School Recycling Club SHIP

(Supporting Home Instruction Program)

Lesson Plan 5

Grade Level:	7-8
Lesson:	I—What is Household Hazardous Waste?
	Hazardous Characteristics
Source:	*Teaching Toxics*
Activity/Craft:	Leaf ID Chart
Video Link:	Hazardous Symbols and Their Meanings (https://www.youtube.com/watch?v=7uHIDdkbcoU)
Game Link:	Outdoor Scavenger Hunt and Sketch (https://buggyandbuddy.com/outdoor-scavenger-hunt-kids-free-printable/)

Lesson Matrix Grades 4-6
Teaching Toxics

Lesson	Concept	Objective	Common Core Alignments		Skills
7-8 **What's Hazardous in the Home?**	Products containing hazardous substances are commonly found in the home.	• Become familiar with types and quantities of hazardous products in the home • Conduct an inventory of hazardous products	**Grade 7** CC.L.7.6 CC.RI.7.7 CC.SL.7.2 CC.W.7.1 CC.7.NS.3	**Grade 8** CC.L.8.6 CC.RI.8.8 CC.SL.8.2 CC.SL.8.4 CC.W.8.1	• Analyzing • Evaluating • Gathering data • Interpreting
7-8 **Hazardous Characteristics**	A substance is considered hazardous if it is corrosive, reactive, flammable or toxic.	• Become familiar with characteristics of a hazardous substance • Perform a series of experiments	**Grade 7** CC.RST.6-8.4 CC.SL.7.1 CC.W.7.7 CC.WHST.6-8.2	**Grade 8** CC.RST.6-8.4 CC.SL.8.1 CC.W.8.9 CC.WHST.6-8.2	• Carrying out investigations • Collaborating • Communicating solutions • Observing
7-8 **Pondering Percolation**	Soil characteristics influence how substances move in the environment.	• Observe how fast water moves through different soil types	**Grade 7** CC.RST.6-8.3 CC.SL.7.2 CC.W.7.2	**Grade 8** CC.RST.6-8.3 CC.SL.8.2 CC.W.8.2	• Carrying out investigations • Explaining • Hypothesizing • Observing
7-8 **Toxicity: A Relative Term**	The toxicity of a chemical is determined by its concentration, its amount and the individual characteristics of the person exposed to it.	• Become familiar with what determines toxicity • Perform a series of experiments	**Grade 7** CC.L.7.6 CC.RST.6-8.3 CC.W.7.9 CC.7.RP.3 CC.7.SP.4	**Grade 8** CC.L.8.6 CC.RST.6-8.3 CC.W.8.9 CC.8.EE.2 CC.8.SP.1	• Carrying out investigations • Explaining • Hypothesizing • Observing
7-8 **The Battle of Baking Soda**	Purchasing decisions are based on personal values.	• Compare toxic and non-toxic cleaning products • Examine the factors that influence how people choose cleaning products	**Grade 7** CC.SL.7.4 CC.W.7.1 CC.W.7.10 CC.7.NS.2	**Grade 8** CC.SL.8.4 CC.W.8.1 CC.W.8.10 CC.8.EE.2	• Analyzing • Communicating solutions • Gathering information • Observing

PRODUCT LABEL EXAMINATION

Questions	Product Name/Type of Product	Product Name/Type of Product
1. Why is this product hazardous? (toxic, corrosive, reactive, flammable)		
2. Does the label list storage or disposal instructions? If yes, summarize.		
3. Is the product being stored according to the directions?		
4. Are there health precautions to be taken when you use this product? If yes, summarize.		
5. List the first 3 ingredients.		
6. List terms that you do not understand or that you think are vague.		
7. If a consumer toll-free number is listed, call to see if you can obtain any missing information. Summarize your conversation.		
8. List any less toxic alternatives that you know that can be used instead of this product.		

7-8: Hazardous Characteristics

Subject

Science

Skills

Carrying out investigations, collaborating, communicating solutions, observing

Materials

(per small group)

Learning Station 1:

- one plain nail (steel, non galvanized)
- 50 ml of 10% solution copper sulfate - 125 ml beaker
- Alternate experiment:
- two packages of gelatin
- 1 ml of phenolphthalein
- magnesium ribbon
- nail
- shallow dish

Learning Station 2:

- one gram baking soda
- 50 ml of vinegar
- 250 ml beaker
- Alternate experiment:
- drop of bromothymol blue
- 25 ml vinegar
- beaker

Learning Station 3

(teacher demo):

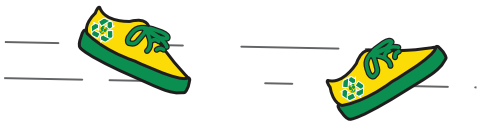
- match, burner and hot plate

Time

Two class periods

Vocabulary

Hazardous, corrosive, toxic, reactive, flammable, acute, chronic, concentration



Concept

A substance is considered hazardous if it is corrosive, reactive, flammable or toxic.

Objective

Students will become familiar with the characteristics of a hazardous substance by performing a series of experiments.

Background

See Information Section, pages 120, 127-139.

Waste from homes is considered hazardous if it is corrosive, reactive, flammable or toxic.

- CORROSIVE materials destroy metal surfaces and living tissues. They chemically change what they touch. Corrosive substances are acidic (pH less than or equal to two) or caustic (pH greater than or equal to 12.5).
- REACTIVE materials are very unstable and interact with the substances around them. They are explosive and can sometimes create toxic fumes.
- FLAMMABLE materials will burst into flames if they come into contact with sparks or flames at specific temperatures. The temperature at which this happens is referred to as the flash point
- TOXIC materials cause immediate or long term negative health problems. Exposure to toxic materials may result in injury, illness or death.

Procedures and Activities

Introduction to Hazardous Characteristics

- Review which products used in the home are hazardous. List these products on the board.
- Discuss that these products are hazardous because they have one or more of the following characteristics: corrosive, reactive, flammable or toxic.
- In small groups, have students categorize the hazardous products list by what they think is the dominant hazardous characteristic in the product. Note: Most hazardous products have more than one hazardous characteristic. For example, toilet bowl cleaner is toxic and corrosive. Ask students what they think is the most common characteristic in hazardous products (toxic, flammable).

Common Core Alignments

GRADE 7

CC.RST.6-8.4
Reading in Science & Technical Subjects:
Craft & Structure

CC.SL.7.1
Speaking and Listening:
Comprehension & Collaboration

CC.W.7.7
Writing:
Research to Build & Present Knowledge

CC.WHST.6-8.2
Writing in History/Social Studies, Science & Technical Subjects:
Text Types & Purposes

GRADE 8

CC.RST.6-8.4
Reading in Science & Technical Subjects:
Craft & Structure

CC.SL.8.1
Speaking & Listening:
Comprehension & Collaboration

CC.W.8.9
Writing:
Research to Build & Present Knowledge

CC.WHST.6-8.2
Writing in History/Social Studies, Science & Technical Subjects:
Text Types & Purposes

Hazardous Characteristics Learning Stations

- In small groups, students will rotate through learning stations that demonstrate three characteristics of a hazardous substance (corrosive, reactive, flammable). For detailed instructions, see the lab sheet on the following page. Below is a brief demonstration description. Toxicity, the fourth characteristic, requires a long-term experiment. Please refer to 7-8 Toxicity: A Relative Term.

Learning Station 1: Corrosive
Students will observe the reaction of a plain nail (steel, non-coated, non galvanized) in 10% solution of copper sulfate. The nail will become visibly corroded.

Learning Station 2: Reactive
Students will add baking soda to vinegar and record their observations. This fizzy reaction of the baking soda and vinegar forms carbon dioxide.

Learning Station 3: Flammable
The teacher, not students, will conduct this demonstration. This demonstration will show that heat, friction and exposure to flame causes a flammable material to ignite.

1. Strike a match in order to light it. Note: you can also use a Strike Anywhere Match and see if students know why you are able to light it.
2. Light a match by leaning it against a lit burner.
3. Light a match by placing it slightly above a heated hot plate.

After each of these demonstrations, have students list the steps that occurred in order to ignite the match.

- After students have completed the stations, discuss the questions on the student sheet. Discuss why students think it is difficult to include an experiment on toxicity in a one-day lab. What are their ideas for designing an experiment to test toxicity?

Alternate Demonstration for Corrosion
This is a highly visual demonstration. The resulting color changes indicates an electromagnetic reaction. This chemical change is what occurs during corrosion.

Prepare two packages of gelatin according to the directions on the box. Add 1 ml of phenolphthalein to the gelatin. Have students wrap magnesium ribbon around a nail. Pour some of the gelatin solutions in a shallow dish. Place the nail into the solution. In about 20 minutes, the wrapped nail will begin to show a vivid color change.

Alternate Demonstration for Reactive
Using indicators is a dramatic way to demonstrate change. In a beaker, add one drop of bromothymol blue to 25 ml of vinegar. Bromothymol blue will react with the vinegar, turning the solution yellow.

For more dramatic examples of flammable materials, contact your local fire department to see if any training films are available.

Using and Storing Hazardous Products

- Based on what they learned in the experiments, student groups should create guidelines for storing hazardous products.
- Discuss the groups' ideas as a class.

General Guidelines for Storing Hazardous Products

- **Flammable Products**
  Store away from heat and any source of ignition (e.g.: sparks, friction). Anything that can easily catch on fire should not be near flammable products.
- **Toxic Products**
  Store in locked cabinets. Toxic products should be properly labeled and in their original containers.
- **Corrosive Products**
  Keep the product in its original container. If it is placed in another container, there is a risk that is may corrode the container. Make sure the product does not come into contact with anything it may react with.
- **Reactive Products**
  Store away from any substances that will cause a violent reaction.

Extensions

Have students use a chemical dictionary to research specific hazardous substances found in products in their home inventories.

From School News You Can Use – May 2019

From our Friends at DIYideacenter.com

Do You Know Your Leaves?

As we all venture outside with the nice weather, let's be prepared with this handy infographic on leaf identification.

For a downloadable Leaf Identification Guide, go to:

https://www.diyideacenter.com/Outdoor-Projects/Leaf-Identification-Guide-Infographic