

Lesson Plan
Where Is Away?
A Geographic Look At A Problem Where You Live

Objectives:

Cognitive:

To know or to understand:

- Geographers are interested in helping to solve the problems in any place.
- That every community generates solid and hazardous waste.
- The problems of local government officials as they manage solid and hazardous waste generated in the community.
- Where people take wastes for disposal, how they are best managed and how drinking water and the environment can be harmed through improper waste management.
- The differences in the characteristics of household waste, other solid waste, hazardous waste (e.g., toxic waste).
- The need for effective solid and hazardous waste management.
- The health problems presented by hazardous waste.
- That waste and the resulting polluted food and water can be hazardous to a community.
- That every community needs to have facilities (e.g., landfills, incinerators) to manage the waste it generates.
- The governmental structure of the waste management and emergency management plans of the community.

Psychomotor:

- Mapping the locations and routes to legal disposal sites.
- Mapping the location of drinking water wells, surface water bodies and other environmentally sensitive areas (e.g., wetlands).
- Identifying governmental officials responsible for hazardous waste management.
- Use research skills and community resource persons to better understand waste management issues.
- Learning about the different kinds of municipal waste and how it is generated and managed.

Affective:

- To appreciate the esthetic benefits of a clean environment.
- To appreciate the necessity of a community to properly manage its waste.

- To appreciate the importance of having a clean environment/community and to recognize that everyone should do their part to achieve it.
- To appreciate the geographic approach to solving problems.

Generalizations:

- In every community, households, companies (large and small) and public agencies (including schools and universities) generate solid and hazardous waste.
- Most citizens are not aware of the solid and hazardous waste problems present in their communities.
- Most citizens do not want to have a solid or hazardous waste site near their home (the NIMBY dilemma).
- Improper management of solid and hazardous waste can be harmful to human health, the environment and the esthetic quality of a community.
- Improperly managed hazardous waste is a major threat to humans, animals and the environment.
- Toxic materials in the environment are insidious because, in many cases, they cannot be seen, smelled or tasted, and they have long-term, harmful effects to the body.
- A clean environment is an important aspect of a healthy and prosperous community.

Concepts: (Defined in glossary at end of lesson)

Corrosive waste	Drinking water	Drinking water wells
Hazardous waste	Ignitable waste	Illegal waste disposal sites
Impacts of waste on physical & cultural systems		Improper waste management
Legal waste disposal sites	NIMBY	Pollution
Reactive waste	Sanitary landfill	Solid waste
Toxic waste	Trash or household waste	Waste distribution
Waste generators	Waste migration	

Content:

- Primarily, the content of this lesson will be the definition of the various concepts and generalizations developed above. However, other content would include the following:

Map the sites of trash dumps, solid and hazardous waste management facilities at the school, city and county levels or seats. (This is an opportunity to deal with the concept of scale if applicable.)

Hazardous waste includes ignitable materials, corrosive materials which are acid, reactive materials which are base, and toxic materials which are harmful to the body.

Toxic waste management is important to a community's health because they can cause cancer, neurological problems (loss of eyesight, shaking or breathing problems), congenital problems such as brain damage and other birth defects and, in some instances, death due to poisoning.

County emergency response plans are found in every community. They include an identification of tanks of chlorine and other harmful materials. Chlorine is the most common deadly material and the tanks are located and mapped in relation to wind direction, schools, nursing homes, churches, hospitals and other places where particularly the very young and old are congregated.

Learning about each community's waste management problems and plans.

Some hazardous waste can be toxic to humans and animals at concentrations which are very low, so low they cannot be smelled, seen or tasted in drinking water. Consumed over time, these wastes can be harmful to health.

Methods/Activities:

1. The lesson is introduced by writing the question on the board "Where is away?" followed by the question, "If you eat a candy bar and drink a cold drink, what do you do with the paper wrapper and the can?" The statement "we throw it away" is elicited, and therefore the motivation for the lesson is begun because you have brought the topic into their personal life/interest. How many times have you gotten through with a piece of paper, a bottle, a can or a chemical of some kind and said "I am going to throw it away"? Well, where is away? Does the item cease to exist when you throw it away? How does it react with the environment? What problems does this create for city, county and state government? I-low are hazardous wastes different from solid waste or trash? Which is a greater threat to ground water? Why?
2. On a county map locate trash dumps. Are they satisfactorily located and managed? What important issues are related to the location of these facilities? On a large scale map of the local area, locate areas of an unacceptable amount of litter. What can students do about this situation?
3. Interview local officials about solid and toxic waste management in your county (include waste management districts if they exist). The resource people mentioned below (under materials) will help answer the questions in this activity.
4. Think about what waste is generated in the home. (A sample list is given at the end of the lesson.) What is done with it? Where is away?
5. What types of businesses and industry in your town have hazardous waste as a byproduct? What do they do with it? Where is away? (Dry Cleaners, Photo Labs, Radiator Shops, Hospitals, Universities, Police Departments, Furniture Refinishing and Gas Stations)
6. Read the state law about solid and hazardous waste. (In Florida, the law governing solid and hazardous waste is Florida Statutes Ch. 403.) Can you find examples in the news of people who violate these laws? What is the punishment? Is it Just? When people violate these laws is it always a criminal act or is it possibly a result of a lack of information?
7. What is the cost in your town for disposing of solid and hazardous waste? (Start with the Public Works Office for answers.)
8. Does your town have mandatory waste pick-up? Does your community have a recycling program? Is it a mandatory program? (This is a reasonable time to discuss whether or not

government should require people to recycle. Some cities now have laws which allow people who do not recycle to be fined.) What are the arguments for and against mandatory waste pickup?

9. Trace (map) the movement of solid and hazardous waste through “your place” (you define) by highway, railroad or pipeline. Is it safe? Do these routes go through sensitive areas such as wetlands, water bodies or densely populated places?
10. How does littering fit into the waste management picture? How does littering affect wildlife? (Remind students that fish, birds and other wildlife will eat or get tangled in plastics or metal can debris.)
11. When it is time to construct a new landfill or incinerator in your town, where should it be built? “What factors need to be considered in selecting a new location? How does NIMBY affect this decision?
12. What are some other important solid and hazardous waste management questions for your town?
13. In addition, maps could be made of the location of municipal drinking water wells, lakes, rivers and wetlands. Are the locations identified in that activity close to the trash dumps and landfills? What are the implications? Are there residences nearby the dumps and landfills? Where do these families get their drinking water? Are there farms nearby? Could crops and farm animals be affected by the waste from these facilities? How?

For other activities, see the article *Where Is Away? - A Geographic Concept*

*Some of the above activities may not be applicable to your community. Feel free to adapt.

Materials:

A map of the school and its neighborhood (if that activity is chosen), a map of the community, a map of the county.

Any other materials generated from calls or visits to the following offices:

County health office, county disaster preparedness, local fire department, county planning office, regional water management district, regional planning council, local university agency such as the FSU Center for Biomedical and Toxicological Research and Hazardous Waste Management. It is recommended that this unit be shared with the school science teacher in order to benefit from his or her possible contributions

NOTE: Much of the content for this lesson is new to teachers. Do not feel that you need to know all about this topic before you are willing to undertake it with your class. Go into it with your class as a learner. Your authority and expertise come from knowing how to ask questions and how to organize a study of such a problem as opposed to knowing all the answers beforehand. Enjoy the lesson with the class.

Teachers should be encouraged to be objective about this lesson. Be careful not to imply that everyone who pollutes is a bad guy. Encourage students to make value judgments, but allow for differences of opinion.

Evaluation:

Tests, reports, cooperative efforts to gain information, ability to discuss the problem rationally, presentation of data. Explain how mapping data helps a citizen solve a problem.

Relationship to the National Geography Standards:

- Knows and understands how to use maps, globes and other graphic tools and technologies to acquire, process and report information from a spatial perspective. (#1)
- Knows and understands the physical and human characteristics of place. (#4)
- Knows and understands how earth's physical and human systems are connected and interact. (#14)
- Knows and understands the consequences of the interaction between human and physical systems. (#15)
- Knows and understands how to apply geography to interpret the present and plan for the future. (#18)

Relationship to the Florida Department of Education Curriculum Framework - Grades 6-8:

- Recognize interrelationships among Florida's population, economy, technology and environment.
- Identify the major problems facing present and future Floridians, including environmental, economic, social and political.
- Explain how people impact their physical environment.

Why this lesson is Geographic:

This lesson is geographic because it deals with the location and distribution of various trash, garbage and waste (including toxic) sites and because it describes and measures the spatial interaction of waste, the physical and cultural environments.

Glossary:

- Corrosive waste:** a waste that is similar to an acid (with a very low pH) or chemically the opposite of an acid (a base with a high pH value) - these wastes can corrode or otherwise "burn" skin and other materials including metals (example: acidic wastes or basic wastes e.g., radiator repair shop wastes).
- Drinking water:** either groundwater (water below ground which typically flows through the soils and rocks to either a lake, river, stream, wetland or is withdrawn by a well for drinking, irrigation or industrial use) or surface water (lake, river, stream, ocean) which we use to drink, cook or clean.
- Drinking water wells:** wells which are used typically by communities to withdraw water from the ground for household and commercial uses.

- Hazardous waste:** a waste that is either toxic, ignitable, reactive or corrosive.
- Ignitable waste:** a waste that has the capability to ignite or catch fire easily (example: a solvent or paint).
- Illegal waste disposal sites:** waste facilities (dumps) which have not been approved by state and local government authorities to operate in a given location - these facilities do not have a permit to operate
- Impacts of waste on physical & cultural systems:** human health impacts (immediate and long-term adverse impacts), environmental impacts (flora and fauna & contaminated water and soil) political impacts and related issues (where to locate new facilities, what fees to charge for waste disposal, whether to build a new sanitary landfill or an incinerator), esthetic impacts (litter and its adverse impacts on the quality of life of the community), economic impacts (the costs and benefits of various approaches for waste management, recycling, reuse).
- Improper waste management:** waste management practices which result in adverse impacts to human health or the environment (dumping of household waste in the woods, sending hazardous wastes to a non-hazardous waste facility or the discharge of hazardous wastes directly to the environment).
- Legal waste disposal sites:** waste facilities (sanitary landfills, incinerators) which have been approved by state and local government authorities to operate in a given location - these facilities have a permit to operate.
- NIMBY:** an acronym for “not in my backyard” ‘which refers to the classical political and real life dilemma concerning the community’s need for waste management facilities and the difficult decisions about where to locate these facilities (everyone needs them but no one wants them near to their home).
- Pollution:** The release of a substance, through human activity, which chemically, physically, or biologically negatively alters the air or water it is discharged into.
- Reactive waste:** a waste that is unstable under normal circumstances; unstable in this case means can explode if jarred or create deadly fumes if mixed with water other liquids or heat (example: dynamite, sodium wastes or phosphorous wastes).
- Sanitary landfill:** a landfill which is designed to have negligible adverse impacts on the environment; these facilities typically have a liner below the waste, pipes/pumps to capture any liquids which are generated by the waste, monitoring systems to ensure that wastes are not migrating off-site; these facilities are covered with soil (each day) to minimize odor and typically have a top liner (a cap) when the landfill is full and finally closed.
- Solid waste:** some is hazardous and some is non-hazardous - the non-hazardous solid waste is typically waste from households (food, paper, yard wastes), restaurants (food waste, paper wastes), offices (paper waste) - the term solid waste is commonly used interchangeably with non-hazardous waste..

- Toxic waste:** a waste that is poisonous - either strongly poisonous (you will die or have noticeable discomfort immediately after exposure) or poisonous after long exposure in very small doses (example: hazardous wastes in drinking water) (example: industrial solvents or dry cleaner solvents).
- Trash or household waste:** wastes which are typically non-hazardous (although they can be hazardous) and are generated by households, offices and certain smaller businesses.
- Waste distribution:** a set of numbers which indicates how much of various types of waste are produced over a given time period by, for example, a community - the distribution can be either in absolute values (tons) or in percentages (for example, 10% of a community's waste is hazardous and 90% is non-hazardous solid waste - of the hazardous waste, 15% is toxic, 50% is ignitable, 20% is corrosive and 15% is reactive).
- Waste generators:** includes all aspects of human activity, including households, companies and public agencies; all generate solid waste; both hazardous and non-hazardous.
- Waste migration:** the movement of waste materials, primarily, in water.(both surface water and groundwater); water in contact with a landfill or dump can carry water to lakes, streams and drinking water wells.

WHERE THE WASTE GOES

Waste	Who Takes It	What They Do With It
Car Tires	County Hazardous-Waste Collection	Shred them and use to cushion landfills. Tires can also be used to make asphalt, running tracks and fuel.
Spray Cans	County	Puncture the can, put the gas in a charcoal filter, recycle paint or oil or send to disposal firm, send metal to a metal recycling plant.
Paint	County	Give it to City Housing Foundation. Small amounts are mixed to make one color.
Empty latex paint cans	Landfill (first, leave the top off and let the paint solidify)	Bury it.
Car and boat batteries	County	Send to a battery recycler.
Old flashlight batteries	County	Send to a mercury-refining company or hazardous-waste facility.
Flashlight batteries purchased since July 1993	Landfill	New flashlight batteries have no cadmium and such low levels of mercury that they can be buried on the landfill.
Button and rechargeable batteries	County	Send to hazardous-waste facility.
Used motor oil	Collection centers at service stations and oil change facilities	Send it away to be re-refined and reprocessed for industrial use.
Cooking oil	Landfill	Can be put in trash.
Yard trash	Landfill (separate from garbage)	Make mulch for parks and nature trails.
Appliances	Landfill (separate)	Crush and sell for scrap metal.
Fluorescent tubes	County	Send to recycler. Mercury, glass and end caps can be used again.
Office paper	Recycling Program	Make into another paper product.
Muriatic acid (used to clean concrete and pools)	County	Give it to a radiator shop.
Pesticides, unregulated	County	Send to a hazardous-waste landfill.
Gasoline	County	Used to make fuel for cement kilns
Mercury	County	Send to mercury refining company.
Cardboard boxes	Landfill (separate)	Send for recycling.

From Sunday, Sept. 11, 1994, Tallahassee Democrat. Article entitled "Waste not want not"

