



## Lesson: Hazardous Routes

**Grade:** 4-5

**Subject:** Health, English

**Students will:**

- identify ways people dispose of household hazardous waste
- identify the impacts these disposal methods have on health and the environment
- suggest safe alternative management routes for household hazardous wastes
- learn vocabulary: poisonous, toxic, hazardous, dangerous, flammable, ignitable, corrosive, reactive, irritant
- understand that the words: “caution,” “warning,” and “danger” have special meaning and that children should never play with certain types of household products

(Continued)

### Background:

Many products commonly used for cleaning, gardening and auto maintenance, if used or disposed improperly, are hazardous. (See “There is No Away” Background for information on hazardous material disposal). These products are referred to by solid waste professionals as “Household Hazardous Waste” or HHW. In total, the state of Oregon spends around 1.4 million dollars per year for HHW disposal and education.

You can recognize hazardous products because they have special signal words on the labels that say, “Caution”, “Warning”, “Dangerous” or “Poisonous”. Many of these products, when used by a business, have regulations on how they may be disposed. However, in our homes, there is little control over how these products are handled. Thus, education and awareness of these hazards, combined with knowledge of less toxic substitutes, will help preserve and protect Oregon’s environment.

Hazardous products can enter the environment in a variety of ways. Sometimes when a person has no more use for the product but there is still some left in the container, the products are dumped in toilets or drains (i.e. sinks and tubs). These drains go directly into sewers or septic tanks. The sewer systems usually lead to wastewater treatment plants, but sometimes flow into rivers as well. Wastewater treatment plants are not designed to handle most hazardous wastes. Also, large amounts of hazardous wastes may kill the living organisms used to break down chemicals in treatment and septic plants. If these organisms are killed, the system does not work properly, and hazardous wastes can enter our waterways.

Other methods of disposal may include dumping on the ground, sending the material to the landfill or incinerator, or burning garbage at home. When applied to the ground, these hazardous chemicals leach through the soil or out of leaking landfills, eventually contaminating our groundwater. Incinerating hazardous wastes can release harmful air pollutants and products in aerosol cans may cause explosions. People burning their own garbage at home can create serious hazards to themselves and the air quality by burning hazardous products and plastic containers.

Another way these chemicals enter the environment is through “surface run-off” during rain storms. For example, if gardening products are improperly or over applied, water running off your property during a rain storm may enter nearby streams, rivers, or sewer systems and cause surface water pollution. In the environmental field this is known as “non-point source pollution”. In fact, non-point source pollution is a greater contributor to our environmental problems because it is difficult to regulate. The best method of pollution prevention is to minimize the use of hazardous products and use good judgement when you use them.

**REDUCE**  
**REUSE**  
**RECYCLE**

## Procedures:

- Today we are going to learn about ordinary things inside or around our house that may be harmful (or hazardous) to us, to wildlife, or to the environment.
- **Can anyone name some things you have seen at your house that you believe could be dangerous?** (Some examples are: a type of cleaning product in the kitchen, laundry room, or bathroom or some other products used in your yard or on your car). Write the student's responses on the board.
- Pass out the worksheet *Words of Warning* and instruct students not to turn over *Words of Warning*. First, fill in their own definitions of the words. Tell them that if they don't know to leave it blank, and that by the end of the lesson, these words should be familiar to them.
- **Who knows what it means if something is poisonous, toxic, or hazardous? Something that is poisonous, toxic, or hazardous can cause illness, injury or death.** Students should know that these words mean that something can be harmful to people and to the environment and that great care should be taken to avoid these dangerous substances and to prevent their release into the air, water or soil.
- **Tell me and show me the five different routes a hazardous substance might enter the body.** (Eyes, nose, mouth, ears, skin). Display the transparency "Routes of Exposure".
- Introduce the two puppets and tell the children that they have a story to share.
- Perform the play for the class.

## Reflection/Response:

- Display and discuss the transparency "Learning about Labels" or show actual examples of hazardous labels on products to the class.
- Display and discuss the transparency "Hazardous Products" and "Dangers". Help students understand that chemicals are dangerous to humans, animals and the environment.
- Now display the transparency "Hazardous Routes". Help students realize how products get released either intentionally or accidentally into the environment through storm drains, waste water treatment plants, landfills, incinerators, and non-point sources as described in the Background section. Students should realize that these chemicals escaping into the environment can end in our bodies through drinking contaminated water or by eating fish from contaminated rivers, so we must use as much care as we can to properly use and dispose of these products.
- **What warning words have you learned today?**
- **Should you ever play with household products or try to use them without your parents permission? NO!**

## **Teaching Time:**

Introduction 10 minutes.  
Read the play and go over the overheads 50 minutes. Student time to fill out Words of Warning 20 minutes.

**Materials:** Two puppets (any type); Play: "Rocky's Not-so-Fun Adventures" (in the Resource section); worksheet, From Sink to Stream (maze); transparency, Hazardous Waste Routes; Learning about Labels; Routes of Exposure; Hazardous Products; and Dangers; worksheet, Words of Warning and Identify the Hazards

(Optional:) Bring in examples of products with hazardous labels.

- **How do we get rid of hazardous products? First we use it properly until it is gone; next, if you have some leftover materials, give it to someone else who can use the rest; third, store it properly until it can be taken to a household hazardous waste collection center or to a collection event for hazardous products.**
- **How will you keep yourself and others from getting harmed by these things?**
- Now turn your worksheet over and read the correct definitions for all of the important warning words you have learned today and fill in the definitions in your own words.
- Assign Sink to Stream maze and the Tips for a Safer Home handout and ask students to talk with their parents about what they have learned.

### **Extensions:**

- Visit a waste water treatment plant or invite someone to come speak to your class.
- Call your local city or county solid waste official to find out more about safe disposal in your area. Also call the Household Hazardous Waste Hotline: 800-732-9253.
- Visit the Oregon Department of Environmental Quality's web site at: <http://www.deq.state.or.us/wmc/solwaste/hhw.html> and have students report on their findings.

#### **Oregon Common Curriculum Goal:**

##### **Health Education:** Safe and Healthy Environment

- Understand the potential influences of environmental factors on personal and public health.
- Understand and apply prevention and risk reduction strategies for health-related interventions.
- Understand and apply strategies to improve and maintain individual, family, school and community health.
- Evaluate the validity and reliability of health-related information, products and services as a consumer or potential consumer.

##### **English:** Literature

- Evaluate how use of literary elements and devices (e.g., setting, plot, theme, character, word choice, point of view, tone, language) contribute to the work's message and impact.

#### **Grade 5 Benchmarks:**

Students will:

- identify how literary elements contribute to the overall meaning of a selection.
- identify a theme of a selection.
- identify how dialogue is used to develop characters and mood in a selection.

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**REUSE**  
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## Overhead: Learning about Labels



### WORDS ON LABELS THAT MEAN HAZARDOUS

Caution	Harmful if swallowed
Corrosive	Ignitable
Danger	Warning
Explosive	Poison
Flammable	Toxic
Keep away from children and pets	

Source: California Integrated Waste Management Board: *Closing the Loop: Exploring Integrated Waste Management and Resource Conservation K-6* (2000).



# A Product Is Hazardous When It Is:

## CORROSIVE /CAUSTIC

Can burn and destroy living tissues when brought into contact



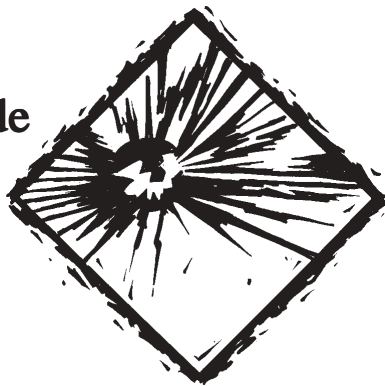
## FLAMMABLE

Can easily be set on fire or ignited



## REACTIVE

Can detonate or explode through exposure to heat, sudden shock or pressure



## TOXIC

Capable of causing injury or death through ingestion, inhalation or absorption

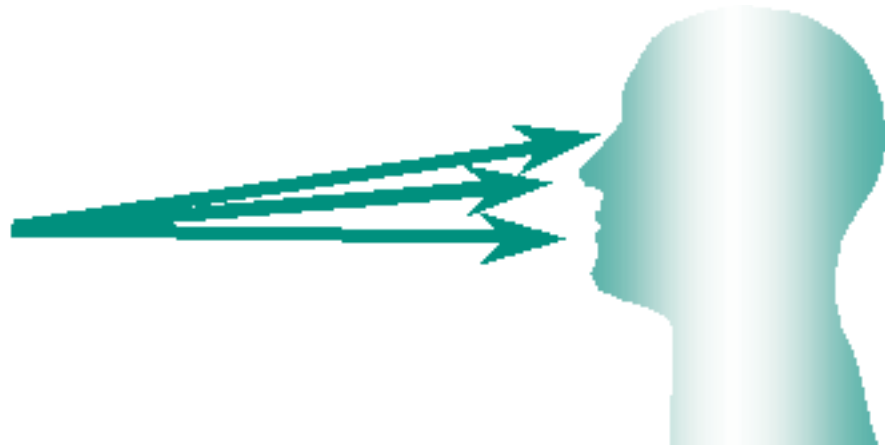


## Health Problems and Injuries

☠ Mixtures of some hazardous products can produce dangerous vapors, explosions or fires.



☠ Products containing acid or bases can burn skin, eyes or respiratory passages.





## Overhead: Dangers (continued)

**☠** Exposure to some pesticides, paints and solvents can cause weakness, confusion, dizziness, irritability, headaches, nausea, sweating, tremors and convulsions.

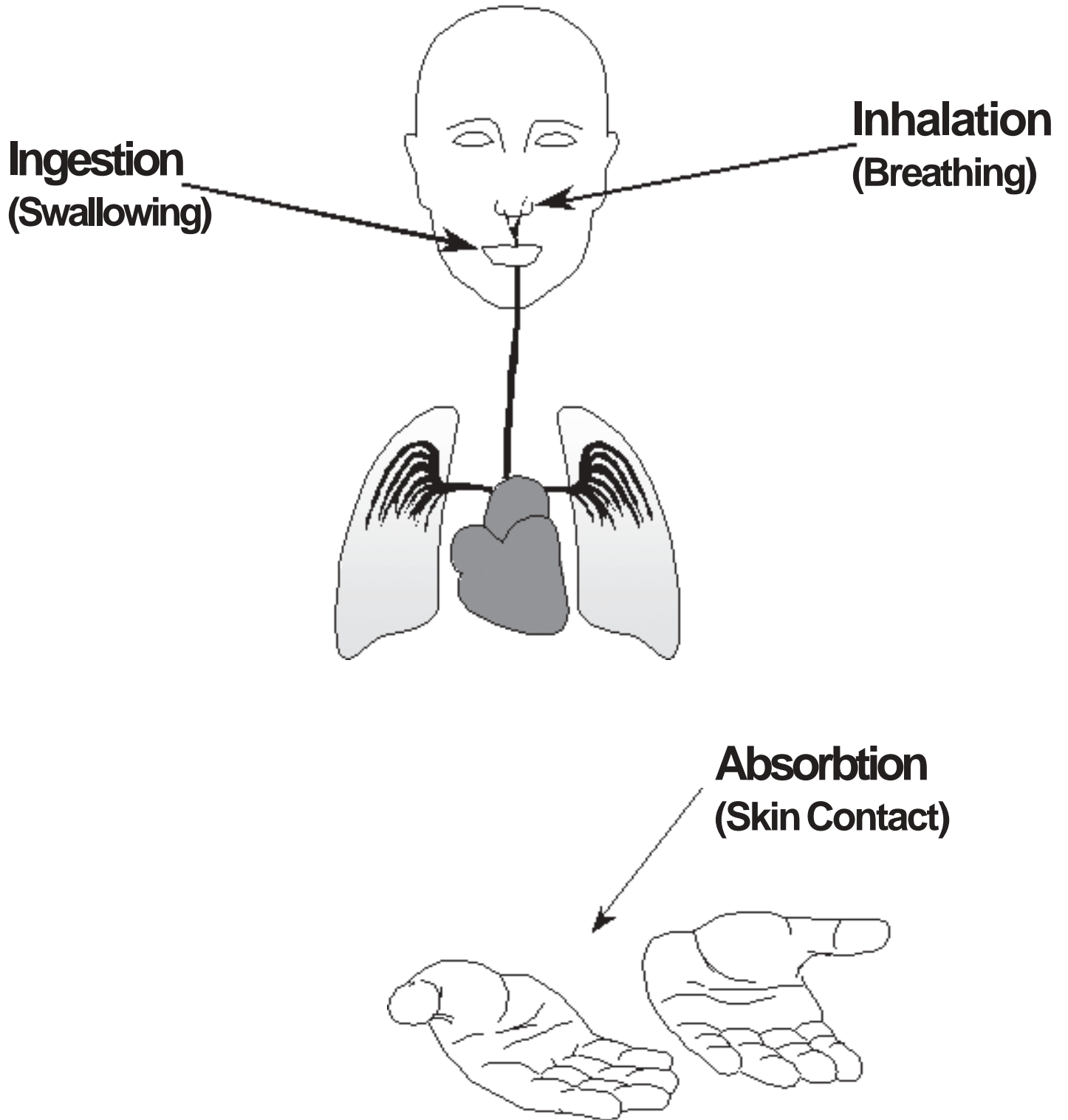
**☠** Repeated exposure to some chemicals can cause cancer or birth defects.

**☠** Hazardous materials placed in the garbage can seriously injure sanitation workers.



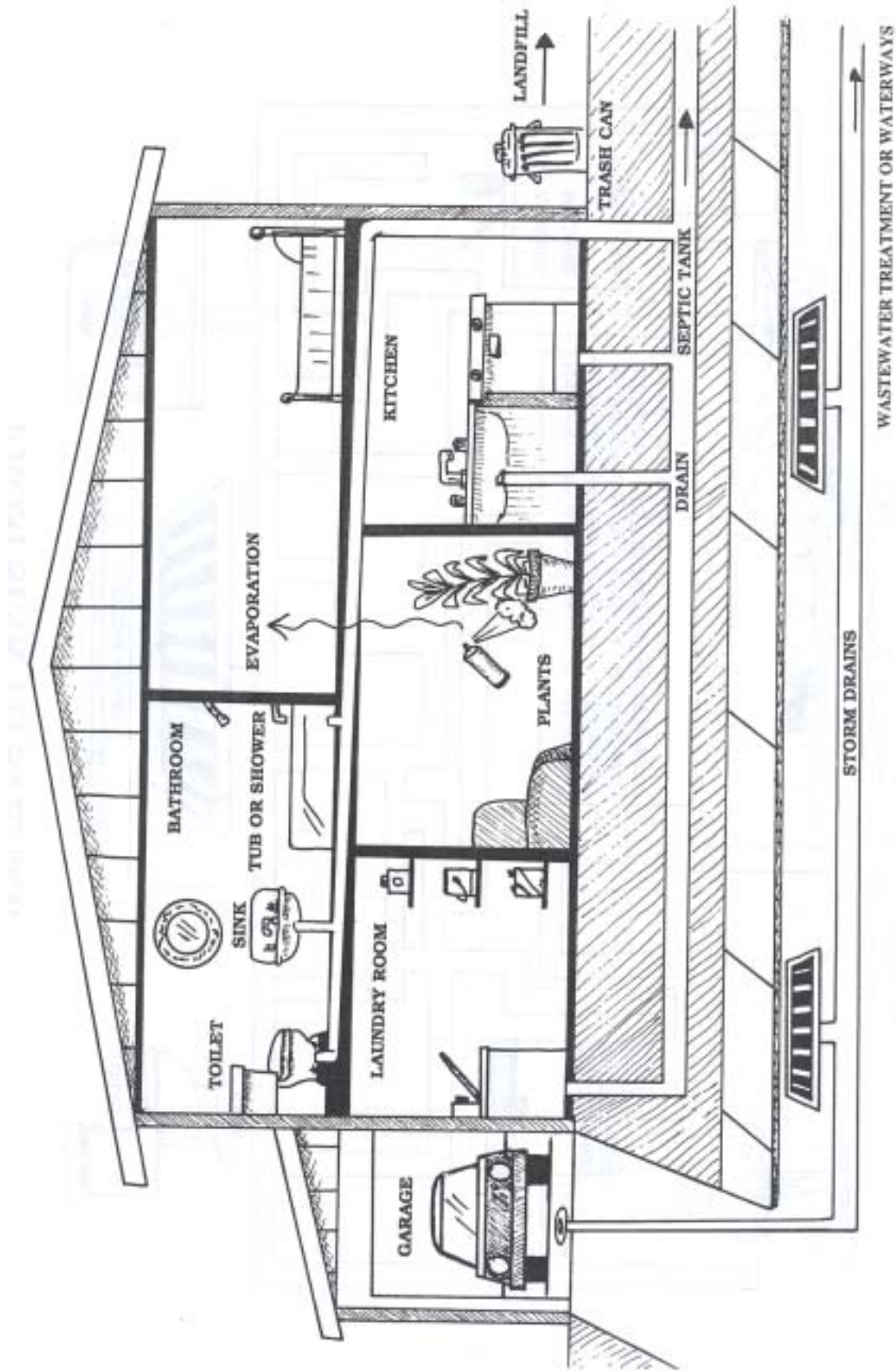


# Overhead: Routes of Exposure





# Overhead: Household Hazardous Waste Routes





# Worksheet: Words of Warning

Fill in your own definition of what you think these words mean. If you do not know, leave the space blank. Now turn the page over and look at the definitions to see if you were correct. Fill in the correct responses or add to your own.

**Toxic:**

**Ignitable/Flammable:**

**Corrosive:**

**Reactive:**

**Danger:**

**Warning:**

**Caution:**

**Hazardous:**

**Poisonous:**

**Reactive:**

**Irritant:**



## Words of Warning: Answers

**Toxic:** Hazardous materials that are poisonous, harmful, destructive, or deadly

**Ignitable/Flammable:** Easily started on fire; capable of burning rapidly

**Corrosive:** Chemical agent that reacts with or attacks the surface of a material causing it to deteriorate or wear away

**Danger:** Warning label for hazardous substances that are extremely toxic (lethal dose is a drop to a teaspoon)

**Warning:** Hazardous substance label for very toxic substances (lethal dose is a teaspoon to a tablespoon)

**Caution:** Warning found on a moderately toxic substance (lethal dose is an ounce to a pint)

**Hazardous:** Substances which cause special problems because they are poisonous, explosive, corrosive of metal or skin, harbor disease-causing microorganisms, are radioactive, or are dangerous for any other reason

**Poisonous:** A substance that causes illness, injury, or death, particularly by chemical means

**Reactive:** Hazardous substance that undergoes an unwanted reaction when exposed to other substances

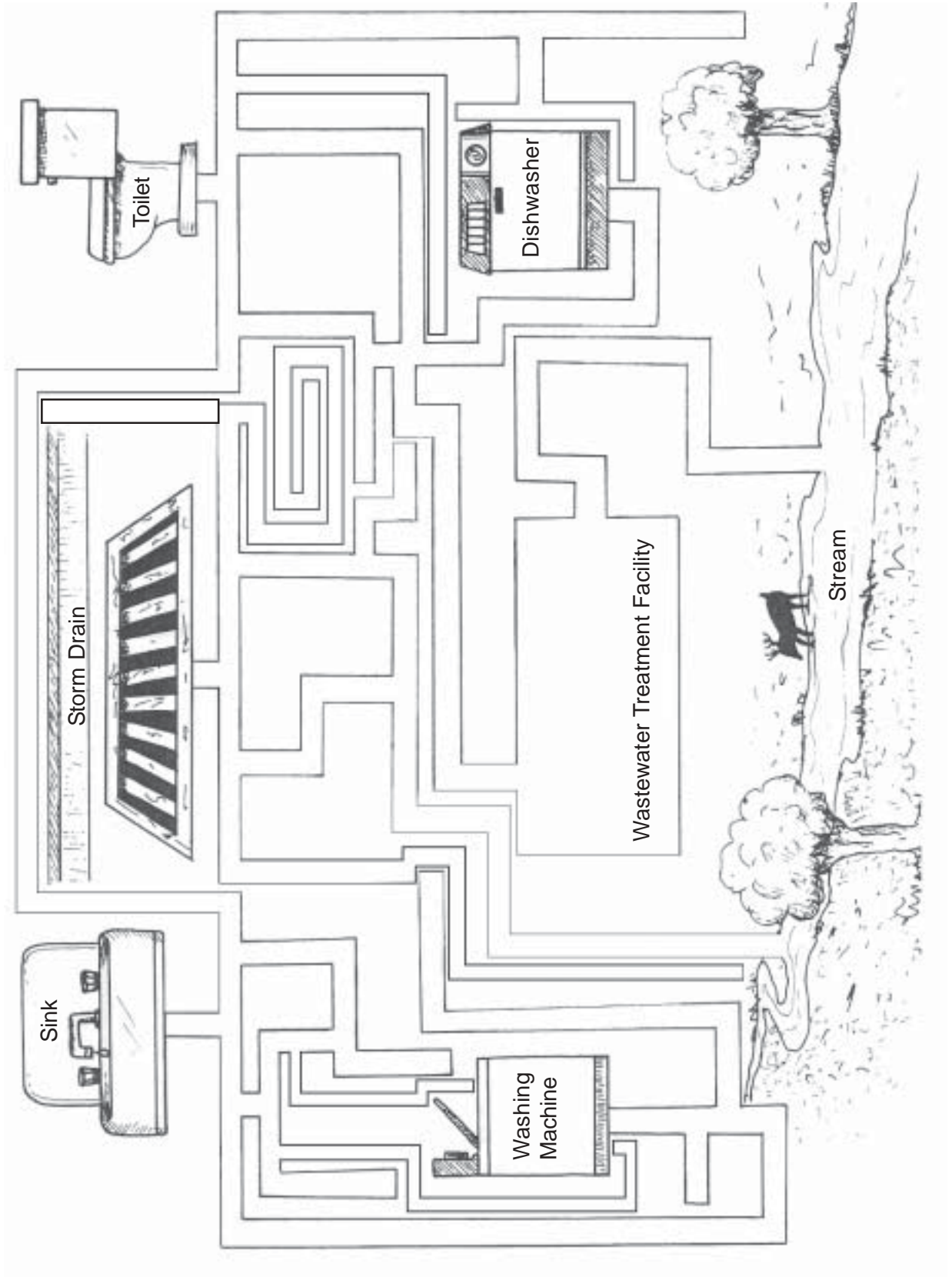
**Irritant:** Hazardous substance that causes soreness, burning or inflammation



# Worksheet: Sink to Stream

Name \_\_\_\_\_

Draw a line from the sink to the stream. Using a different color for each, do the same with the toilet, the storm drain, the dishwasher, and the washing machine. Which one(s) go directly to the stream? Which one(s) go through a treatment facility?





# Worksheet: Identify the Hazards

Student Name: \_\_\_\_\_

Circle the items that are most likely to be a hazard to people or the environment if used or disposed of incorrectly.

