SCHOLASTIC

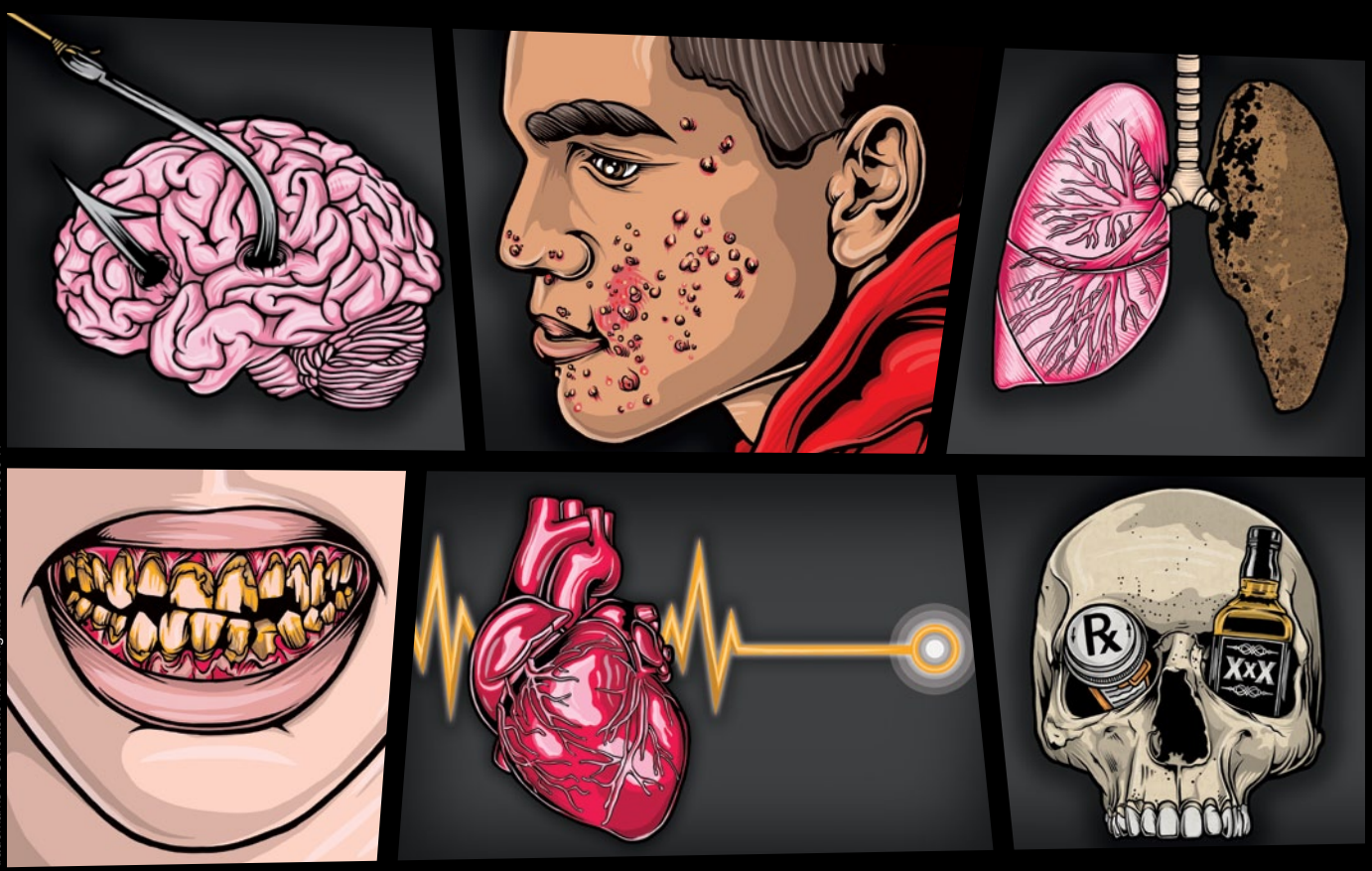
Aligned with National Standards

# DRUGS + YOUR BODY:

## It Isn't Pretty

### Science and Critical-Thinking Program for Grades 7–12

Includes:
- Poster
- Teaching Guide
- Student Activity Reproducibles






**HEADS UP REAL NEWS ABOUT DRUGS AND YOUR BODY**

NIDA NATIONAL INSTITUTE ON DRUG ABUSE

U.S. Department of Health and Human Services
National Institutes of Health
*NIH... Turning Discovery Into Health®*

# Dear Teacher,

As an educator, you are aware of how important it is for teens to have reliable information to answer their questions about drugs and drug abuse.

Scholastic and the scientists at the National Institute on Drug Abuse (NIDA) have created this poster/teaching guide, **Drugs + Your Body: It Isn't Pretty**, to provide students with important scientific facts about the wide-ranging effects of drugs on their developing brains and bodies.

The poster and activities included inside provide factual details and critical-thinking questions on the effects drugs have on the brain and body—including harmful physical and psychological consequences that affect not only individuals, but also families, friends, and communities.

Thank you for sharing this valuable information with your students.

Nora D. Volkow, M.D.
Director
National Institute on Drug Abuse

Ann Amstutz Hayes
Vice President
Scholastic Inc.

## ADDITIONAL RESOURCES

For more facts about drugs and health, visit:

- **teens.drugabuse.gov**
- **scholastic.com/headsup**

To order or download free copies of Heads Up materials, including this Poster/Teaching Guide, visit:

- **scholastic.com/headsup/teachers**

## CONTENTS



## Alignment with National Standards

**Science (NSES/NRC):**

- Life Science
- Science in Personal and Social Perspectives
  - Risks and benefits
  - Personal and community health

**Language Arts (IRA/NCTE):**

- Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts.
- Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.

# Teaching Guide:

**Overview and Objectives:** The materials in this poster/teaching guide are designed to provide students with scientific facts and engage them in critical thinking about how drugs affect different parts of the body, including the brain, as well as the nonphysical effects on their lives (e.g., difficult relationships, poor grades, problems with friends).

By completing the activities, students will understand how specific drugs can affect the delicate balance between the brain and body, possibly causing lasting physical or mental problems, including addiction. They will also learn how an individual's drug abuse can affect friends and family and become a public health problem for society at large.


The **four student activity reproducibles** found in this poster/teaching guide can be used individually by students and/or as additional resources for larger class discussions. The **classroom poster** can also be used to engage students in the activities. The work sheets can be taught independently, but are ideally taught in sequence in the order presented.

**Time Required:** Approximately 20 minutes for each of the four activity reproducibles. Additional time for class discussion may be required.

**Materials:** Before displaying the poster, copy the activities on the back for use in the classroom. Depending on how the activities are conducted, some will require additional paper and a pen or pencil.

**Launching the Activities:** Display the **classroom poster** and start a class discussion with students:

- Provide some examples of how abusing drugs harms the brain and body.
- Excluding the impact of drugs on the body, how else does drug abuse harm a person? Other people?
- Where do students get their information about the effects of drug abuse?

**Activities Discussion Topics:** Instruct students to study the poster and information contained on the work sheets and use this information to complete each activity, and participate in class discussions. Explain to students that the poster and activities present information about how drugs can affect their brains, bodies, and lives.

- **Activity 1:** What do the students know about the brain and what it does? What do they know about how the brain controls the body?
- **Activity 2:** Why is understanding the physical effects of drugs important information for teens to have? Are teens less likely to abuse drugs when they know the health effects?
- **Activity 3:** How can the actions of one person affect the lives of others? How can understanding that connection help in decision making?
- **Activity 4:** Drug abuse is a public health problem. This means it affects not only an individual or his or her family, but society at large. How are communities affected by individual actions? How can society respond to problems that arise from increased drug abuse?

## Activities Answer Key / Evaluations

**ACTIVITY 1: "The Brain–Body Connection"** *Answers may vary, but should include content along the following lines: 1) The brain directly or indirectly controls not just thoughts, feelings, and actions, but also the function of virtually all body organs and systems. It also monitors a person's current environment (both external and internal) to help them survive. If respiration needs to be slowed, the brain sends messages through the peripheral nervous system to the lungs, causing the lungs to slow down. 2) When I'm scared, or when I run fast, my heart beats faster. Drugs that can cause the same reaction in a person include cocaine, methamphetamine, and prescription stimulants (at high doses or taken inappropriately, such as snorting). 3) A physical activity such as working out includes both voluntary and involuntary responses. A person voluntarily moves his or her body, which creates involuntary responses from the lungs (breathing harder) and the heart (beating faster).*

**Evaluation:** Do students understand the difference between voluntary responses like walking, and involuntary responses like breathing? Do they understand that normal organ functions are part of the involuntary system that can be disrupted and/or damaged by drugs of abuse?

**ACTIVITY 2: "Drugs + Your Body"** *1) Endocrine system: feminization/masculinization; bones: stunted growth; skin: acne breakouts. 2) Tobacco contains many chemicals (carcinogens) that can lead to cancer. 3) Meth and tobacco. Both cause brown or lost teeth, gum disease, bad breath. Long-term exposure to the cancer-causing chemicals in smokeless tobacco can cause oral cancer. 4) Alcohol impairs the liver's ability to remove toxins from the body, which causes a buildup of waste and fat, damaging the liver. Tobacco smoke also impairs the ability of the lungs to clean out toxins. Buildup of wastes in the liver or the lungs can lead to life-threatening diseases.*

**Evaluation:** Did students understand the material and were they able to apply the facts presented to their conclusions? Were they able to compare drug effects to come up with logical conclusions about similarities?

**ACTIVITY 3: "Drugs + Your Life"** *Answers will vary, but possible outcomes include: incarceration; accidents that cause fatalities or serious injuries; and loss of job, driving privileges, or opportunities for college/career. Fill-in-the-blank question answers will also vary. Outcomes for underage drinking include injuries, academic failure, alcohol poisoning, and heightened risk for other drug use and addiction.*

**Evaluation:** Did students make a clear connection between decisions and consequences? Did they understand that one choice could affect them and those around them for the rest of their lives?

**ACTIVITY 4: "Drugs + Society"** *1) alcohol; 2) marijuana, prescription pain relievers, combinations of alcohol and drugs, heroin, ecstasy; 3) alcohol and cocaine; 4) marijuana and prescription pain relievers; 5) increase.* Looking at the Big Picture: *Answers may include: 1) overdose; drug-related accidents; drug-related suicide attempts; accidental ingestion; adverse reactions. 2) increased costs to hospitals and emergency services that lead to increases in insurance premiums and taxes, which costs everyone, not just the injured person; death of innocent bystanders involved in accidents; destruction of property; delays in care for other injured or sick patients.*

**Evaluation:** Did students make the connection between increased emergency room visits and increased costs to society?

ACTIVITY 1

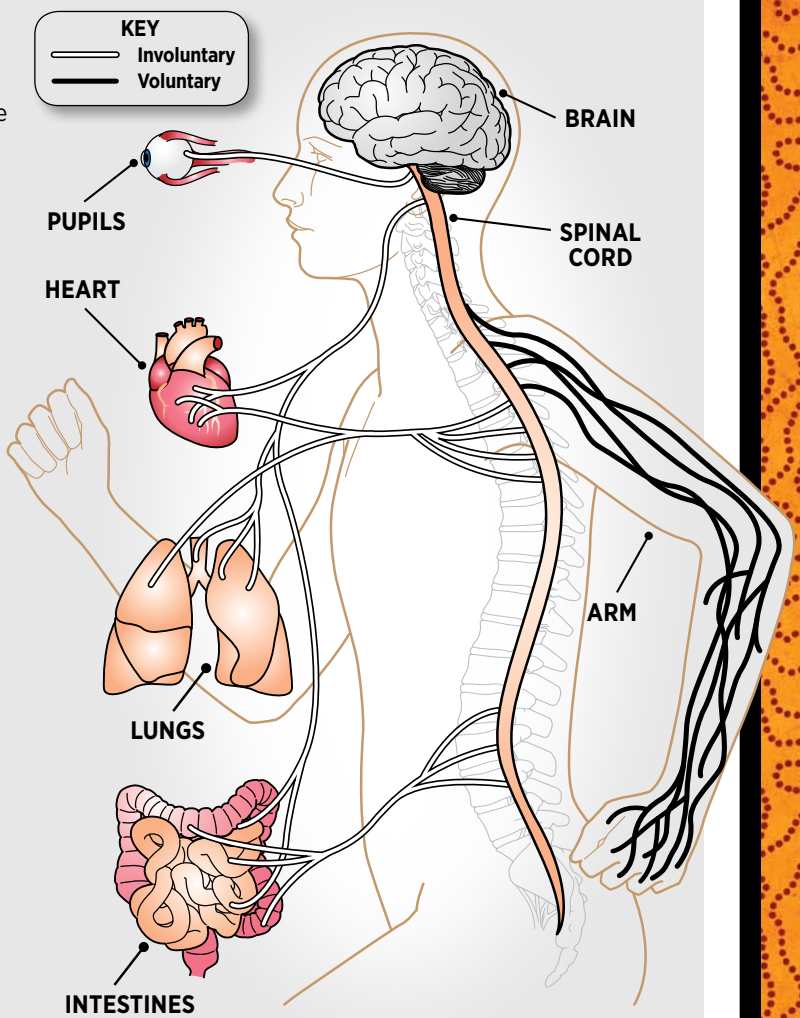
# The Brain–Body Connection

Drugs of abuse can have numerous effects on a person's body. Many of these happen because of how drugs affect the **central nervous system (CNS)**. Made up of the **brain** and **spinal cord**, the CNS controls not just your thinking, feeling, learning, and movements, but virtually everything your body does.

**How It Works:** Information from your environment—both outside (e.g., what your eyes see and skin feels) and inside (e.g., your heart rate and body temperature)—makes its way to the **brain**, which receives, processes, and integrates it so that you can survive and function under all sorts of changing circumstances and learn from experience. The **spinal cord** connects the **brain** to the rest of the body, transmitting messages back and forth from the skin, muscles, and organ systems to the brain. But how does that happen?

The **peripheral nervous system (PNS)**—see figure—serves as the wiring that connects the CNS to your organs and limbs and sends information back and forth between your brain and spinal cord to your body and vice versa.

The PNS is divided into two parts: 1) a **voluntary system** that allows you to control muscle movements, such as when you pick up a book or walk; and 2) an **involuntary system** that is your automatic pilot, controlling systems like those responsible for breathing, heart rate, and digestion to keep you alive, even when your environment changes. For example, if you see a snake, your heart rate increases and your muscles get ready to react—this is known as the fight-or-flight response, and it happens quickly because the involuntary system is very efficient.

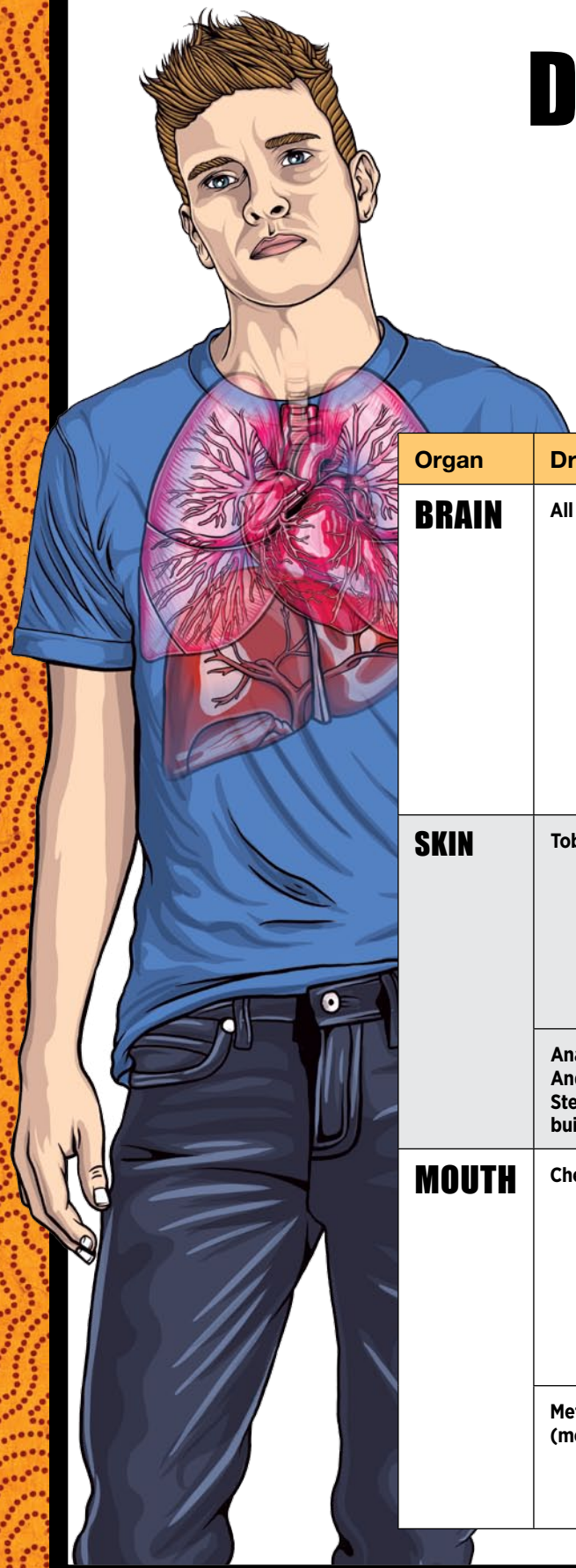



**Effects of Drug Abuse:** Drugs of abuse affect many parts of the brain, including those that direct the PNS and the muscles and organs it controls. For example, marijuana and alcohol can make you uncoordinated and clumsy. That is because they act on a part of the brain that affects how your voluntary system controls your movements.

Drugs can also affect your involuntary system, causing your body to respond to a situation that doesn't really exist. For example, cocaine affects a part of the brain that tells your involuntary system to increase your heart rate as if you were stressed or panicked even when you're not. Extended heart stimulation can cause high blood pressure, strokes, and heart attacks. Abusing prescription pain relievers can create a response similar to being sluggish—causing a person's breathing to slow down. Taking large quantities or using them inappropriately (e.g., injecting) can slow breathing to dangerous levels, which can lead to death.

**Think It Through:** On separate paper, answer the questions below based on the passage above. Use complete sentences.

1. How does the brain tell the lungs to slow breathing?
2. Name a situation that might make your heart beat fast? What drugs cause a similar reaction?
3. What are some actions that include both voluntary and involuntary responses?



# Drugs + Your BODY:

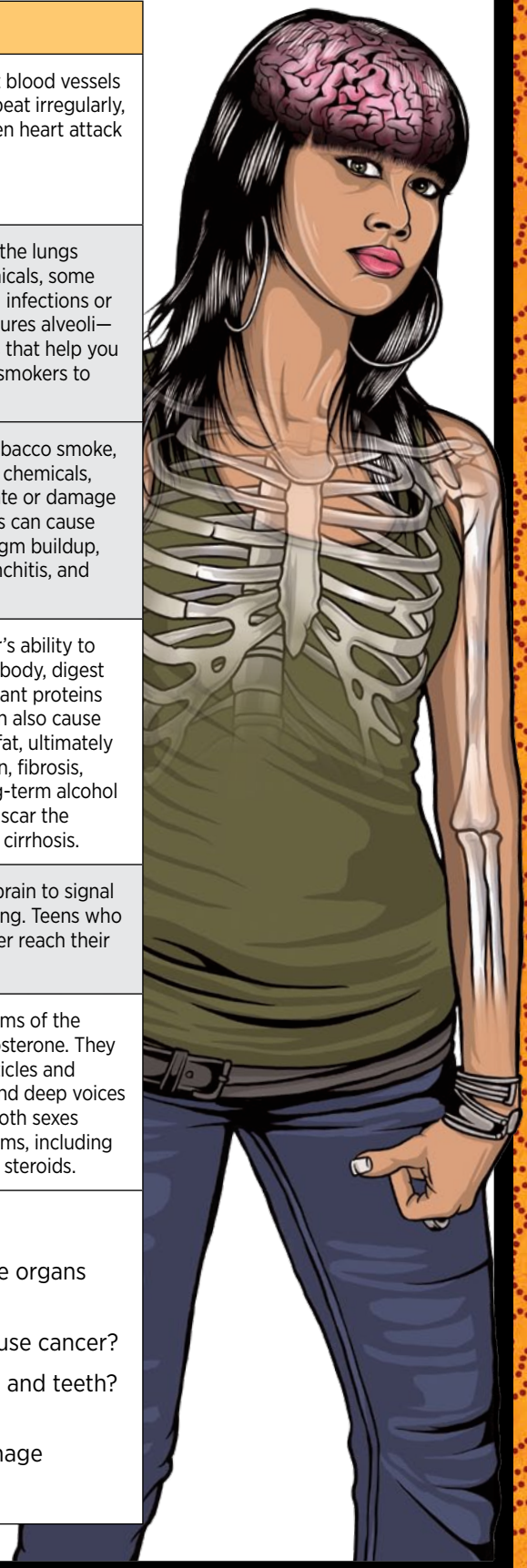
## It Isn't Pretty

Abusing drugs interferes with the body's normal functioning. The information below explains what drugs can do to the human body and how. Use the information to answer the questions beneath the table.

| Organ | Drug(s) | EFFECT(S) | Reason(s) |
|---|---|---|---|
| **BRAIN** | **All** | • **Learning impairment**<br>• **Sleeplessness**<br>• **Emotional problems**<br>• **Addiction**<br>• **Altered heart rate, breathing, body temperature** | Drugs directly affect many parts of the brain, which can cause problems with learning, sleeping, and emotional health. Over time, drug abuse can change the brain's wiring and function, turning a voluntary behavior (trying drugs) into a compulsive one (not being able to stop using drugs) that defines addiction. Drugs such as opioids (e.g., heroin, Oxycontin®, and Vicodin®) act on areas of the brain that signal the lungs to slow breathing, and when abused, can be deadly. |
| **SKIN** | **Tobacco** | • **Wrinkles** | Nicotine causes blood vessels at the skin's surface to narrow, reducing blood flow and depriving the skin of important nutrients and oxygen. Other chemicals in cigarettes cause skin to sag by damaging collagen and elastin, proteins important for smooth, young-looking skin. |
| | **Anabolic Androgenic Steroids (body-building steroids)** | • **Severe acne** | The hormones in steroids stimulate oil glands in the skin, leading to outbreaks of pimples on the body, including on the back, face, and shoulders. |
| **MOUTH** | **Chewing tobacco** | • **Cancer**<br>• **Brown or lost teeth**<br>• **Gum disease**<br>• **Bad breath** | Chewing tobacco directly exposes teeth and gums to toxic chemicals, causing a buildup of plaque and tartar. This buildup also harbors bacteria that cause gum disease and bad breath. Long-term use of smokeless tobacco can cause oral cancer. On average, only half of those with oral cancer survive beyond five years after diagnosis. |
| | **Meth (methamphetamine)** | • **Rotting teeth**<br>• **Gum disease**<br>• **Bad breath** | Meth use can cause dry mouth, teeth clenching, and a craving for sugary beverages and foods. This, combined with poor dental hygiene, can result in "meth mouth." |

*continued next page*

| Organ | Drug(s) | EFFECT(S) | Reason(s) |
|---|---|---|---|
| **HEART** | **Stimulants (such as cocaine and meth)** | • **Heart attack**<br>• **Stroke**<br>• **Blood clots**<br>• **Heart damage**<br>• **Sudden death** | Stimulants can constrict blood vessels and cause the heart to beat irregularly, which can lead to sudden heart attack and even death. |
| **LUNGS** | **Tobacco** | • **Frequent coughing**<br>• **Bronchitis**<br>• **Lung infections**<br>• **Cancer** | Smoking cigarettes fills the lungs with thousands of chemicals, some of which can cause lung infections or cancer. Smoking also injures alveoli—tiny air sacs in the lungs that help you breathe—which causes smokers to feel out of breath. |
| | **Marijuana** | • **Frequent coughing**<br>• **Bronchitis**<br>• **Lung infections** | Marijuana smoke, like tobacco smoke, contains many different chemicals, some of which can irritate or damage the lungs. These irritants can cause lung inflammation, phlegm buildup, frequent coughing, bronchitis, and other lung infections. |
| **LIVER** | **Alcohol** | • **Fatty liver**<br>• **Alcoholic hepatitis**<br>• **Cirrhosis** | Alcohol impairs the liver's ability to remove toxins from the body, digest foods, and make important proteins that a body needs. It can also cause the liver to accumulate fat, ultimately resulting in inflammation, fibrosis, pain, and jaundice. Long-term alcohol abuse can permanently scar the liver—a condition called cirrhosis. |
| **BONES** | **Anabolic Androgenic Steroids** | • **Stunted growth** | Steroids can cause the brain to signal the bones to stop growing. Teens who abuse steroids may never reach their full adult height. |
| **ENDOCRINE SYSTEM (HORMONES)** | **Anabolic Androgenic Steroids** | • **Feminization/ masculinization** | Steroids are artificial forms of the male sex hormone testosterone. They can cause shrunken testicles and breast growth in boys and deep voices and facial hair in girls. Both sexes risk reproductive problems, including infertility, when abusing steroids. |



**Think It Through** (use separate paper):

1. Steroids affect many of the body's organs. What are some of those organs and the effects?
2. What is it about tobacco, whether smoked or chewed, that can cause cancer?
3. What are two drugs that can cause physical damage to the mouth and teeth? What kind of damage?
4. How does alcohol damage the liver? How is this similar to the damage nicotine causes to the lungs?

ACTIVITY 3

# Drugs + Your LIFE: It Isn't Pretty

In addition to the health risks to the brain and body, abusing drugs can place people in situations that put them at risk for other types of harm. Consequences can include accidents or injuries from driving under the influence of drugs and/or alcohol, acquiring a sexually transmitted disease, having an unwanted pregnancy, and the deterioration of personal relationships. These effects impact not just individuals, but also families, friends, or total strangers.

**Think It Through:** *A causal diagram* is a tool to help chart possible outcomes that can result from decisions or incidents. The causal diagram below includes a scenario about drinking and driving. Part of the diagram has been completed. On separate paper, answer the A, B, and C questions in the context of where they appear in the diagram. Also, fill in the blanks in the diagram with possible outcomes. Make sure your answers are realistic and that each outcome could logically lead to the next outcome.

**A.** What is a possible negative outcome from this decision?

**B.** What could happen to the girls and their families or even a total stranger if your outcome for A happened?

**C.** What could be one outcome if B happened?

**Mina and Penny are sophomores in high school. Most Friday nights they stay in and watch movies, but tonight Jenny has invited them over. Jenny's brother, who has just graduated college, is also home with a few friends. One of them offers the girls alcohol. Not expecting it, the girls hadn't thought about what they would do if there was alcohol at Jenny's house, and even though they are only 16, they are flattered by the offer.**

**DECIDE TO DRINK**
**Caught off guard, both girls accept the drinks, then soon realize it's time to go home.**

**DECIDE NOT TO DRINK**
**Both girls laugh the offer off and say, "No, thanks, we'd like to keep the driver's licenses we just got!"**

**DECIDE TO DRIVE**
**The girls decide that Penny doesn't seem to be affected by the alcohol so she could safely drive them home.**

A

B

C

**DECIDE NOT TO DRIVE**
**Both girls decide it is not worth the risk for either of them to drive (or to ride with an impaired driver).**

A

B

C

**They ask someone at the house who did not drink any alcohol to drive them home.**

**They call Mina's parents to drive them home.**

**The girls' parents realize why someone else brought them home and are glad they did not drive. They decide not to take away the girls' driving privileges.**

**Their parents decide that because the girls drank alcohol their punishment will be:**

_____

_____

_____.

**The parents decide that the best way the girls can learn from their mistake is:**

_____

_____

_____.

**The girls decide that before a night out, they should always have a plan on how to decline if someone offers them alcohol and how to get home safely when they aren't the drivers.**

Image: road sign, © Shutterstock.

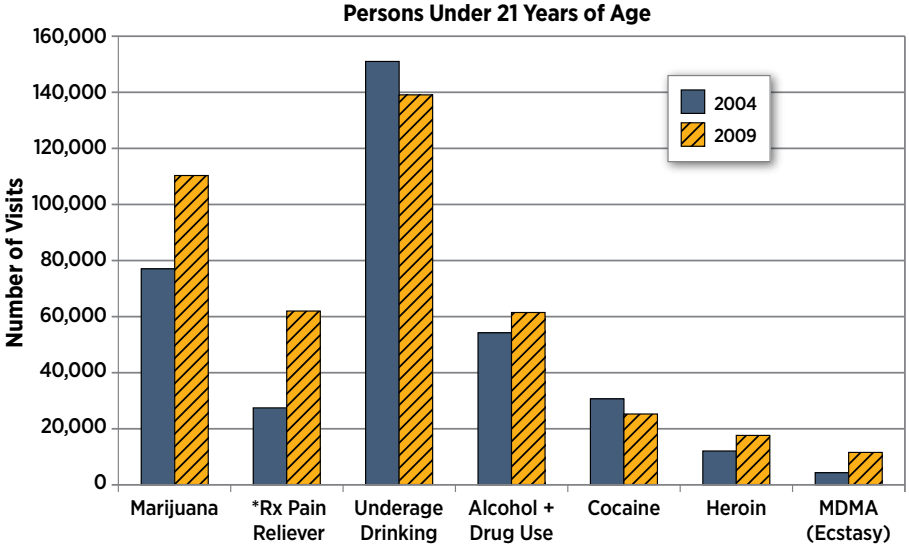
ACTIVITY 4

# Drugs + SOCIETY: Emergency Room Visits


The following graph compares the number of emergency room visits due to alcohol and drug abuse nationwide for people under 21 in the years 2004 and 2009. Use the information from the graph to answer the questions at the bottom of the page.

## Drug- and Alcohol-Related Emergency Department Visits by Drug Type

**Persons Under 21 Years of Age**




*Rx = prescription; includes pain relievers such as codeine or oxycodone, not over-the-counter relievers such as Tylenol® or Advil®

Source: *Drug Abuse Warning Network, 2009: Selected Tables of National Estimates of Drug-Related Emergency Department Visits. Rockville, MD: Center for Behavioral Health Statistics and Quality, SAMHSA, 2010, www.samhsa.gov/data/DAWN.aspx*

## Questions

1. In both 2004 and 2009, which drug contributed to the most emergency room visits by people under 21?

   _____

2. For which drugs did emergency room visits **increase** from 2004 to 2009? _____

3. For which drugs did emergency room visits **decrease** from 2004 to 2009? _____

4. Which two drugs showed the biggest increase in emergency room visits from 2004 to 2009?

   _____

5. Overall, did drug-related visits to the emergency room increase or decrease from 2004 to 2009?

   _____

## Looking at the Big Picture (use separate paper as necessary):

1. What are some reasons why drug abuse can cause a person to visit the emergency room? Do research as necessary to support your answer. _____

2. What are some possible outcomes or costs to society that may result from drug- and alcohol-related emergency room visits? _____