want to go. But one day, that battery loses its chemical energy. The electricity doesn't get generated. The spark doesn't go through the spark plug to ignite the explosion in the cylinder. Somebody has to buy a brand new battery. What happens to the old battery and why are we concerned about it?

Lead compounds and sulfuric acid are very useful compounds in a car battery, but they're bad news for the environment. Even when they are inside the battery case in the car, they can be very dangerous. Whenever somebody handles car batteries, they should wear safety glasses and gloves and should be prepared to lift about 38 pounds. Batteries can be explosive and corrosive. The acid can burn through clothing and skin and the fumes are bad news for your nose and lungs. We don't want lead loose in the environment, because it can cause brain damage.

The good news is that when your mom or dad go to buy a new battery at the store or garage, Indiana law requires the seller to take back the old batteries (effective January 1, 1991, House Bill 1391). Some places will even give you a refund for old batteries! Lead acid batteries shouldn't be put in landfills or incinerators. Two thirds of the lead in our landfills comes from lead acid batteries, although they're pretty easy to recycle. Each car battery has about 18 pounds of recoverable lead, three pounds of polypropylene plastic casing, three pounds of PVC cell separators, three pounds of lead sulfates and oxides, and a gallon of sulfuric acid!

Information sources: *The Random House Book of 1001 Wonders of Science*, by Brian and Brenda Williams, 1990, Random House, New York.

The Indiana Recycling Handbook, by the Indiana Recycling Coalition, 1990, 1st ed.

ACTIVITY 5 (continued)

Word Puzzle One

Only one letter of the alphabet appears in all three words in each line. Transfer that letter to the corresponding numbered blank at the bottom to spell out the secret message.

1. battery, sulfur, iron
2. energy, lead, fumes
3. cycle, car, sick
4. recycle, by, annoy
5. electricity, cop, can
6. lead, sulfuric, pool
7. cyclinder, fumes, the
8. bad, buy, knob
9. gallon, acid, day
10. environment, but, yacht
11. safety, top, unit
12. terrific, cell, enough
13. brain, red, our
14. Indiana, oxide, high
15. news, require, employ
16. glasses, thirds, soup

Secret Message:

R
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Word Puzzle Two

Unscramble each of the words in the following sentences.
Example: slt' ufn ot eylrce = It's fun to recycle.

1. aBttreeis amek lecertyt rfmo hcmecila neregyl.
2. dicA semuf era dab rof ruoy eson dna sgnul.
3. Teh sotre wliil tkae yuor odl btatrey wehn yuo buy a nwe oen.
4. udlAts ohusdl sue faesyts saslegs nad olvgse hwne dnlahngn elda-cadi tearbise.
5. aoltV saw na liantla ststciien how did yaerl perioxments whit triestabe.

ACTIVITY 6

HAZARDS

What Is A Hazard?

When you care for yourself, your home, your gardens, and your machines, you use many chemical products. Research sponsored by the U.S. Environmental Protection Agency shows that some of these products contain hazardous chemicals. The E.P.A. defines a hazardous substance as a "dangerous" substance which may harm human health or the environment. To be included in the E.P.A.'s hazardous category, the substance must meet certain standards during accepted scientific tests which show that it is TOXIC, IGNITABLE, CORROSIVE (likely to eat through its container or your pipes) or REACTIVE (may explode during routine handling).

When Is It Hazardous?

If used according to label directions, most household products are not hazardous. They may become hazardous if you use them improperly, store them improperly, or dispose of unused products improperly.

IMPROPER USE may cause toxic health effects. IMPROPER STORAGE may allow chemicals to leak into the environment causing dangerous chemical reactions, toxic health effects, or environmental pollution. IMPROPER DISPOSAL allows these dangerous chemicals to enter *directly* into the environment through waterways or groundwater. These chemicals can pollute drinking water, kill wildlife, and accumulate in foods such as fish and ducks.

Who To Call

Poison Information Center
1-800-382-9097

Department of Environmental Management
External Affairs (317) 232-8560

U.S. Consumer Product Safety Commission
1-800-638-2772. This number will provide information on product labeling.

Chemical Referral Center
1-800 CMA-8200 This number is sponsored by The Chemical Manufacturer's Association. This number will refer you to a specific manufacturer for answers about product questions.



Do's

- Read the product label. Follow use directions carefully.
- Watch out for SIGNAL WORDS, such as CAUTION, WARNING or DANGER. U.S. Product Safety Commission requires the use of these words on products which are toxic in small amounts. Keep *all* of these products away from children!
- Buy just enough product to do the job.
- Look for a non-hazardous or less hazardous product to perform each job.
- Return used motor oil to the waste oil collection site in your county.
- Properly dispose of leftover products.
SEE CHART ON REVERSE SIDE FOR DISPOSAL RECOMMENDATIONS.
- Keep leftover products in original containers.
- Share unused products.

Don'ts

- Do *not DUMP* leftover products in the backyard or down the storm sewer.
- Do *not BURN* leftover products.
- Do *not BURY* leftover products.
- Do *not REUSE* pesticide or other chemical containers for other purposes.
- Do *not MIX* chemical wastes.

Collect information on hazardous wastes (leaflets and other information).

Home Product Disposal Guide

Symbols following product type represent first, second, and third disposal choices.

- First sign symbolizes best PRODUCT disposal choice.
- Second sign symbolizes best action if other option is not feasible.
- Third sign indicates how an EMPTY container should be disposed.
 - a. Use up product.
 - b. Rinse container if water soluble or evaporate remaining solvents if feasible (open air, away from flame or pets).
 - c. Use rinse water.

This review is based on products commonly available and best available information about their contents as of July 1986. If you have any doubt about an acceptable disposal procedure contact your local authority.

Meaning of Symbols:

- Weekly trash collection to clay-lined municipal landfill or incinerator. Avoid old or unlined dumps if possible.
- ☐ Weekly trash collection with *special wrapping*. Wrap container in absorbent material such as newspaper and cover with a plastic bag.
- ↑ Evaporate small amounts of solvents if feasible (*open air, away from flame or pets*). If not feasible, use ☆ or ☐.
- ↓ Pour down drain with plenty of water. NOT appropriate for all household drains, especially septic systems.
- ↪ Share with a neighbor or recycling facility. For help in finding a waste oil or battery recycling facility, call one of the local officials listed on reverse side.
- ☆ Community household hazardous waste collection program. Encourage your community to sponsor a collection program.

Guide is on next page.

1st CHOICE
2nd CHOICE
EMPTYIES

1st CHOICE
2nd CHOICE
EMPTYIES

Personal Care			
cosmetics (large quantities)	↪	● ¹	●
detergent	↪	↓	●
spot remover (with chlorinated solvent)	↪	↑	●
dry cleaning fluids	☆	↑	●
alcohol based lotions (after shave, perfume, etc.)	↑	↓	●
permanent lotions	↪	↓	●
medicine (expired)	↓	☐	●
nail polish	↪	☐	●
nail polish remover	↪	↑	●
moth balls	↪	↑	●
shoe polish	↪	↑	●
Plant and Yard Care			
herbicides/weed killers	↪	☆	☐
insecticides	↪	☆	☐
fertilizer	↪	●	●
fungicide	↪	☆	☐
severely toxic pesticides — DO NOT USE	☆	☐	☐
Aldrin, Chlordane, DBCP, DDT, Dieldrin, Endrin, Heptachlor, Kepone, Lindane, Mirex, Silvex, Toxaphene, 2,4,5T (Silvex and 2,4,5-T may not be accepted by your community collection program)			
House Care			
rat or mouse poison — arsenic based	↪	☆	☐
rat or mouse poison — warfarin based	↪	●	●
drain cleaner	↪	↓	●
abrasive cleaners	↪	↓	●
disinfectants (household quantities)	↪	↓	●
furniture polish or wax	↪	↑	●
silver/copper polish	↪	☐ ¹	●
hardwood floor cleaners	↪	☆	●
bleach	↪	↓	●
ammonia based cleaner	↪	↓	●
aerosol cans ²	↪	↑	☐
oven cleaners (lye based)	↪	☐	●
toilet bowl cleaner	↪	↓	●
window cleaner	↪	☐	●
tub and tile cleaner	↪	☐	●
mildew cleaner (fungicide)	↪	☆	☐
rug and upholstery cleaner (solvent based)	↪	↑ ¹	●
detergent based upholstery cleaners	↪	↓	●
air freshener (solid) ²	↪	↑	☐
dish detergent	↪	↓	●

septic tank degreaser — DO NOT USE (with chlorinated solvent)	☆	↑	●
smoke detectors, radioactive (low level) — return to manufacturer			
Motor and Vehicle Care			
waste motor oil	↪ ³	☆	☐
gasoline	↪	↑ ⁴	☐
old antifreeze (2 gallons or less)	↪	↓ ¹	●
used brake or transmission fluid	↪ ³	☆	☐
old car batteries	↪ ⁵	☆	n/a
degreasing chemicals (carburetor cleaner, etc.)	↪	↑ ¹	☐
auto body repair products	↪	↑ ¹	☐
car wax (solvent-based)	↪	↑ ¹	●
other leftover fuels	↪ ³	☆	☐
Home Repair			
old paint (lead base)	☆	↑	●
old paint (lead free)	↪	↑ ¹	●
old paint (latex)	↪	↑	●
stains	↪	↑	●
wood preservative (pentachlorophenol)	☆	☐	●
solvents, thinner, turpentine	↪	↑ ¹	●
paint or finish removers	↪	↑ ¹	●
glue (solvent based)	↪	☆	●
glue (water based)	↪	↓	●
Hobbies			
pet flea collars	↪	☐	☐
flea sprays	↪	☐	☐
ammunition			local police or fire department
artist paints/solvents	↪	↑ ¹	●
gun cleaning solvent	↪	↑ ¹	●
lighter fluid	↪	↑	●
mercury battery (D cell and smaller)	☐	●	n/a
photographic chemicals (unmixed)	↪	☆	●
photo chemicals (mixed and diluted)	↪	↓	●
swimming pool chemicals (undiluted)	↪	☆	●
acids	↪	☆	●

¹ May be acceptable in your community ☆, call for information.
² Incinerators may have special disposal rules. Some collection programs may not accept aerosols. Product components vary widely in hazard content. Some aerosol products may not include hazardous components, but *all* should be disposed of with care.
³ Locate local oil recycling facility.
⁴ Let sludge settle, use remaining gas or evaporate if in very small quantities.
⁵ Locate local battery recycling possibilities.

ACTIVITY 7

WASTE REGULATIONS

Indiana Waste Management Regulations

Waste management, including recycling, involves many activities that have the potential for affecting public health and the environment. Waste may contain many dangerous materials that can injure workers and seriously affect neighbors. There is a possibility of fires and explosions, or the release of toxic or infectious materials. During management of waste, toxic materials may be released into the environment. Landfills may have odors or produce leachate that can contaminate the groundwater. Waste to energy facilities and incinerators may generate a hazardous ash as well as release toxic materials into the air.

Recycling is not exempt from these potential problems. The recycler must take care to recycle in an environmentally sound manner.

The Indiana Solid Waste Management Board has the responsibility for adopting regulations and overseeing their implementation to control these activities to limit any potential impact to public health and the environment.

Through its Office of Solid and Hazardous Waste, the Indiana Department of Environmental Management (IDEM) is responsible for implementing the regulations adapted by the Solid Waste Management Board.

Waste management regulations are found under Title 329 of the Indiana Administrative Code (IAC). There are two fundamentally different rules to manage solid waste. The first rule, 329 1AC2, addresses all solid waste in Indiana except hazardous waste. This rule, referred to as the Indiana Solid Waste Rule, is unique to Indiana and does not have a federal counterpart. It was substantially revised in early 1989. This revision is significantly more protective of the environment than the prior version and is generally more protective than federal proposals.

The second rule, 329 1AC3, addresses hazardous waste. In contrast to the Indiana Solid Waste Rule, this rule is based on the U.S. Environmental Protection Agency's (EPA) regulations. These federal regulations are based on a law passed by Congress called the Resource Conservation and Recovery Act (RCRA). With a few exceptions, Indiana's regulations are the same as the federal regulations.

Both rules affect recycling in Indiana. The first step in understanding this impact is to understand the hazardous waste rule.

The hazardous waste rule establishes specific standards for a generator of hazardous waste based on the amount generated. Subject to limited exceptions, generators that generate less than 220 lbs. of waste per month that

meet the definition of hazardous waste are conditionally exempt from the rules. The solid waste they generate is by definition not hazardous waste. The waste may be legally disposed of as municipal solid waste, despite being hazardous. Residential hazardous waste generators are similarly exempt. This exempt waste is referred to as "household hazardous waste".

If generators generate between 220 and 2,200 lbs. per month of hazardous waste, they are considered small quantity generators. If more than 2,200 lbs. per month is generated, they are considered large quantity generators. Small quantity generators are subject to less stringent requirements than large quantity generators.

Hazardous waste generators must label the waste and properly store it. More importantly, they cannot store the waste for more than a specific number of days: 90 days for large quantity generators, without obtaining a special permit. This permit is called a RCRA Treatment, Storage or Disposal (TSD) permit. It is also known as a "Part B" permit.

When generators ship waste off-site, they must ship it to a facility with a TSD permit using registered hazardous waste transporters. Their shipments are tracked with a special manifest system that ensures that the waste was received intact and unaltered at the TSD facility.

The TSD permit is an elaborate permit that describes in detail how the waste must be managed at the facility.

Recyclers must be careful not to accept any hazardous waste and must be aware of the definition of hazardous waste. They must get advice immediately when confronted with the prospects of generating hazardous waste or obtain a TSD permit to manage it.

Hazardous waste is defined by an intricate two step process. First, the material must be solid waste. Second, the solid waste must be considered "hazardous".

A material may be a solid waste despite the fact that it is recycled. If the recycling involves processing the material to make it usable or involves separation of the waste into its components, the material is probably a solid waste until it is made reusable. This recycling process is called "reclaiming".

In contrast, if the material can be reused as an effective substitute for a commercial product without any significant processing, the material is not a waste. In general, the recycler should presume all materials that are being recycled are solid waste unless proven otherwise.

As a result of this presumption, the recycler needs to be sensitive to the second part of the definition of hazardous waste. From the recycler's perspective, the most important aspect of this step is to recognize wastes that exhibit any one of

four characteristics.

IGNITABILITY

Generally addresses liquids that can burn at temperatures of 140 degrees F. or less.

CORROSIVITY

Generally refers to aqueous acids with a pH of 12.5 or greater.

REACTIVITY

Addresses wastes that react violently with water, are unstable or explosive, or contain cyanide or sulfide under certain conditions.

EXTRACTIVE PROCEDURE (EP) TOXICITY

A test that evaluates the potential of a waste to release specific contaminants into the leachate typically found in a municipal landfill.

The most challenging characteristic is EP toxicity. Only 14 contaminants representing certain metals and pesticides that have specific limits established for public water supplies are addressed by this test.

The U.S. Environmental Protection Agency (EPA) replaced this test on March 6, 1990, with a new test called the Toxicity Characteristic Leaching Procedure (TCLP). This test is designed to simulate landfill conditions more closely. In addition, it adds 25 organic contaminants to the procedure. Many wastes that are not hazardous wastes under the EP toxicity procedure may become TCLP hazardous wastes.

If a solid waste is not a hazardous waste, then it is regulated under the Indiana Solid Waste Rule. Under this rule, anyone who disposes of solid waste in or on the land must receive a Solid Waste Disposal permit. Any one who conducts a listed processing activity must obtain a Solid Waste Processing permit.

While it is unlikely that recyclers will engage in disposal activities, they may engage in processing that requires a permit. Recyclers should presume they need a processing permit unless the recycling falls into any of the following exemptions:

- Solid waste that consists of uncontaminated, untreated natural growth waste, such as leaves, brush and grass trimmings
- Solid waste that consists of uncontaminated rocks, bricks, concrete, road demolition waste and dirt (but probably not asphalt).
- Solid waste, except for tires, that has been segregated from the general solid waste stream prior to arrival at the facility.
- Legitimate use of iron and slag, as well as certain foundry sands and other materials.

ACTIVITY 7 (continued)

These exemptions exclude most recyclers and yard waste composters from the need for a permit. However, recyclers who receive a mixture of municipal solid waste and separates out the recyclables are not except.

Despite being exempt from the Indiana Solid Waste Rule, the composter must be aware of two other permits. The first is a federal "dredge and fill" permit issued by the U. S. Army Corps of Engineers. This permit may be required whenever a composter puts material into a wetland, ditch or stream. The second is a National Pollutant Discharge Elimination System (MPDES) permit that is issued by the IDEM. This permit is required for most point discharges to surface water.

The final issue under the Indiana Solid Waste Rule that may have a significant impact on a recycler is IDEM's special waste program. this program addresses wastes that may have the potential for causing problems during waste management but do not meet the legal definition of hazardous waste.

While the EPA's definition of solid waste focuses on the hazards of the waste, IDEM's special waste program focuses on the source of the waste. Generally, any waste from a pollution control operation, an incinerator or an industrial process is a special waste. In addition, any asbestos containing materials, and most contaminated or recalled products are special wastes.

Special wastes that are not in one of several specific categories must be individually reviewed and certified by the IDEM if the waste is going to be disposed of in Indiana. Processing facilities must receive special permission in their permit in order to process special waste. The recycler should seek advice when managing wastes that may be special wastes.

STATE AND LOCAL PROGRAMS IN INDIANA

State lawmakers and Indiana cities and towns have become more involved with encouraging recycling programs.

Current state laws provide gross income tax deductions and property tax exemptions for buildings, equipment and land involved in recycling operations. The state also funds the Center for Value Added Research at Purdue University, which investigates ways to process once discarded food byproducts into textiles, animal feeds and other applications.

In 1989, the Indiana General Assembly enacted a law to regulate disposal and handling of used motor oil. Additional legislation mandated state government to source separate waste paper for recycling in government offices and to procure recycled paper products.

ACTIVITY 7 (continued)

The General Assembly also established the Indiana Institute on Recycling to monitor and evaluate recycling programs throughout Indiana, research barriers to recycling markets, and develop funding options for recycling and composting programs. The Institute will make recommendations to the General Assembly to advance recycling statewide.

In Fall 1989, Gov. Evan Bayh established the Indiana Recycling Grants program to promote recycling as a means to minimize Indiana's dependence on waste treatment and disposal. The program supports local recycling efforts and provides funding for start up costs and capital expenditures.

In 1990, the General Assembly adopted a series of laws designed to aggressively promote reuse, recycling and solid waste reduction in Indiana. These laws:

- Establish a 10 percent purchasing preference for state government on products that contain 50 percent or more recycled materials.
- Impose strict standards on lead acid batteries to encourage recycling.
- Give a mandate to the Corporation for Science and Technology to become involved with certain aspects of recycling.
- Changed the name and reconstituted the Indiana Energy Development Board to the Indiana Recycling and Energy Development Board. The board was mandated to become active in many aspects of recycling.
- Mandate the Department of Commerce to create a Packaging Waste Reduction Task Force and a Recycled Paper Task Force.
- Give authority to the Solid Waste Management Board to prohibit the disposal of recyclables to the greatest possible extent.
- Set recycling goals of 35 percent by 1996 and 50 percent by 2001.
- Mandate the development of district solid waste management plans that integrate reduction, recycling and composting.
- Establish a Solid Waste Management Fund to promote recycling and the use of recycled materials. This fund is derived from a \$0.50 per ton fee on the disposal of solid waste from Indiana.
- Establish a Waste Tire Task Force to develop a plan for creating markets for Indiana's waste tires.

ACTIVITY 7 (continued)

Statewide Recycling Organizations

Various organizations within Indiana support and encourage recycling efforts. These groups are an invaluable resource for municipalities, county governments, groups and individuals wanting information on recycling procedures:

Indiana Institute for Recycling
Indiana State University
Terre Haute, Indiana 47808

Indiana Department of Commerce
1 North Capitol Avenue
Indianapolis, Indiana 46204
(800) 382-4631

Indiana Department of
Environmental Management
105 South Meridian Street
Indianapolis, Indiana 46225
(317) 232-8603

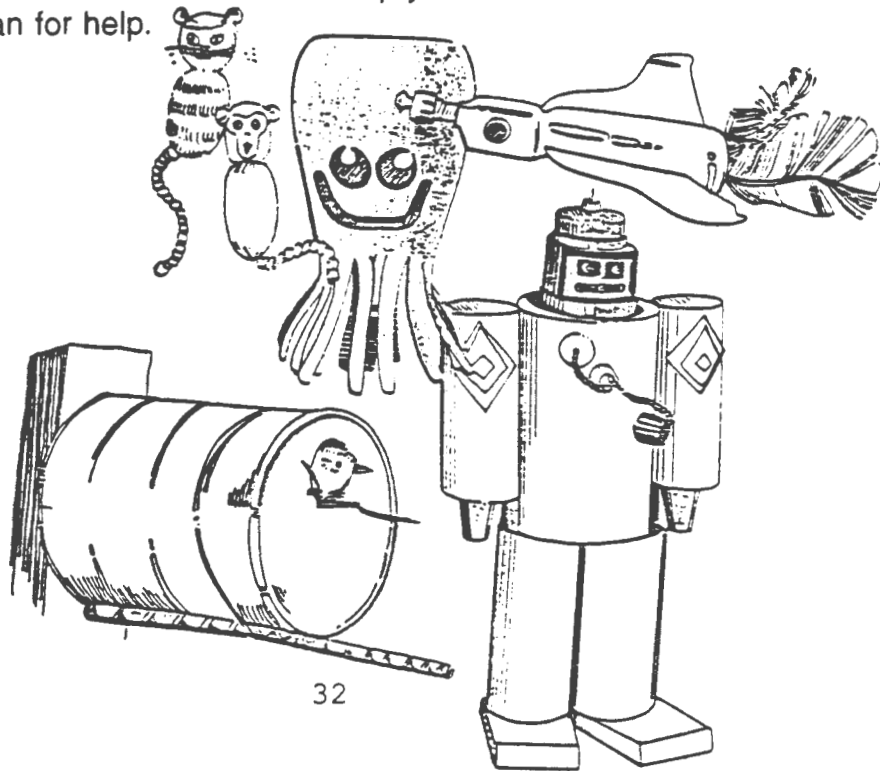
Indiana Recycling Coalition
Post Office Box 6357
Lafayette, Indiana 47903
(317) 283-6226

Reuse It

There are many activities you can try that illustrate reuse. Here's a list of a few: choose one (or devise one of your own!).

- Hold a yard sale
- Create a canister set from coffee tins
- Make newspaper logs
- Cut the legs off old pants for "cut offs"
- Make some crafts from trash.

Your library will have books that can help you. Look under "crafts" or "trash" or ask the librarian for help.



ACTIVITY 7 (continued)

Recycle

What does **recycle** mean? **Re** means again. **Cycle** (like **bicycle**, **tricycle**, **motorcycle**) means circular or around. So **recycle** means _____

When a product is recycled, it is taken from its "consumer use state" - a fancy way of saying the way you buy it - and returned to an "industrial use state" - the way it has to be in the factory. Glass is molten (melted), metals are returned to ingots (bricks of processed ore). Paper is returned to slurry (paper and water) and so on. Then the material is remade into "new products".

How do you fit into the picture? You can choose to recycle - save and collect newspapers, glass, aluminum cans and take them to a recycling station. Some recyclers accept different materials as donations or gifts. Often, these are non profit organizations (they don't make money). Some are buy back centers, which pay you by the pound for different materials. These are scrap dealers who often accept items only from large suppliers like businesses and not from groups or individuals. There are even some recyclers who will buy just one or two items, like aluminum only. Try to find the recyclers in your area. Your phone book (yellow pages - Scrap Dealers; Recyclers) might be a place to begin. After locating recyclers, fill in chart (on the next page). You will need to learn their address, what materials they accept (and how they want them) and if they are buy back or donation. A club tour to a recycling center could be a fun and educational field trip.

How do recyclers want their materials? From doing the activity, you may have discovered the following generally required:

PAPER

Newsprint often needs to be baled (tied with twine) or in brown paper bags. It always needs to be clean and dry.

GLASS

Sometimes it doesn't matter. Other times it needs to be sorted by color - green, flint (brown), and clear. One in a while, it needs to be cullet or in small uniform pieces. Usually, the recycling center has a glass crusher that does this.

ALUMINUM

Cans are usually accepted in any way, but some recyclers require them crushed. If you are going to save them for any amount of time before you turn them in, rinse them out before you put them aside.

PLASTIC

2 liter bottles are usually accepted rinsed out and with the bottom "cup" removed.

ACTIVITY 7 (continued)

As you probably found out, requirements vary from recycler to recycler. So be sure to check *in advance with the recycler*. If you follow the recycler's requirements, you will be a welcome customer and receive the best price the recycler can give.

Recyclers in My Area

Name	Address	Phone	Hours	Buy back	Donation	Sorted	Baled	Aluminum	Glass	News paper	Steel	White paper	Other
Example: Recycle, Inc.	00 Main Street	555-1111	10 - 5 M - F	Yes		No	No	X					

ACTIVITY 8

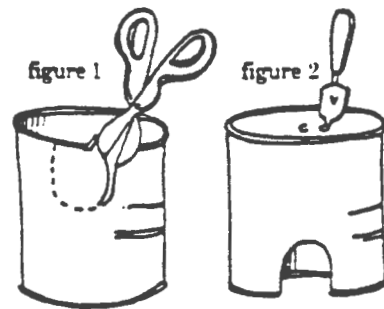
INCINERATION

Incineration: A Mini-Plant

For this experiment, you're going to build a mini-incinerator! **DO THIS ONLY WITH ADULT SUPERVISION.**

You will need:

- Large "tin can" (coffee can or similar)
- Aluminum pie plates
- Tin snips and bottle opener
- Window screening (or chicken wire)
- Similarly sized stones
- Garbage and trash
- Matches
- Hot pads and hot mitts



ACTIVITY 8 (continued)

The Incinerator:

Cut out one end of the can completely. Using the tin snips, cut a U shape out of the can, with the flat end along the rim of the open end (figure 1). Using the bottle opener, punch out two holes side by side in the unopened end of the can (figure 2).

Put the pie plate on cement, blacktop, or a non-burnable surface outdoors. Place the four stones in a square in the pie plate. The square should fit inside the can. Cut the screen (or double layers of the chicken wire) to fit over the square. Place the tin can open end down over the screen inside the pie plate. Your "incinerator" is ready to go! Sort garbage into categories of paper, glass, plastics, metals, wood, and other. Because this incinerator does not have an automatic lighting mechanism, you will need to place a layer or two of paper on the screen for each test.

Remove the tin can. Place the paper and add a layer of one type of material (glass, metal, etc.). Put the can back on the pie plate. Carefully ignite the paper through the upside down U shaped door. Watch until the fire burns itself out, then wait a few minutes to allow the metal to cool. Wearing the baking mitts, remove the can. Record what you see on the following chart. Repeat with each type of trash.

Type of Trash	Describe Smoke	Smell	Ashes	Other
Example: Paper	Clear to grey	Like leaves	Grey flakes	Burned completely
Glass				
Paper				
Metal				
Plastic				
Wood				
Other				

Continued on next page.

ACTIVITY 8 (continued)

Did anything not burn? _____ What? _____

All of these materials can burn or melt, but it takes much higher temperatures than you can make here. Did any of them stink? _____

What does this tell you about air pollution? _____

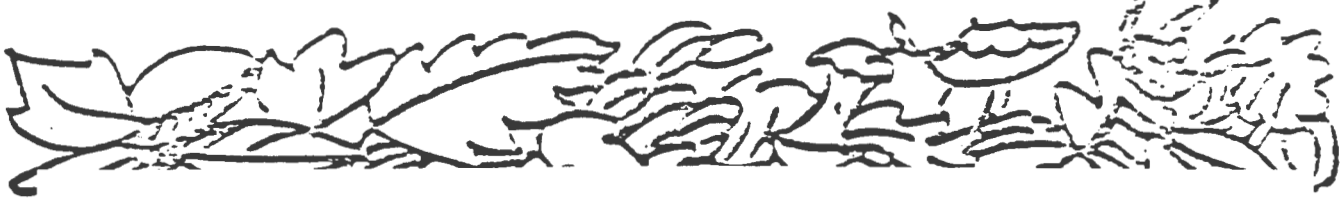
At very high temperatures, metals and glass melt rather than burn. Could this cause problems? _____

What kinds of problems? _____

What else could be done with glass and metals? _____

Do you think incineration could be an effective way to dispose of trash? _____
Why? _____

What would make it expensive? _____



ACTIVITY 9

COMPOSTING

COMPOSTING

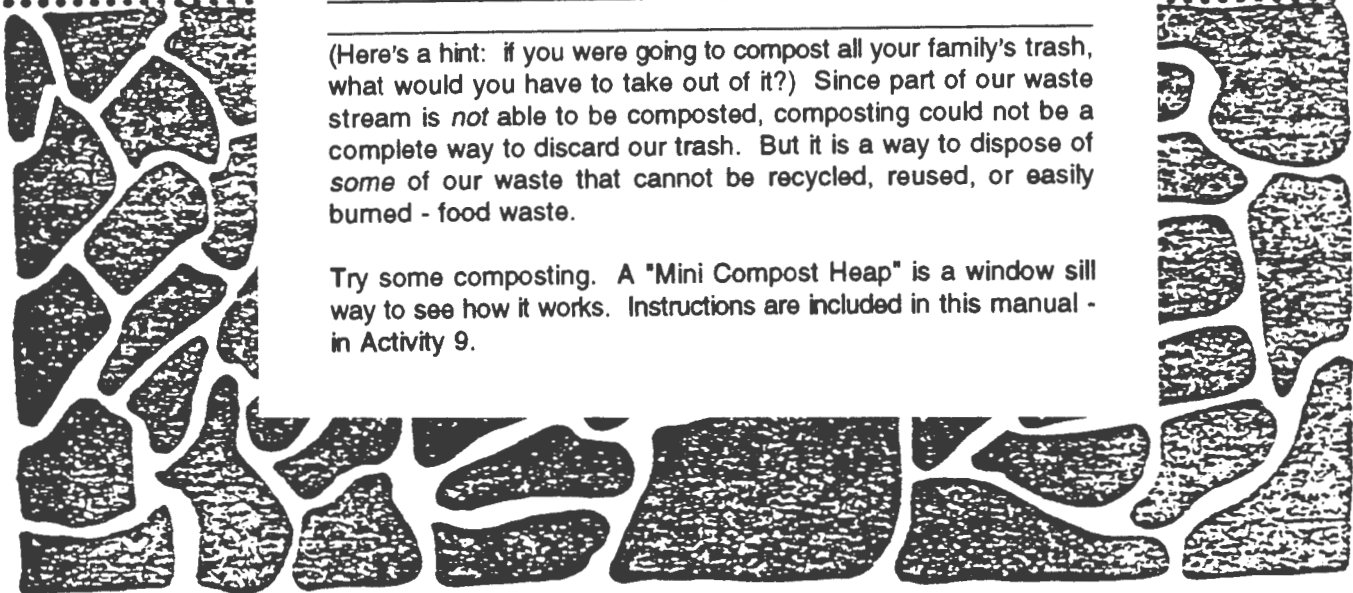
Composting is decayed organic matter created through the act of biodegradation. Sounds impressive, doesn't it? It's actually very simple. Biodegradation is "organic" or natural materials returning to soil. In a forest leaves and dead plants *biodegrade*. So do fallen trees, though much more slowly. Farmers make use of biodegradation. They often spread animal manure over their fields - it fertilizes the soil by the minerals in the manure returning to the soil. Composting, which is the result of biodegradation, is using this breakdown of organic matter to create a fertilizer for reuse on land. What are some of the things in household trash that you think are biodegradable? _____

Did you say food wastes, paper (paper is made from wood - a natural substance!), wood, and cotton clothing? See the chart on the next page. Human made products, such as most plastics, glass, metal alloys, and fibers (polyester, nylon - clothes), biodegrade very, **very** slowly. So they are not useful to composting.

Composting on a large scale is not very efficient and can be very expensive. Why do you think? _____

(Here's a hint: if you were going to compost all your family's trash, what would you have to take out of it?) Since part of our waste stream is *not* able to be composted, composting could not be a complete way to discard our trash. But it is a way to dispose of *some* of our waste that cannot be recycled, reused, or easily burned - food waste.

Try some composting. A "Mini Compost Heap" is a window sill way to see how it works. Instructions are included in this manual - in Activity 9.



ACTIVITY 9 (continued)

Composting: Did You Know

Using calculations based on average degradation environments, the People's Almanac Book of Lists # 2* presented these figures:

A paper traffic ticket	takes 2 - 4 weeks to biodegrade
A cotton rag	1 - 5 months
A piece of rope	3 - 14 months
An unpainted wood stake	1 - 4 years
A painted wooden stake	13 years
A railroad cross tie	30 years
A tin/steel can	100 years
An aluminum can	200 - 500 years
Plastic 6 pack carrier	450 years
Glass cola bottle	Unknown

* Wallace and Wallechinsky, Eds. William Morrow and Co., Inc. New York, New York, 1980.

Composting: Biodegradation Rates

Time Length: 2 months

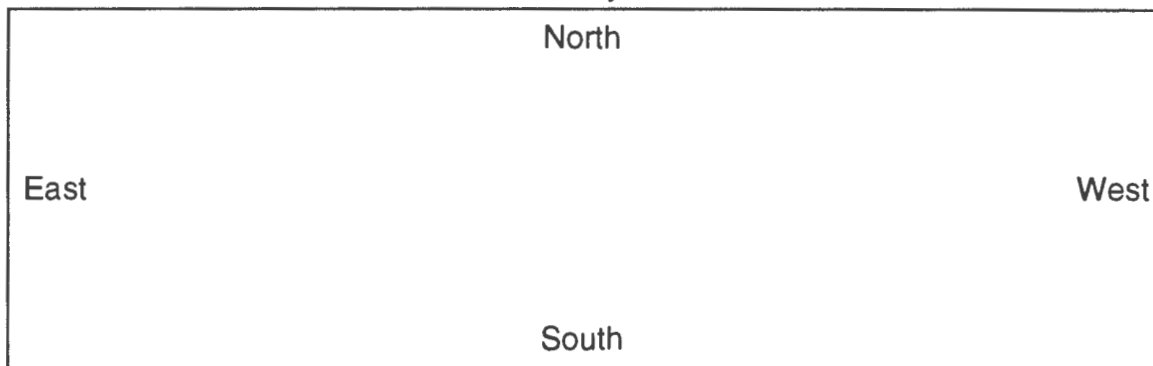
Before we go to the window sill compost activity, here is an experiment on biodegradation rates. How long does it take different materials to biodegrade? Try this experiment.

You will need:

A piece of newspaper	A sheet of writing paper
A cotton rag	An apple core
Different food scraps	A leaf
A piece of bark	

Mark off a small area of ground (1 foot square should be sufficient). Dig in the marked area to loosen soil. Fill in the chart below with items you will test. Bury the items in 1 inch to 2 inches of soil and mark them in your "box". Check the items each week for 2 months. Fill in the chart with progress you note.

Mark in this box the location of the items you buried.



ACTIVITY 9 (continued)

Composting: Biodegradation Rates (continued)

Item	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8

What decomposed fastest? _____

What slowest? _____

Can you guess why? _____

Composting: A Window Sill Compost

Here's a scaled down version of a compost pile that you can do indoors or out.

You will need:

A waxed - paper milk carton or a plastic gallon jug


Some soil

A spoon and a fork (ask your parents!)

Collected leaves and garbage

Fertilizer (not necessary but it helps)

Lay the milk carton on its side and cut off the side that is on top. Tape the spout end shut. If you are using a plastic gallon jug, cut off the upper part of the jug, leaving a 6" high cup (base of the jug).

Put a layer of dirt on the bottom of the carton/jug about 1" deep. Put in a 1" layer of soil. Sprinkle with fertilizer and moisten with water. Place another layer of garbage and leaves, cover with soil, fertilize and water. You should cup the heap () to help it hold water.

Composting occurs by anaerobic heat. The inside of the heap will get warm. You do need to keep the pile moist. It sometimes helps to put a pencil or a popsicle stick vertically into the pile to keep the pile moist throughout. Every week or so, you will need to "turn" the compost. You can use the spoon or fork like a shovel to do this.

If you did this activity, answer the questions:

What did you do? _____

How did you do it? _____

How many times did you turn it? _____

Tell what you saw each time _____

What did you do with the mulch your compost produced? _____



ACTIVITY 10

CLEAN UP CAMPAIGNS

Roadside and Site Clean Ups

Planning

1. Decide on a "target area"

For roadside clean ups:

Decide on the area your club will be cleaning up and how much time it will take. Plan on three younger club members and one older member, junior leader or advisor (adult) per group. An hour per mile is an average time to do a good job - and one mile per group could be enough! Try to do one concentrated area rather than scattered areas. Avoid pick up projects along busy highways such as state routes and interstate highways.

For site clean ups:

Some examples of site clean up projects are: a park, a playground or an empty lot.

2. Set a tentative date and time but also have a "rain date". Be sure enough club members and adults (advisors) are able to make both dates to guarantee a successful clean up.
3. Determine equipment you will need: plastic buckets for everyone are helpful as are large tough plastic trash bags and pick up trucks.
4. Contact local officials. For roadside projects: Decide whether the road is maintained by the township, county, municipality or the State. This is usually marked on the road sign giving the name or number of the road.

If a:	Contact:
Township Road	The local township trustees or road maintenance personnel
County Road	The County Engineers Office
Village or City Street	The mayor or street department
State Highway	The regional office of the Indiana Department of Transportation

These officials can advise and assist you in planning and carrying out a safe project. You may also want to contact the local police, county sheriff or the Indiana State Police for safety assistance.

For site projects: Determine who owns the site. This could be city, township, county, state or privately owned property. Your club will need to get permission to clean the area.

5. Discuss safety procedures: Do the local officials suggest a car follow each group with hazard lights? Do they have special "crew working" signs to put on each road? Do they have safety vests for your club to wear? Do local officials have guidelines to follow or perhaps if the site is especially bad, do they want some of their own personnel to help you? They may have special equipment you can use. Attempt to set safety equipment locally.
6. Disposal. Be sure you know where you can legally and safely dispose of the collected trash. Arrange for passes or payment to the landfill. Recycle what you can.
7. **Before the clean up campaigns, check to be sure everything is definite and nothing is left to chance.**

The adult responsible for the activity may want to have each participant, or parent or guardian of a participant to sign a written liability waiver or release form prior to the project (example attached). A letter to the parents or guardians explaining the project is also suggested.

The adults responsible for the activity may wish to carry a first aid kit with them for any minor injuries.

8. **You may want to consider short term activity insurance.** This is typically available for 15 to 20 cents per person per day. For information see your County 4-H/Youth Educator.

PICK UP

Everyone should meet at the agreed time and place. All should wear light, bright colors, with long sleeves, long pants, socks and work shoes, boots or heavy soled shoes. No one should have open toed shoes or sandals. Gloves are recommended. (Remember, there is a lot of broken glass out there. Gloves and shoes will keep you safe!)

ROADSIDE

Agree upon pickup times and places after clean up is finished. If a group finishes quickly, they should wait at the pick up spot. Adults in cars should monitor the progress.

Drop off the clean up crews (each crew is three members and one Junior Leader or adult). The crew should be two people on one side of the road and two on the other. Crew members should not cross or walk on the road. One crew person on each side should carry extra plastic bags. Place trash into plastic pails and then put it into a garbage bag. When the bag is about full or difficult to move,

put it by the side of the road for later pick up and continue on down the road. If the crew comes across a large piece of junk (like a muffler or rubber from a tire) put it beside the road to be picked up later. Never put anything on the road.

The pick up crew should go down the road(s) and collect all the bags and large junk into a truck. Partially filled bags can then be combined so that full bags are taken to the landfill.

SITE PROJECTS

Have club members work in an organized pattern. Start at one side and work across the area rather than jumping around.

Securely tie all bags when full and collect the bags and large items in one spot. If there are a lot of very big, heavy pieces (like washing machines, refrigerators, etc.) you will need either special equipment (from the township, city or county) or a great deal of "people power".

Load up the trucks and dispose of the trash.

As you work, you may have someone take pictures for your club scrapbook.

When you are finished, have refreshments ready for everyone!

ADOPT A SITE

If your club wishes to do more than a one time clean up of a site (park, playground, lot) you could consider the "adopt a site" project. In this, your club would clean up a small site on a regular basis. Once a month is usually sufficient.

In adopting a site, your club may want to beautify or fix up the area after it has been cleaned. Flowers or shrubs could be planted, fences painted and so on. Arrangements could be made to have a public trash container at the site. Other community groups may be interested in getting involved after the original clean up is done. Flower or garden clubs, civic and service groups may lend a hand if you or members of your club ask them. (Here is a chance to do some talking before other groups.)

A small sign might be a good way to let the community see who cleans this site. And do not forget your local newspaper could use the story.



SAMPLE RELEASE

In consideration of being permitted to participate in the (name of club) 4-H litter pick up project, I hereby voluntarily assume all risks of accident or injury and release the Indiana Cooperative Extension Service, its employees, and all (name of club) 4-H advisors from all liability for personal injury or damage of any kind sustained by me or my child during my participation in said project. I acknowledge the hazards inherent in this project, and I have been informed of the steps to alleviate these damages (i.e. broken glass, traffic safety procedures and including wearing gloves and shoes).

Participant

Date

Parent/Guardian
(If participant is younger than 18 years)

Date