

LESSON 2

Recognizing Workplace Hazards



Description:

Students discuss the effect of potential workplace injuries on their lives, brainstorm lists of different types of workplace hazards, and then map potential hazards in work environments.

Learner Outcomes:

Students will be able to do the following:

1. Identify the range of effects serious injuries or illnesses could have on their lives.
2. Give examples of different types of workplace hazards — biological, chemical, and physical.
3. Recognize hazards in a workplace environment.
4. Perceive the importance of evaluating potential hazards in their workplaces.

Key Concepts:

1. The many kinds of workplace hazards are divided into three categories:
 - **Physical**—hazards due to a transfer of energy between an object and a worker (e.g., falling from a height, a burn

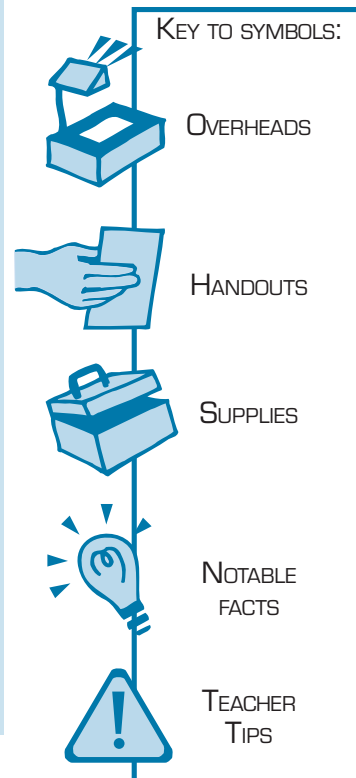
- **Chemical**—hazards due to contact with chemicals (e.g., cleaners, pesticides, fertilizers).
- **Biological**—hazards due to contact with living organisms or their by-products (e.g., molds, bacteria, HIV, grain dust).

These categories are not mutually exclusive; they are important only in that they give structure to a broad topic.

2. Hazards may cause both **temporary** and **permanent** injuries and illnesses.
3. Some hazards will create an injury or illness **right away**. Other hazards may not cause an injury or illness until **much later in life**. For this reason, workers should take all hazards seriously, even if they do not experience problems right away.
4. It is important for all workers to be aware of potential hazards when they enter a workplace.

Fact:

In a New York state study, agriculture, which employs only 3% of working adolescents, was the second most dangerous occupation for teens, accounting for the highest number of injuries among 16- and 17-year-old workers.¹ Farming consistently has been identified as Minnesota's most hazardous occupation.



Materials

Needed:

- Overheads 2.1, 2.2, 2.3, 2.4, and 2.5
- Chalkboard or blank overhead
- Large sheets of butcher paper
- Markers (at least one per group of four students)
- “Teacher’s Key: Possible Hazards Identified on Student Hazard Maps”
- “Workplace Safety Attitude Survey” handout

Preparation Needed:

1. Set up the overhead projector. Place the overheads in order according to the lesson outline.
2. Draw the three hazard categories (Physical, Chemical, and Biological) on the chalkboard or overhead before class begins.
3. Familiarize yourself with the example hazard maps (Overhead 2.4 and 2.5), so you can explain them to the class.
4. Make copies of the “Workplace Safety Attitude Survey” (one per student).

Optional Activity: You may want to invite a guest speaker to class who has experienced a workplace injury or permanent disability. The individual may have suffered a sudden injury such as a loss of a limb or finger or paralysis due to a fall. Or perhaps the individual has experienced an injury or illness that developed gradually over time, such as a loss of hearing due to working with loud machinery or lung-related conditions due to working in dusty or hazardous environments.

Hearing the story of someone who has a workplace injury may help make the material “real” to students and reinforce the concepts presented in this lesson. Perhaps one of your students may have suffered a serious workplace injury and may be willing to share his or her own experience with the rest of the class.

If you are not sure where to find a speaker for your class, local organizations who serve people with disabilities may have suggestions.

Directions:

You may want to extend this lesson over a two-day period to allow more time for discussion and completion of the hazard maps.

Life After An Injury — Part II (10 minutes)

Optional: You may want to allow students time to complete their “My Experience With A Workplace Disability” essays at the beginning of class, if they were not able to complete them as homework assignments.

1. Have one or two students from each disability group describe their experiences with the simulated disabilities during the previous class day. Ask other students from the same group, if they would like to add anything about their experiences.

If students do not include the following information, ask them:

- What was your experience like?
- What activities did you have to change, because you could not use your thumb, arm, legs, or hearing?
- For those with the disfigurement, what did you experience?
- How might your life be different, if this situation was permanent for you?

2. Explain:

You experienced what it was like to be injured at work, to lose a thumb, an arm, a leg, your hearing, or to have scarring on your face. Most of you found it difficult. People who are really injured at work in these ways do not have the option to go back to life before the injury.

People often are injured at work. It is not uncommon for a person to lose their hearing, if they work in a noisy workplace for a long period of time. It is not uncommon for a person to lose a limb or finger while working around large, moving machinery.

3. Show Overhead 2.1. Explain:

Some workplace injuries or illnesses affect us only for a short time. Getting a burn that heals in a week or feeling nauseous for a few hours after using a strong chemical cleaner are examples of temporary injuries or illnesses.

Ask:

What are some other examples of temporary work injuries or illnesses?

(Example answers: small cuts; bruises; strains; sunburns)

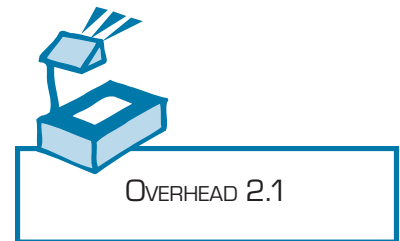
Explain:

Other injuries or illnesses affect us for a long period of time, maybe even for the rest of our lives. Losing an arm in a power takeoff or losing the ability to walk after breaking your back in a fall are two examples of **permanent** injuries or illnesses. Having a scar on your face is also a permanent injury.

Ask:

What are some other examples of **permanent** work injuries or illnesses?

(Example answers: losing a finger; losing your eyesight; developing work-related asthma)



4. Explain:
You can also look at workplace injuries or illnesses in another way. Some hazards create an injury or illness **immediately**. For example, if you touch a hot grill, you get a severe burn right away.
5. Ask:
What are some other examples of immediate work injuries or illnesses?
(Example answers: cutting your finger in a meat slicer; hurting your back when you fall)
6. Explain:
Other hazards may not cause an injury or illness until **later in life**. For example, a person who works in a very dusty workplace may have no problems right away but may develop lung problems after years of exposure.
7. Ask:
What are some other examples of work injuries or illnesses that show up later in life?
(Example answers: loss of hearing gradually over time; carpal tunnel caused by repetitive motions over time; back problems caused by repeated lifting; cancer or lung disease caused by prolonged exposure to harmful chemicals).

Note: Spend some time talking about injuries or illnesses that show up later in life. Students may not always be aware of or concerned with these hazards. Future health problems may not seem as important as getting a job done quickly now. Discuss the problem with this short-sighted view on work safety.

Explain:

When we think of workplace injuries or illnesses, we often think of those that happen immediately, but the hazards that cause injuries or illnesses later in life are just as serious. For this reason, workers should take all hazards seriously, even if they do not experience problems right away.

Identifying and Defining Hazards

(20 minutes)

1. Ask:
All workplace injuries or illnesses are caused by hazards. What was the definition of a “workplace hazard”?
(Answer: A workplace hazard is anything at work that can harm a person—physically or mentally.)

Explain:

Remember, the hazard is what **caused** the injury or illness, not the injury or illness itself. For example, hot oil is the hazard, not the burn the hot oil caused.

The hazard is also not the action that was taking place at the time of the injury. For example, painting is not the hazard, it is the height the painter fell from that is the hazard. Of course, painting may cause muscle strain or repetitive stress injuries.

2. Show Overhead 2.2. Explain:

You may be exposed to hazards at work in a number of ways. You may be exposed to a physical hazard whenever a transfer of energy between you and an object is possible. How many of you have studied physical science? Can you explain what a transfer of energy involves?

A difference of temperature between an object and a person creates the potential for heat energy to be transferred, if the person and object come in contact. For example, if your bare hand touches a hot oven, the heat energy of the oven is transferred to you through touch, causing a burn.

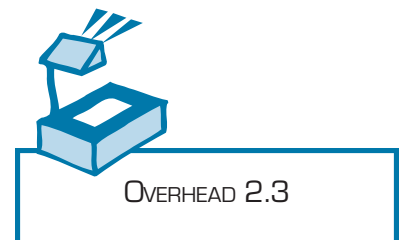
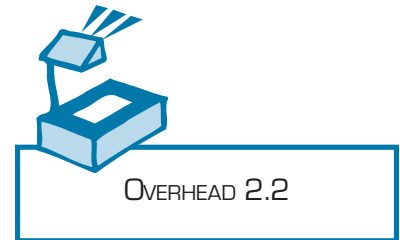
A moving object also has energy that can be transferred. A box sitting on a high shelf gains a lot of momentum as it falls. If the box hits you, that energy is transferred to you, causing an injury. In the same way, if you fall from a height, your body gains a lot of momentum, causing it to be injured when you hit the floor.

3. Show Overhead 2.3. Explain:

You may also be exposed to biological and chemical hazards by breathing them in (inhalation), absorbing them through the skin (absorption) or through breaks in the skin, or swallowing them (ingestion).

To prevent injuries, it is important to think about how your body comes into contact with hazards. For example, if you work with chemicals in the workplace and forget to wash your hands before lunch, you may ingest the chemical while you eat without realizing it. Even if the chemical causes no immediate discomfort, why could ingesting it be a problem?

(Answer: Illnesses may occur later due to repetitive actions over time.)



- Draw a three-column table on the chalkboard or blank overhead. Label one column “Physical Hazard,” one column “Chemical Hazard,” and one column “Biological Hazard.”

Say:

Now without using the fact sheets, just using your memories or personal experiences, give me some examples of workplace hazards.

- As students list the hazards, decide as a class which category they fit under and write them in the appropriate column.

Again, make sure students are mentioning hazards, not injuries or illnesses. Students may be somewhat confused with the difference between categories. Biological hazards deal with any fluid or product from an animal. A person’s blood, if infected with HIV, is a biological hazard. Lifting a person, though the same object, is a physical hazard.

Refer to the workplace hazards fact sheets for more examples. Your completed chart may look like the following:

Physical	Chemical	Biological
Loud noises Ladders, staircases Hot ovens Power takeoff Tractor Freezer, cold places Very hot or cold weather	Pesticides Cleaning products Paints Fertilizers	Grain dust Human blood Large animals Manure pits

- Ask:
Looking at these lists of hazards we just created, which ones can be found on a farm?

Star the agricultural hazards.

Mapping Hazards (30 minutes)

Note: You may not have enough time to complete this activity during this class period. You may want to extend this activity to your next class session. Students will map hazards again in Lesson 4 as part of designing a prevention plan. Mapping hazards here will prepare students to complete the activities in Lesson 4 in less time and give them an opportunity to use workplaces that are familiar to them.

1. Explain:

Once you know the basic kinds of hazards, you can begin to identify them in the workplace. When you walk into a workplace, use what you know about hazards to identify them.

Although each workplace is unique, the types of dangers in each are not. In any workplace you may find physical hazards such as noise, moving machine parts, or other dangerous equipment. Chemical hazards, such as pesticides or cleaning products, or biological hazards, such as human blood, grain dust, or manure pits, also may be present. If you remember the basic hazard categories, it will be easier to see them in many different workplaces.

Hazards at a workplace may change from day to day. If, for example, a large shipment of supplies comes in and needs lifting and carrying, a new physical hazard is created. You will want to be aware of new hazards that come into your work environment each day. We are going to practice analyzing work environments for hazards by developing hazard maps.

2. Show the class Overhead 2.4. Explain:

This simple map shows the basic layout of a grocery store. You will be working in small groups to create maps like this of different types of workplaces. Work together using the butcher paper and markers. You do not need to draw fancy maps.

3. Explain:

To begin the map, draw a rough floor plan of the workplace you are studying. The floor plan should show rooms, work areas, major fixtures and equipment, doors, and windows.

TEACHER TIP:

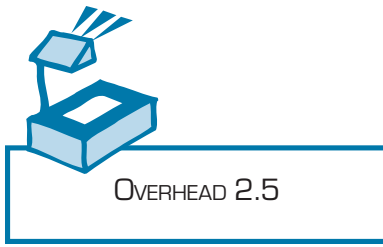
If you want to save time in class, give this exercise as a homework assignment.



Although each workplace is unique, the types of dangers in each are not.



OVERHEAD 2.4



It is always better to ask if something is a hazard than to ignore it and find out later.



4. Show Overhead 2.5. Explain:
Once your floor plan is drawn, decide where the hazards are located. Mark these locations on the floor plan using the markers. Label the type of hazards you find with this code:

- **P** to show physical hazards.
- **C** to show chemical hazards.
- **B** to show biological hazards.

You may want to write this code on the board so students can refer to it. Label a few of the hazards on the overhead using this coding system.

Explain:

If you are not sure whether something is a hazard, mark it anyway. It is always better to ask if something is a hazard than to ignore it and find out later that it was a hazard, because you or someone else became injured or ill.

5. Divide the class into small groups of three or four students. Have each group select a type of workplace to study. It would be best, if they choose one of their own workplaces, but they could also use one of the following:
 - Farm (barn, machine shop, feedlot, or cropland)
 - Restaurant
 - Nursing home
 - Movie theater
 - Office

The same workplace can be assigned to more than one group. If possible, each group should include some students who have worked in, or are familiar with, that type of workplace.

Note: If you are short on time, provide the workplace maps for students. Have them fill in the hazards found there.

6. Give each group a set of markers and a large sheet of butcher paper.
7. Allow the groups at least 15 minutes to complete their maps. If some groups get done with their maps before others do, encourage them to go back and read their hazard fact sheets to see if any hazards were missed.
8. Then have each group choose one person to report to the class. Each group's spokesperson will have one or two minutes to explain their map. Have at least four groups report. If groups begin to repeat the same hazards, ask them to focus on hazards that have not yet been mentioned.

Note: Possible hazards for each workplace are listed in the teacher's key included in this lesson.

9. Explain:
Whenever you are in a workplace, make a mental map of where the hazards are, just as you did today. Tomorrow, we will talk about what can be done to reduce the risk of workplace hazards, once they have been identified.
10. Have students fill out their “Performance Criteria and Checklist” for today’s work.



Taking It Home:

Have students do the following assignment:

Give each student a copy of the “Workplace Safety Attitude Survey.”

Explain:

This is a survey about workplace safety attitudes. I would like you to fill this survey out as honestly as you can.

Read each statement and ask yourself whether you agree or disagree with it. Think about your current or past work situations. Does this statement describe your attitude in that workplace?

Take your time reading and considering each statement. No answers are right or wrong. I am looking for your opinions. You will not be graded on your answers, but you will get credit for completing the survey.

Again, be as honest as you can. If you have not worked, think about what your attitudes are **right now** as you think about working in the future. You will hand in this survey during our next class session.



Footnotes:

¹ Belville, R., et al. “Occupational Injuries Among Working Adolescents in New York State.” *Journal of the American Medical Association* 269 (1993): 2754-2759.

Note: Portions of this lesson are adapted from the “Teen, Work, and Safety” curriculum distributed by the Labor Occupational Health Program, Center for Occupational and Environmental Health, University of California, Berkeley.

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A Body's Response To Hazards

Temporary
versus
Permanent

Immediate
versus
Later in Life

Pathways of Exposure

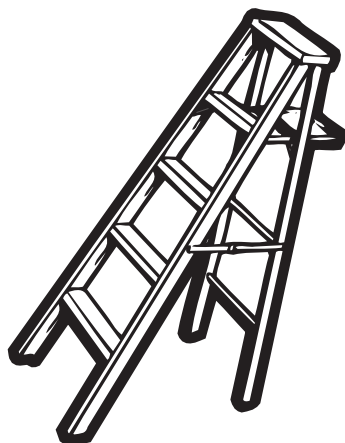
Physical Hazards

Energy is transferred to a worker
in a variety of ways:



Heat (burns)

**Falling
objects**



**Falling
from heights**

Pathways of Exposure

Biological and Chemical Hazards

Workers are exposed to these hazards by the following means:

Inhalation (breathing in)

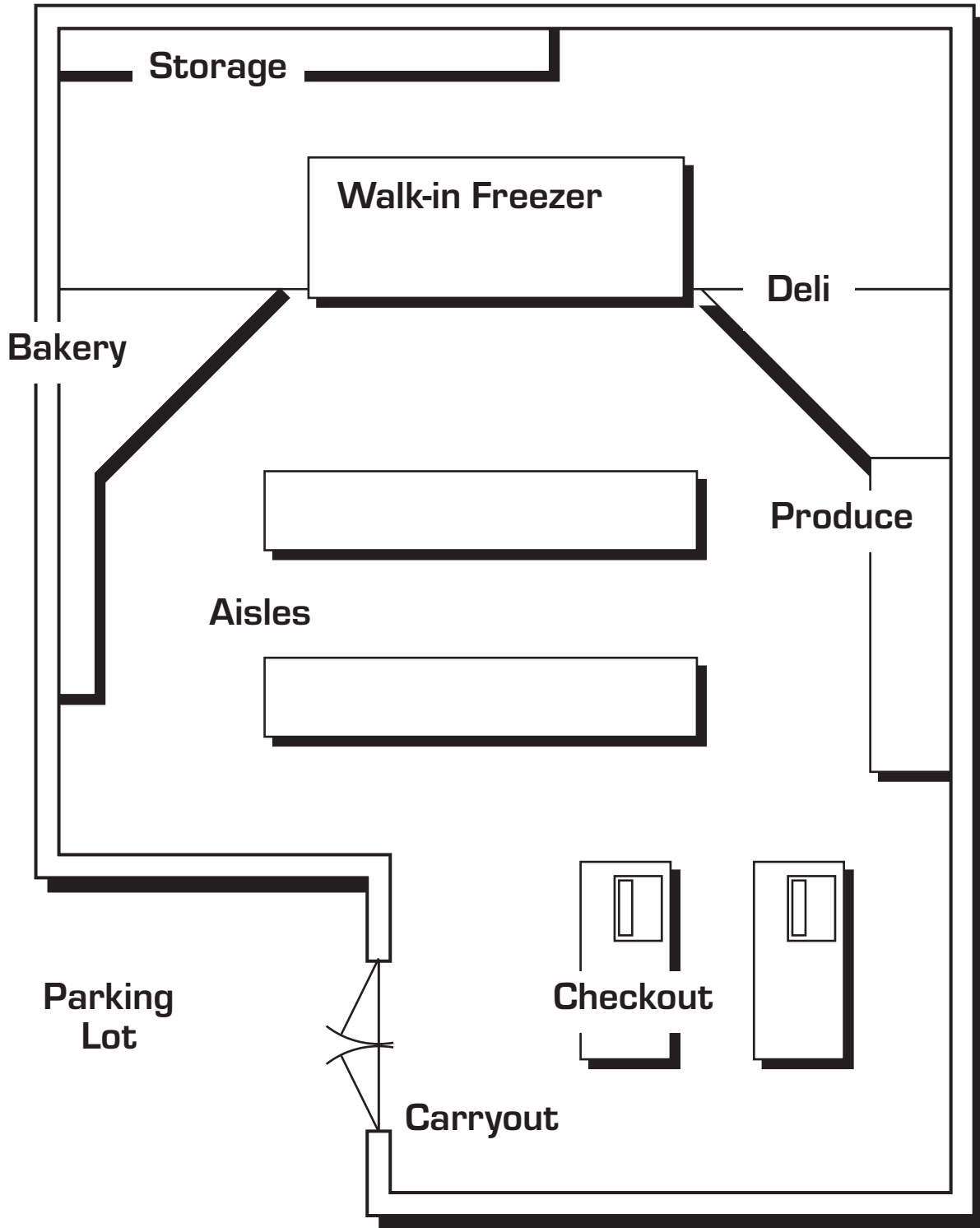
Absorption (passing through skin)

Entrance through cuts or abrasions

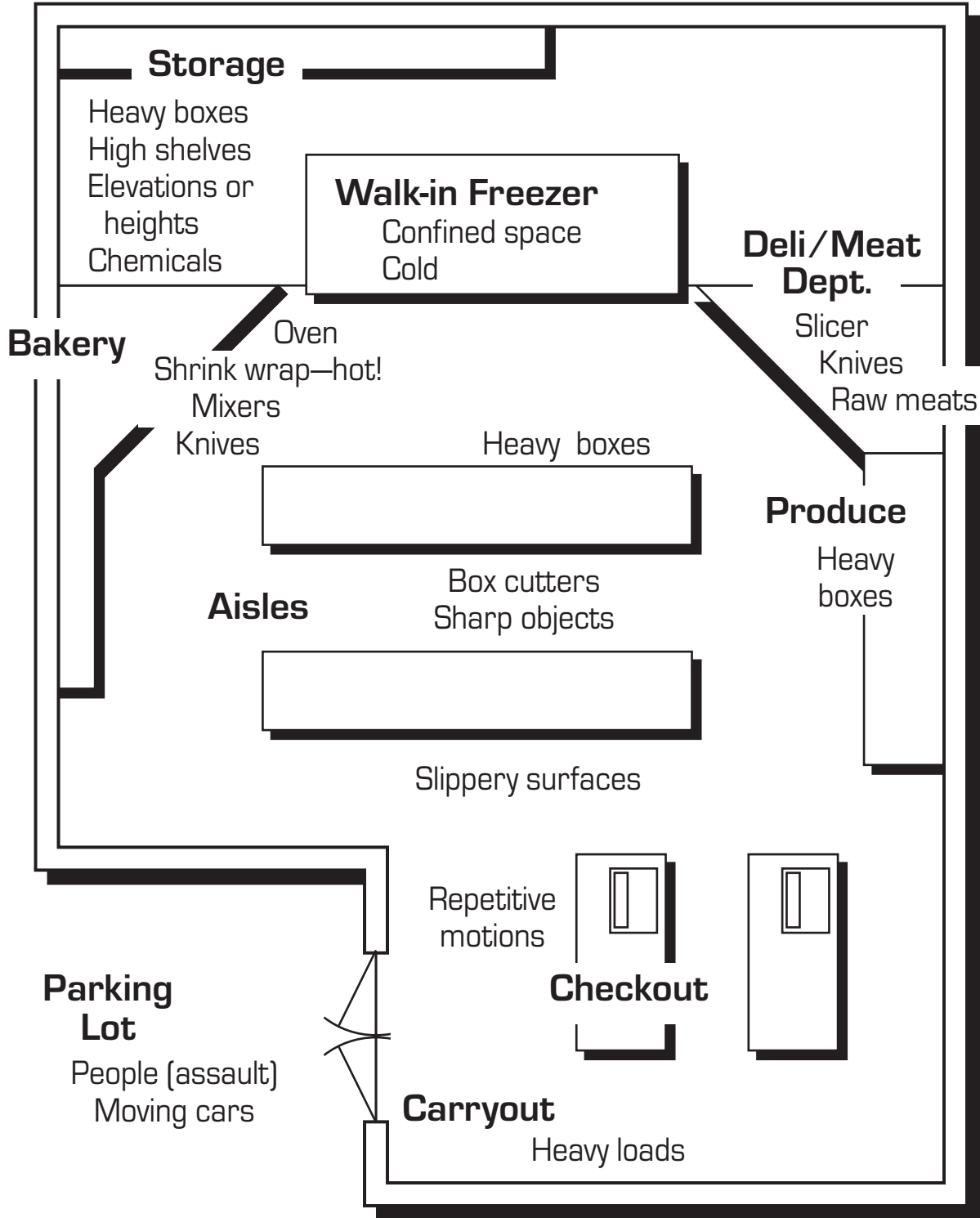
Ingestion (swallowing)



Example Hazard Map: A Grocery Store



Example Hazard Map: A Grocery Store



Teacher's Key: Possible Hazards Identified on Student Hazard Maps

On a Farm

In and around a barn:

Ladders or hay loft (falling)
Animals
Dust, molds
Chemicals (milking barns)
Conveyor belts
Manure pits
Silos or other enclosed bins
Tractors

In a machine shop:

Chemicals
Power tools (cuts, electrocution)
Truck or car jack
Dust
Moving parts in motors
Noise
Toxic gases

In and around a feedlot:

Animals
Manure pits (toxic gases)
Silos or other enclosed bins
Grain wagons
Tractor rollovers and runovers
Electric fencing
Barbed wire fencing
Insect bites
Noise

On cropland:

Tractors
Power takeoff
Moving parts (chopping, cutting)
Pesticides and other chemicals
Holes
Sun and heat
Dust, molds, pollen
Noise
Insects

Fast Food Restaurant

Cooking equipment (burns, electrocution)
Sharp knives
Slippery floors
Money (robbery)
Standing for long periods of time

Hot grease
Slicers/meat cutters
Chemicals (cleaners, pesticides)
Heavy objects

Nursing Home

Heavy objects (people)
Chemicals (disinfectants, cleaners)
Needles
Cooking equipment
Moveable beds
Physical violence

Human bodily fluids
Standing for long periods of time
Medicines
Slippery floors
Physical therapy equipment

Movie Theater

Popcorn, hot dog and coffee machines (burns)
Ladders
Money (robbery)
Dark environments (falls)

Slippery floors
Cleaning products
Standing for long periods

Office

Cords or loose carpeting
Poor indoor air quality
Computer monitors
Repetitive work

Electric circuits
Computer keyboards/mouse
Sitting for long periods of time

Name: _____ Class Period: _____

Workplace Safety Attitude Survey

For each of the following statements, check the response that best fits what you think or believe *right now*. Be as honest as possible. This survey will not be graded.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. My health is very important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. A workplace injury or illness will never happen to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If I do not watch out for my own health, I can't assume anyone else will.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Workplace injuries or illnesses just happen. I can't do anything about them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. It is worth the inconvenience to take the necessary precautions to be safe at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I do not worry about workplace injuries or illnesses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. People may think I am strange if I am concerned about safety at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I am more careful than other people, so I do not think I will get injured at work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. If I had to choose between completing my job quickly and being safe, I would choose to be safe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. If I get injured at work, it will most likely be minor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. A person could get fired by questioning safety on the job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. If someone gets injured at work, it is their own fault.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I do not care what other people think. I would rather be safe than sorry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. You really cannot predict how or when people are going to get hurt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. If it would make my job faster, I would remove protective equipment on machinery.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Some jobs, like office work, are totally safe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I would give up a high-paying job if I thought it was unsafe.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Even if protective clothing was uncomfortable or seemed unnecessary for the job, I would still wear it.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I do not pay much attention to written safety warnings. Most of them are unnecessary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. If I worked at a job for a long time and never got hurt, I would still be concerned about injuries or illnesses.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>