

LESSON EIGHT

● INHALANT ABUSE

GOALS

1. To show students how to protect themselves from accidental inhalant poisoning
2. To motivate students not to use inhalants intentionally
3. To motivate experimenters to quit

SUMMARY OF ACTIVITIES

1. Introduce Lesson (1 min.)
2. Introduce Concept of Body Pollution (3 min.)
3. Reinforce Oxygen's Importance to the Body (6 min.)
4. Distinguish Between Inhaling Nonpoisonous Substances vs. Toxic Chemicals (2 min.)
5. Discuss Poisoning by Breathing Chemical Fumes (7 min.)
6. Discuss Protection From Toxic Chemicals in Inhalants (4 min.)
7. Discuss How Toxic Chemicals Can Harm the Body (5 min.)
8. Reasons Not to Inhale Toxic Fumes (12 min.)
9. Wrap-up (3 min.)

DESCRIPTION

Lesson 8 responds to the growing concern about pre-teens and teenagers experimenting with inhalants. It is designed to:

- differentiate toxic inhalants from other nonpoisonous substances
- help students learn how to protect themselves when using toxic chemicals
- inform students of the physical consequences of experimentation with or abuse of inhalants.

There is strong evidence that these chemicals are poisonous to the body, even when inhaled for the first time. In this lesson, motivation not to experiment relies on information about physical consequences.

Activities 2-4 teach the importance of breathing “clean” air and how our bodies use oxygen. Activities 5-6 discuss how to protect ourselves from accidental poisoning by chemical fumes, and Activity 7 introduces the subject of intentional inhalant abuse by teenagers.

Students brainstorm and write reasons (physical consequences) not to inhale toxic fumes in an exercise that asks them to talk some friends out of it (Activity 8).

The skills for resisting internal and external (peer) pressure taught throughout the curriculum are applicable to inhalants as well. For many teachers, this lesson contains new information. Teacher Reference material on inhalants (pages 8.7-8.14) has been carefully selected to provide a solid background in this subject.

PREPARATION

- Review Lesson Plan
- Review information on inhalants and inhalant abuse:
 - Biggest Dangers with Inhalants* (Teacher Reference, page 8.7)
 - Inhalants* (Teacher Reference, pages 8.8-8.12)
 - Health Effects of Inhalants* (Teacher Reference, pages 8.13-8.14)
- Optional: before class you may want to prepare a 3" x 5" reference card listing key health effects (pages 8.13-8.14)
- Collect and prepare materials, as indicated below

MATERIALS NEEDED

Assemble the following materials:

- Completed visual: *Ground Rules: Students* (saved from Lesson 1)
- Poster 11: *Toxic Chemicals Affect Your Body Right Away* (Activity 5)
- Masking tape and thick, felt-tip, nontoxic markers for partial and completed chart paper visuals, below

Prepare the following materials:

- Partial Visuals:
 - *How to Protect Yourself From Toxic Chemicals* (title only, Activity 6)
 - 5-6 pieces of chart paper titled *Reasons Not to Inhale Toxic Fumes* (Activity 8)
- Completed Visuals:
 - *How Toxic Chemicals Can Kill You* (Activity 7), title and three ways written on chart paper or on the board
 - *Scenario* (Activity 8A), written on chart paper or on the board
- Copy *Our Family's Guidelines for Using Household Chemicals* for each student (page 8.16) for Activity 9

ACTIVITIES

1. Introduce Lesson (2 min.)

- A. Display visual: *Ground Rules: Students.*
- B. *“We have talked about resisting peer pressure to use alcohol, cigarettes, and other drugs. Today we are going to talk about protecting ourselves from toxic (poisonous) fumes.”*

2. Introduce Concept of Body Pollution (3 min.)

- A. Ask students to raise their hands if they are concerned about air pollution. Look around the room and verbally note that most of the class is concerned.
- B. Ask students to raise their hands if they are concerned about water pollution. Again, verbally note that most of the class is concerned.
- C. Now ask students to raise their hands if they are concerned about “body pollution.” Look at the class and note that many hands are not raised. Remind students that if our air and water are polluted, our bodies will become polluted as well.
- D. *“Today we are going to discuss ways to prevent body pollution.”*

3. Reinforce Oxygen’s Importance to the Body (6 min.)

- A. *“Oxygen is our body’s primary fuel. Let’s think about what happens when your body doesn’t have oxygen.”*
- B. *“Imagine we are on a spaceship bound for another planet. After the ship lands, you prepare to walk on the planet’s surface. What should you be wearing before you step out of your ship?”* (spacesuit, helmet, oxygen tank) *“Would it be safe to go without your helmet and oxygen tank?”* (No.) *“What would happen?”* (Because other planets’ atmospheric gases do not contain oxygen, you would quickly die without your oxygen tank.)
- C. *“Why must you have oxygen to live?”* (Without oxygen, cells stop functioning properly and quickly die.)
- D. *“Can’t your body use other gases found on the planet? Maybe hydrogen or argon, for instance?”* (No.) *“Why not?”* (Your body is designed to use a specific gas: oxygen.)
- E. *“Now, think of a car. If you run out of gas, can you fill the tank with water, milk, or orange juice?”* (No) *“The car is designed to run on only gasoline, so it won’t work if the gas tank is filled with something else. In fact, these other liquids could permanently damage the car. Your body can’t change fuels, either. Breathing in poisonous fumes and gases damages your body, just as the wrong liquids can damage a car.”*

4. Distinguish Between Inhaling Nonpoisonous Substances vs. Toxic Chemicals (2 min.)

- A. *“What does the word ‘inhale’ mean?” (Breathing in) “We all breathe in a lot of things – oxygen in fresh air, the aroma of flowers, the smell of freshly baked cookies, medicine for asthma. BUT, many products are dangerous if you inhale their fumes (vapors).”*
- B. *“How many of you have been in a room that has been freshly painted, or used spray paint, glue, or fingernail polish remover for a long time? How did you start to feel?” (dizzy, nauseated, had a headache) “Your body was reacting to the toxic ingredients in these products. They are important warning signs that you shouldn’t ignore.”*

5. Discuss Poisoning by Breathing Chemical Fumes (7 min.)

- A. *“Is it safe to drink gasoline or hairspray?” (No, they are poisonous.) “What about breathing in gasoline or hairspray fumes? That’s very dangerous, also. When the fumes from these products are inhaled, the same chemicals enter the body, just as if they were swallowed. Poisonous chemicals are contained in the products’ fumes and these chemicals can pollute/damage your body.”*
- B. *“Let’s trace the path of fumes as they enter and then circulate throughout the body.”*
- C. Display poster: *Toxic Chemicals Affect Your Body Right Away.*
- D. Have a student read the sentence next to #1. (*“Toxic chemicals go in the nose and mouth.”*)
- E. *“Then they go to the lungs and air sacs. There they enter the bloodstream through the tiny air sacs.”*
- F. Have a student read the sentence next to #2. (*“They travel immediately throughout the bloodstream.”*)
- G. Have a student read the sentence next to #3. (*“In seconds, they settle in the brain, heart, liver and muscles.”*)
- H. *“Now we can understand how inhaling poisonous fumes quickly affects first the brain, then the heart, then other vital organs and cells in the body.”*

6. Discuss Protection From Toxic Chemicals in Inhalants (4 min.)

- A. Show partial visual: *How to Protect Yourself From Toxic Chemicals* (sample on page 8.4).

- B. *“The good news is that you can protect yourself from the dangerous effects of these chemicals. If you are using a product such as spray paint, glue, or fingernail polish, what can you do to protect yourself from breathing in toxic fumes?”* (There is no legislation requiring products to be nontoxic, but many manufacturers are voluntarily making markers, correction fluid, and other products in a nontoxic form.)
- C. Solicit student answers and write them on the visual. (Students often fail to mention “open windows.” Be sure to get them thinking about opening windows themselves.)
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How to Protect Yourself From Toxic Chemicals (sample visual)

1. Read and follow directions on product labels
 2. Buy nontoxic products, when possible
 3. Do the project outside, if possible
 4. Do not put your face too close to the product or project
 5. Open windows, turn on fan
 6. Take fresh air breaks
 7. Wear a safety mask
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- D. *“You have come up with some good ways of protecting yourself when toxic chemicals are being used at home or on a school project. It’s also important not to inhale these chemicals on purpose to get intoxicated.”*

7. Discuss How Toxic Chemicals Can Harm the Body (5 min.)

- A. *“We have always known that toxic chemicals can kill or cause permanent damage. But we’re now learning how many teenagers are dying from intentionally inhaling toxic chemicals. Most people who inhale toxic chemicals don’t know they can die from them.”* If students ask how many people have died from inhalants, indicate that it is hard to get an accurate count because the cause of death is usually written as accident or heart attack. But we do know that death from inhalant abuse is on the rise today among adolescents and it is not an infrequent occurrence, about 200 deaths each year.

B. Display visual: *How Toxic Chemicals Can Kill You* and review the three ways:

1. Heart Stops

“This can occur after a sudden fright while the person is intoxicated. This fright, combined with the effects of these chemicals, can cause the heart to stop. This can happen to people of all ages, including pre-teens and teens.”

2. Accidents

“Toxic chemicals can affect your thinking and coordination. They can also cause people to see things that aren’t there. This has led to fatal accidents, such as getting burned, car crashes, falling off buildings, and drowning.”

3. Suffocation

“This occurs when someone who is intoxicated passes out, throws up, and then chokes on his or her vomit.”

C. *“Toxic chemicals can kill you fast (heart stops) or they can kill you slowly (brain damage). Either way, they are killers.”*

D. *“Even if they don’t kill you, many teenagers have become permanently injured when their heart stops from nerve and kidney damage or from accidents after inhaling toxic fumes. They are permanently paralyzed or shake uncontrollably, have irreversible brain damage, and lose bladder control so that they need to wear a diaper.”*

8. Reasons Not to Inhale Toxic Fumes (12 min.)

A. Display the following scenario (chart paper or board):

“Two of your very good friends come to you and tell you they want to try sniffing because they heard that it makes you feel good. You are worried and want to convince them NOT to. What would you say? Be convincing.”

B. Divide the class into groups of 5-6.

C. Give each group a piece of chart paper titled *Reasons Not to Inhale Toxic Fumes*.

D. Have each group appoint both a Recorder and a Reporter. Have the Recorder list at least four reasons not to try sniffing. Remind them they don’t want to disrespect their friends, but they want to tell them the truth about toxic chemicals.

E. Allow six minutes for brainstorming and writing.

- F. Circulate among groups as needed.
- G. Ask Reporters to bring completed lists up front.
- H. Tape up the lists.
- I. Reassemble the class.
- J. Ask each Reporter to read the group's list.
- K. Reinforce students' suitable reasons.

9. Wrap-up (3 min.)

A. *"Today you learned some important information about toxic fumes.*

- 1. Chemicals are all around you. You use them at school and at home.*
- 2. When you use chemicals, you should try to select nontoxic products when possible, and take precautions to protect your body from being polluted by toxic chemicals.*
- 3. Inhaling toxic chemicals can kill or permanently injure. It is very important to let people know how dangerous they really are."*

B. Homework:

1. Pass out *Our Family's Guidelines for Using Household Chemicals*. If time permits, run through the checklist on page 8.16 to remind students of the safety guidelines they've just learned.

"Work with your parent(s) or trusted adult to develop guidelines that will work for you and your family."

BIGGEST DANGERS WITH INHALANTS

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1. Using inhalants even one time can cause

- sudden death (cardiac arrest)
- suffocation
- visual hallucinations and severe mood swings
- numbness and tingling of the hands and feet

2. With any use you are likely to experience

- heart palpitations
- breathing difficulty
- dizziness
- headaches

3. Right away or over time, inhalants can cause

- nausea and nosebleeds
- decrease or loss of sense of smell
- abdominal pain
- muscle weakness
- violent behaviors
- irregular heartbeat
- dangerous chemical imbalances in the body
- nervous system damage
- irreversible brain damage
- liver, lung, and kidney impairment
- involuntary passing of urine and feces
- damage to vision or hearing

Remember, using inhalants, even one time, can kill you. Death occurs from

- asphyxia – solvent gases can significantly limit available oxygen in the lungs, causing breathing to stop
- suffocation – typically seen with inhalant users who use bags to trap substances
- choking on vomit
- careless behaviors in potentially dangerous settings
- sudden sniffing death syndrome from cardiac arrest

INHALANTS

This material is intended for teacher background information only. A discussion of inhalant types or methods of use are specifically avoided in the curriculum. This section has been adapted with permission from material prepared by the International Institute on Inhalant Abuse, with contributions from Isabel Burk, M.S., CPP, CHES.

HOW INHALANTS WORK

To understand how dangerous inhalants are, let's compare them to drugs and alcohol. When a person swallows a pill or alcoholic drink, it goes to the stomach where it is diluted and broken down by gastric juices, then sent to the small intestine. More enzymes break down the pill/alcohol in the small intestine, and what is left enters the bloodstream, going first to the liver. The liver filters the blood, removing some of the toxicity. Then the blood takes the residue all around the body to every cell.

In contrast, breathing toxic fumes brings them into the lungs where they enter the bloodstream directly, without filtering or dilution. The blood carrying toxic vapors then travels first to the brain, then to the heart and all around the body (Activity 5 and the poster Toxic Chemicals Affect Your Body Right Away will help you explain this graphically to your class). Huffing or sniffing product vapors delivers undiluted toxins directly to brain cells! That is what makes this practice so very, very dangerous.

The fumes and gases that cause the high can damage the brain and can cause sudden heart and respiratory failure. After six months of chronic, persistent use, inhalant abusers will inevitably suffer some form of brain damage and this damage may not be reversible. Youth who abuse inhalants tend to drop out of school, use multiple drugs, and suffer severe health problems, including irreversible brain damage, more often than youth who abuse other substances. Inhalant abuse is highest among eighth graders and many of these youth started abusing before they were ten years old. Fifty-nine percent of students ages 10-11 personally know an inhalant abuser.

WHAT IS INHALANT ABUSE?

Inhalant abuse is the inhalation of volatile substances for the express purpose of attaining a high. Spray paint, correction fluid, gasoline, dry erase markers, air freshener, cooking spray, fabric protector, glue, butane, freon and propane; these are the substances youth are abusing.

Many volatile substances are quickly absorbed by the lungs and can cause changes in mood, altered states of consciousness, and hallucinations. There are chemicals in products such as glue, paint, and nail polish that produce a high when used improperly. The products containing these chemicals were never meant to be abused to achieve a high, and when used improperly become very dangerous to one's health.

The largest number of youth who begin using inhalants do so during their middle school years. In fact, in 2005, 17.1% of eighth graders had tried inhalants and about 4.2% had used in the last 30 days. By 10th grade, the 30-day prevalence rate had dropped to about 2.2%.

Across America, growing numbers of children and teens are willfully inhaling everyday household and industrial products for the purpose of getting high. This intoxication is short-lived (about 2-4 minutes), yet devastating.

CATEGORIES OF INHALANTS

There are over 1,400 inhalable products on the market in these four categories: solvents, aerosols, gases and nitrites.

Solvents

- paint
- glue
- paint thinner
- toxic markers
- toluene
- gasoline/kerosene
- lighter fluid
- nail polish remover
- carburetor cleaner
- grease/spot remover
- correction fluid
- halon

Aerosols

- spray paint
- hair spray
- deodorant
- fabric protector
- room fresheners
- vegetable cooking spray

Gases

- butane
- propane
- nitrous oxide
- helium

Nitrites

- amyl
- butyl

It is important to keep in mind that there are many different products in each of these categories, many of which have euphoric and toxic effects. Many commonly abused products represent complex mixtures of solvents, and the individual makeup of each product varies widely. Typically, these products are found in the home or can be purchased at most neighborhood stores, making them easily accessible.

WHY ARE PEOPLE TURNING TO INHALANTS?

Several reasons can be cited for the increasing use of inhalants:

- the public is generally uninformed of the dangers
- inhalants are generally inexpensive
- inhalants are extremely accessible
- abusers do not need special contacts and do not have to “hit the streets” to obtain inhalants
- inhalants are generally legal to buy
- some states do not have enforceable inhalant abuse laws
- legal consequences are minimal

REASONS GIVEN BY YOUTH FOR USING INHALANTS

In recent surveys, youth have reported several reasons they inhale toxic and volatile chemicals.

Some of these reasons include:

- hallucinations that occur during some inhaling episodes
- a perception that the high of inhalants is better than that of LSD or other drugs
- an enjoyment of the dizziness and “out there” feeling of the high
- a belief that the high can be controlled
- instant gratification, or a rapid progression to the high
- ease of concealment of most inhalants
- a perception that police won’t do anything about inhalant abuse

THE AVERAGE AGE OF AN INHALANT ABUSER IS 14 YEARS OLD.

The rise of inhalant abuse is at least partially attributable to the increasing quantity of abusable products on the market. It is impossible to control or ban the over 1,400 legal products.

Very few people understand the devastating health effects of inhalant abuse. And, frighteningly, many youth do not believe inhalant abuse can be lethal. Without education, many people will continue to abuse inhalants to achieve a cheap, accessible and attractive high, with deadly consequences.

UNDERSTANDING THE HIGH: THE INHALANT ABUSE PROBLEM

While low price and accessibility of inhalants make them attractive substances for many people, the quality of the high is often the deciding factor for abusers. Inhalant abusers report the high is very intense and is sometimes accompanied by hallucinations. Moods, thoughts, and colors can appear enhanced. Because of the desirability of these occurrences, even those who can afford other drugs often choose to abuse inhalants.

An inhalant abuser exhibits symptoms similar to those exhibited with alcohol intoxication, but these symptoms occur much quicker. Observation of these individuals reveals several of the following symptoms: initial excitation turning to drowsiness, disinhibition, light-headedness, and agitation. With increasing intoxication, individuals may develop dizziness, disorientation, and ataxia, which is the total or partial inability to coordinate voluntary bodily movements, such as walking. Further intoxication may result in sleeplessness, general muscle weakness, dysarthria, nystagmus, and occasionally, hallucinations or disruptive behavior. With extreme intoxication, progressive loss of consciousness, even coma or death, may ensue.

Chronic abuse is associated with more serious complications, including weight loss, muscle weakness, general disorientation, inattentiveness, and lack of coordination. Volatile organic compounds are usually inhaled and absorbed by the lungs, where they are transported by the blood stream to other parts of the body.

How the chemical enters the body makes a difference in the type of effect it will have. For example, putting the substance into a small plastic sandwich bag, sealing the bag over the nose and mouth to exclude oxygen, and inhaling deeply will create a more intense effect than sniffing small amounts.

Some of the effects of inhaling can be attributed to cerebral hypoxia, which is a lessened amount of oxygen getting to the brain.

METHODS OF INHALATION

Products are inhaled because of the speed and effectiveness of absorption. Chemicals are sprayed in or on each of the following types of paraphernalia. Each item traps the chemical and allows the fumes to be easily inhaled out of the container or off the cloth. Again, the high can be controlled by the method of inhalation:

- Bagging — substance is placed in a soda can or plastic bag that is placed over the nose and mouth. The fumes are inhaled with quick, short, rapid breaths. Therefore, the high can range from short to long term, light to intense.
- Huffing—substance is inhaled directly from the container, or placed onto a cloth, such as a rag or sock, which is put over the nose and mouth.
- Contents are sprayed directly into the mouth and/or nose.
- Substances (halon, butane, photo lens cleaner) are placed directly over the nose and mouth.
- A large plastic bag is placed over the head and shoulders, and the product is sprayed into the bag, then inhaled.
- Balloons and a cracker are sometimes used with nitrous oxide and other gases. The cracker has a pin to puncture the nitrous container. The balloon is placed over the end of the cracker, and then the gas from the balloon is inhaled.
- Amyl nitrite is found in small thin glass ampules. The abuser crushes the tube and inhales the gas immediately.
- Butyl nitrite comes in a small bottle and is inhaled directly from the container. Butyl nitrite is now illegal, but video head cleaner has been substituted for and sold as butyl nitrite.
- Substances (such as glue) are heated, then inhaled.
- Small, confined areas are filled with a gas (such as propane), while abusers breathe normally.

SLANG TERMINOLOGY FOR METHODS OF INHALATION

- huffing
- snorting
- gliding
- bagging
- spraying
- hacking

PARAPHERNALIA

- soda cans
- balloons
- aerosol spray cans
- apparatus for nitrous
- plastic bags
- butane lighters
- socks/rags
- canisters
- thin glass capsules
- crackers

SIGNS AND SYMPTOMS OF INHALANT ABUSE

- slurred speech
- poor memory
- acute confusion
- dazed or dizzy look
- fatigue
- intoxicated appearance
- less concern about appearance
- stains on clothing/skin
- chemical smell on breath or clothing
- sores/rash around mouth/nose
- sores in the mouth and at the back of throat
- nausea and vomiting
- abdominal pain
- decrease in appetite
- weight loss
- hand tremors
- headaches
- seizures
- chronic cough
- chest pain
- shortness of breath
- ataxia
- sullen/lethargic moods
- agitation
- aggression/irritability
- hysteria
- violence

HEALTH EFFECTS OF INHALANTS

HEALTH CONCERNS AND RISKS

Reports of death from inhalants cross every socio-economic boundary. Some of the most common forms of inhalant-related death are:

- sudden death (cardiac arrhythmia)
- burns
- poisoning
- suffocation (pulmonary)
- injury (trauma from accidents)

After as short a time as six months of chronic abuse, inhalant abusers may suffer some form of irreparable brain damage. They will likely develop other health problems. Some of the health concerns that may develop include:

- burns
- permanent neurologic damage (cognitive, motor control, visual and/or hearing loss)
- liver damage
- heart damage
- poor breathing
- bone marrow damage
- gastroenteritis

VOLATILE ORGANIC COMPOUNDS

Inhalable compounds, called volatile organic compounds, or VOCs, are highly lipophilic (Latin: to like fat). This explains their distribution to organs rich in lipids, such as the brain and liver. After being distributed to these fatty tissues, VOCs are usually metabolized by the liver to water soluble compounds and then eliminated through the kidneys.

The adverse health effects of both acute and chronic inhalant abuse are numerous. They can include acute effects on the heart, lungs, kidneys, and muscles, and severe chronic effects on the brain.

VOCs can produce cardiac arrhythmias (disturbances of heart rhythm) resulting in sudden death. A sudden fright, exertion, or other source of stress causing the release of adrenaline may also cause sudden death.

Certain VOCs, such as solvents, may cause a dangerous lowering of the body's potassium through their effects on the kidneys. Extremely low levels of potassium may result in muscle damage, kidney failure and cardiac arrhythmias.

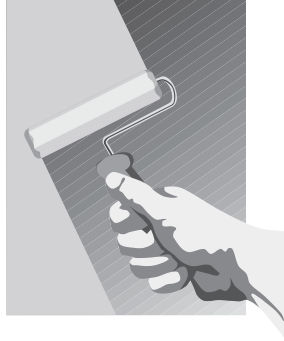
NEUROLOGIC EFFECTS

The neurologic effects of chronic inhalant abuse can also be devastating. Severe brain damage occurs with continued abuse, and is largely irreversible. The types of substances inhaled, the method of inhalation, and the frequency of the inhalation dramatically impact the amount of harm done to the brain, bones, and internal organs.

Neurologic effects result from damage to the white matter (the area of the brain with the highest fatty content) and include:

- memory disturbances
- cognitive problems
- loss of coordination
- ataxia
- visual impairment
- hearing impairment

OUR FAMILY'S GUIDELINES FOR USING HOUSEHOLD CHEMICALS



We think breathing chemical fumes is dangerous because

OUR SAFETY GUIDELINES

- ✓Check with an adult
- ✓Read labels
- ✓Follow instructions on product labels
- ✓Buy nontoxic products when possible
- ✓Don't leave containers open
- ✓Keep eyes, nose and mouth away
- ✓Take frequent fresh air breaks
- ✓Keep products off skin
- ✓Wear a safety mask
- ✓Open windows, turn on fan
- ✓Do project outside, if possible



