

Felt weird, but good. Chose to try it again.

Started looking for chances to get high.

Flunked a few tests at school. Missed Mom's birthday.

Found a connection to score drugs.

Quit after-school stuff to get a job. Used the money to help pay for drugs.

Was tired a lot. Started showing up late to work. Got fired. Told Mom and Dad I quit.

Met some kids from another school and decided to start dealing.

Felt sad for no reason. Couldn't seem to shake the blues.

Got busted for drug possession. Dad picked me up at the station house.

## FACTS ON DRUGS: Teen Guide to Making Smart Decisions

Poster/Teaching Guide

Started feeling hopeless. Opted for treatment instead of juvie. Heard all about how drugs were bad for my health, but didn't listen.

Got high with a friend once treatment was over. Began to feel out of touch. Things went downhill fast at home.

Chose to go back to treatment,  
**this time for real.**

Started to feel different after a few months — calmer, more hopeful. Learned a lot about drugs and how they affect my body — and my mind.

Reconnected with friends who don't use drugs. Started school.

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

U.S. Department of  
Health and Human Services  
NATIONAL INSTITUTES OF HEALTH  
**NIDA** NATIONAL INSTITUTE  
ON DRUG ABUSE

Didn't graduate with great grades, but did graduate.

# Dear Teacher,

As an educator, you're aware of how teen choices regarding drugs, alcohol, and tobacco can result in serious short- and long-term effects. This important teaching guide, **Facts on Drugs—Teen Guide to Making Smart Decisions**, is a skill-building program to help students understand the importance of informed decision making. Developed by the National Institute on Drug Abuse (NIDA) in conjunction with Scholastic, these turnkey lessons and worksheets support the idea that when young people know the facts, they have the tools to make smart choices.

Inside you'll find lessons that bring students facts about the science behind teen brain development and decision making, as well as the health risks associated with drug abuse. You'll also find critical-thinking activities to help students use these facts to evaluate the risks of real-world situations.

We thank you for sharing this important program with your students. In doing so, you are not only increasing their health literacy, but providing them with critical information to help them make healthy decisions.

Sincerely,

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

Ann Amstutz Hayes  
Vice President  
Scholastic Inc.

## Alignment with National Standards

### Science (NSES, NRC)

- Life Science
- Science in Personal and Social Perspectives
  - Risks and Benefits
  - Personal and Community Health

### Reading (IRA/NCTE)

- Students read a wide range of print and nonprint texts to build an understanding of texts, of themselves... ; to acquire new information; to respond to the needs and demands of society and the workplace; and for personal fulfillment.
- 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.

For free printable copies of this Poster/Teaching Guide, visit [www.scholastic.com/HEADSUP](http://www.scholastic.com/HEADSUP).

### ADDITIONAL RESOURCES

- For facts about drugs and health, visit [www.teens.drugabuse.gov](http://www.teens.drugabuse.gov) and [www.scholastic.com/HEADSUP](http://www.scholastic.com/HEADSUP).
- For printable student articles and lessons in the HEADS UP series, visit [www.scholastic.com/HEADSUP](http://www.scholastic.com/HEADSUP).

# What Do You Know About Drugs and Your Body?

## True or False:

- The teen brain is “wired” to take risks.  
 (A) True                       (B) False
- In the teen brain, the prefrontal cortex is important as a control center for thinking ahead and sizing up risks and rewards.  
 (A) True                       (B) False
- A teen’s limbic system develops earlier than the prefrontal cortex.  
 (A) True                       (B) False
- A teen’s brain development is complete by the age of fourteen.  
 (A) True                       (B) False
- Learning how to pause in critical situations is an important part of decision making.  
 (A) True                       (B) False

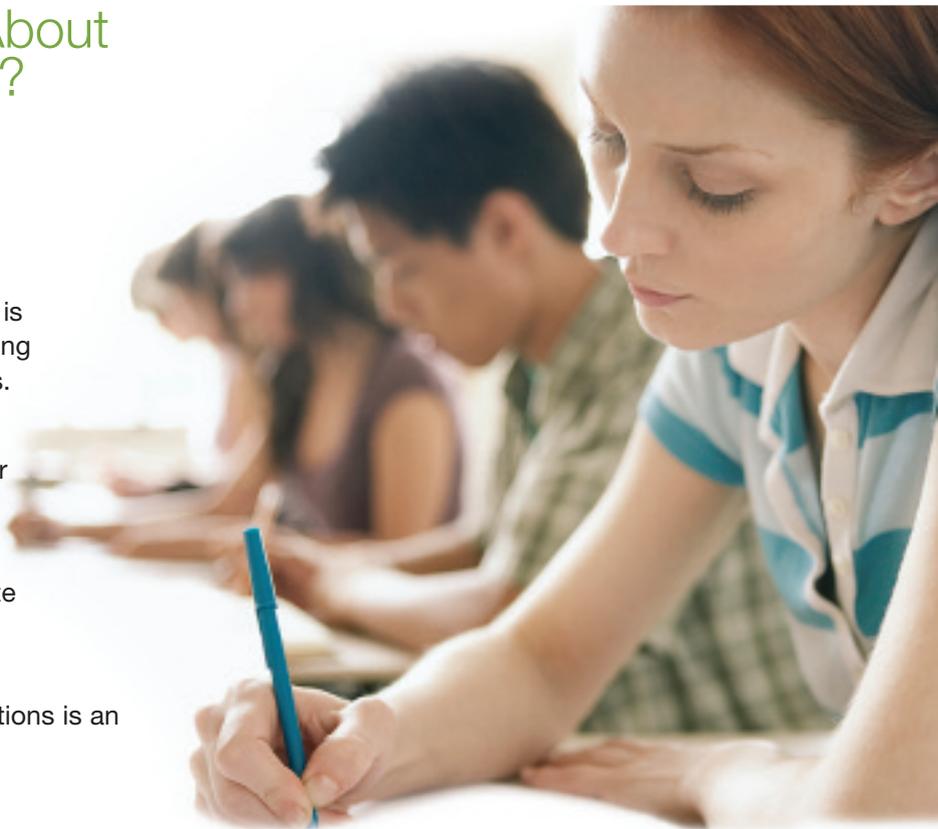


Photo © Fancy/Veer.

## Multiple Choice:

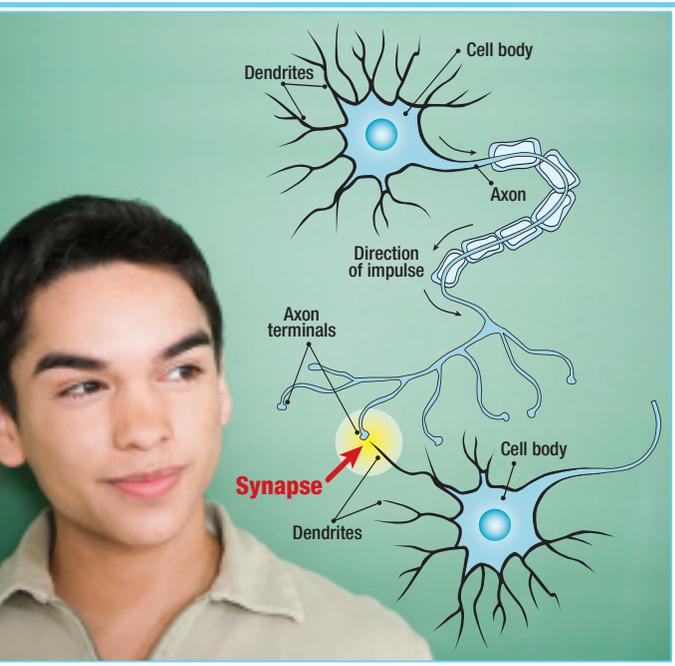
- The space separating two brain cells is called:  
 (A) a protein                       (B) a synapse                       (C) a lock
- Once inside the brain, drugs of abuse can “fool” the brain because they appear similar in shape and size to:  
 (A) neurons                       (B) synapses                       (C) neurotransmitters
- What is the brain’s memory center?  
 (A) hippocampus                       (B) hypothalamus                       (C) cerebral cortex
- What brain region is responsible for emotional reactions, especially involving pleasure or excitement?  
 (A) brain stem                       (B) prefrontal cortex                       (C) limbic system

## Fill in the Blanks:

- The brain has a \_\_\_\_\_ in which different structures talk with each other by way of electrochemical impulses and chemical messengers, called \_\_\_\_\_.
- When teens make choices in emotionally charged situations, those choices often have more to do with \_\_\_\_\_ than with \_\_\_\_\_.
- Drugs are \_\_\_\_\_. They work in the brain by \_\_\_\_\_ with the way nerve cells normally send, receive, and process information.
- The impact of \_\_\_\_\_ can be far-reaching. Some of the effects occur when drugs are used at high doses or after prolonged use, however some may occur \_\_\_\_\_.

**DID YOU KNOW?** While the brain reaches its full size in early adolescence, parts of the brain continue to mature through a person's early twenties.

## The Science of Teen Decision Making



Teenagers thrive on the spur of the moment. Whether it's jumping into the latest fad, rushing into a decision, or acting before thinking something through, teens are known for taking "risks." Science now provides answers on how the teen brain is particularly "wired" to do so.

First, a bit on how the brain works. The brain has a relay system in which different cells, called **neurons**, talk with each other by way of electrochemical impulses and chemical messengers, called **neurotransmitters**. Information flows through this system across small gaps called **synapses**. The signal originates in the cell body, travels down the **axon**, crosses the synapse to affect the **dendrites** on the neighboring cell. The ultimate outcome of this signaling system is a feeling or a thought or a behavior.

Research shows that one's brain reaches its full size between ages twelve and fourteen (depending on whether you are a girl or a boy). However, it also shows that a teen's brain development is not yet complete. Parts of the brain

continue to mature through a person's early twenties.

One part that matures late is the **prefrontal cortex**, located directly behind your forehead. It is important as a control center for thinking ahead and sizing up risks and rewards.

Meanwhile, a part of the brain that matures earlier is the **limbic system**, which plays a role in emotional responses. Since this system matures earlier, it is more likely to take control in teen decision making. When teens make choices in emotionally charged situations, those choices often have more to do with *feelings* (the mature limbic system) than with *logic* (the not-yet-mature prefrontal cortex). The result? Teens are more likely than adults to make impulsive, emotional decisions—rather than carefully considered, logical choices.

Learning how your brain works can help explain why you sometimes behave the way you do. With this knowledge, you can be better equipped to make smart choices.

**Pick Your Brain:** After reading the information above answer the following questions:

1. Brain cells, called \_\_\_\_\_, talk with each other through electrochemical impulses and chemical messengers called \_\_\_\_\_.
2. The \_\_\_\_\_ cortex, located directly behind your forehead, is an important \_\_\_\_\_ center for thinking ahead and sizing up risks and rewards.
3. One's brain reaches its full size between ages \_\_\_\_\_.
4. Parts of the brain continue to mature through a person's \_\_\_\_\_.
5. The brain's \_\_\_\_\_ system plays a role in \_\_\_\_\_ responses.



**DID YOU KNOW?** Some drugs “fool” the brain due to their similarity in size and shape to natural neurotransmitters.

## Drugs and Your Brain

Drugs are chemicals. They work by tapping into the brain’s communication system and interfering with the way nerve cells normally send, receive, and process information. Drugs resemble natural neurotransmitters, a similarity in structure that “fools” receptors in the brain and allows the drugs to lock onto and activate the nerve cells.

Here’s how it works with two commonly abused drugs: marijuana and prescription painkillers. In marijuana, the principal chemical affecting the brain is called THC (or tetrahydrocannabinol) and it attaches to specific receptors called cannabinoid receptors. Prescription painkillers, such as OxyContin® and Vicodin®, are derived from opium in poppy plants and are called opioids. In the brain and body, opioids attach to special proteins called opioid receptors.

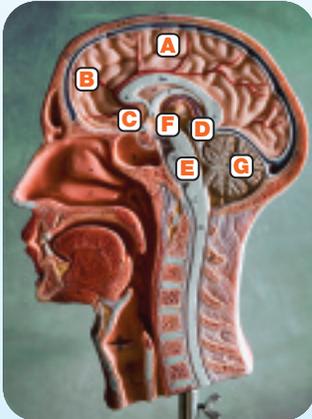
When used as directed by a physician, opioids are designed to ease pain by causing the body to release certain neurotransmitters such as dopamine. But when opioids are abused, there can be serious health risks, including overdose and death.

Both THC and opioids can adversely affect many areas of the brain, impairing a wide range of abilities. In the cerebral cortex, these chemicals dull senses and distort thinking, perception, and judgment; in the cerebellum, they distort coordination, as well as balance and time perception; and in the limbic system, they can alter the brain’s wiring for pleasurable experiences.

Additionally, THC affects the hippocampus, causing problems with short-term memory and attention; the hypothalamus, increasing hunger; and the prefrontal cortex, affecting decisions and promoting risk-taking. Opioids affect the brain stem, slowing breathing and heart rate.

**Pick Your Brain:** After reading the information above, answer the following questions:

- Opioids can adversely affect a person’s breathing. What part of the brain governs respiration and breathing?
  - (A) Brain stem
  - (B) Limbic system
  - (C) Hippocampus
  - (D) Cerebellum
- Tetrahydrocannabinol (THC), the active ingredient in marijuana, acts on the brain by:
  - (A) surrounding the brain
  - (B) creating electrical charges
  - (C) binding to specific receptors
  - (D) reducing blood flow
- THC can affect the hypothalamus by making someone feel:
  - (A) angry
  - (B) hungry
  - (C) alone
  - (D) none of the above
- The cerebral cortex is also known as the:
  - (A) thinking center
  - (B) memory and learning center
  - (C) body regulation center
  - (D) reward center
- What part of the brain determines emotional reactions, especially involving excitement or fear?
  - (A) Brain stem
  - (B) Hypothalamus
  - (C) Prefrontal cortex
  - (D) Amygdala



fear. The amygdala is part of the **limbic system**, a set of interconnected structures, including the hippocampus and the hypothalamus, that works in concert to process emotional information.

- D HIPPOCAMPUS:** The brain’s center for memory and certain types of learning.
- E BRAIN STEM:** Controls automatic functions like breathing, sensitivity to pain, level of alertness; relays messages to the cerebrum and cerebellum and back down to the spinal cord.
- F HYPOTHALAMUS:** Controls body temperature, hunger, and thirst; affects appetite and sleep.
- G CEREBELLUM:** Provides coordination, balance, and precise timing for movements.

- A CEREBRAL CORTEX:** This “thinking center” rules comprehension, self-control, and concentration.
- B PREFRONTAL CORTEX:** Responsible for logic, helps you make decisions and understand long-term consequences.
- C AMYGDALA:** Determines emotional reactions, especially involving excitement or

**DID YOU KNOW?** The damaging effects of drug abuse often occur after prolonged use, but some may occur after just one use.

## Drugs and Your Body

Drugs not only affect your brain, they can seriously damage your body. Cardiovascular disease, stroke, cancer, hepatitis, and lung disease can all be consequences of drug abuse. In addition, intravenous drug use can raise the risk of contracting HIV/AIDS. Some of these effects occur when drugs are used at high doses or after prolonged use; however, **impairment** may occur after just one use. Here's what some specific drugs can do to the body:

**PRESCRIPTION PAINKILLERS** such as oxycodone (OxyContin®) and hydrocodone (Vicodin®) slow breathing and can lead to life-threatening respiratory depression when not used under a doctor's supervision. There is also a high risk of **addiction** and overdose.

**INHALANTS** are breathable chemical vapors that are often found in common household products, and can produce a state of intoxication similar to alcohol. They are extremely toxic to the brain and other major organs and have been associated with a syndrome called "sudden sniffing death" which results from heart failure and/or suffocation or asphyxiation.

**METHAMPHETAMINE** or **METH** is a highly addictive central nervous system stimulant that causes rapid heart rate, irregular heartbeat, and increased blood pressure. It also damages kidneys, lungs, and liver, and can cause psychotic behavior, hallucinations, and stroke.

**ECSTASY** or **MDMA** is a drug that is chemically similar to stimulants and hallucinogens and can make a person feel energized and generate a sense of well-being. It can also interfere with the body's ability to regulate temperature, leading to hyperthermia (increased body temperature) which can cause heart and kidney failure. MDMA can also impair memory and generate **depression** for several days after taking it.

**COCAINE** is a central nervous system stimulant that causes constricted blood vessels, as well as increased body temperature, heart rate, and blood pressure. It also increases the risk of heart attacks, respiratory failure, strokes, and seizures.

## Vocabulary

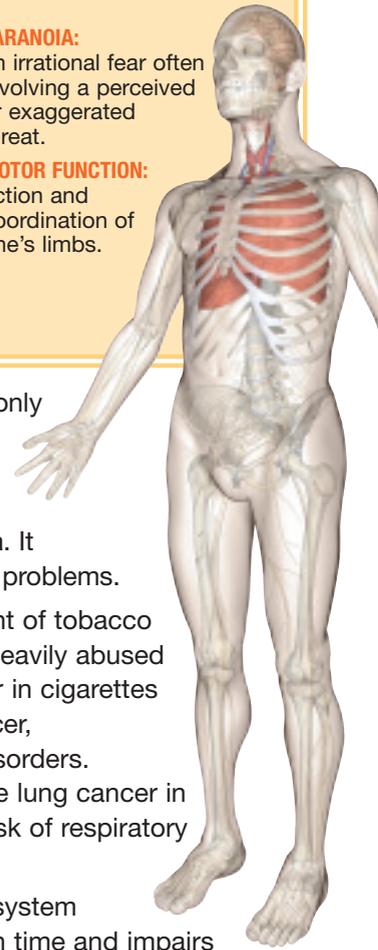
**ADDICTION:**  
a chronic, relapsing brain disease characterized by compulsive drug seeking and use despite harmful consequences.

**IMPAIRMENT:**  
diminished ability to think or function.

**DEPRESSION:**  
a condition of general emotional dejection and withdrawal.

**PARANOIA:**  
an irrational fear often involving a perceived or exaggerated threat.

**MOTOR FUNCTION:**  
action and coordination of one's limbs.



**MARIJUANA** is the most commonly used illegal drug in the United States. It affects judgment, memory, learning and motor skills, and can cause **paranoia**. It increases the risk of breathing problems.

**NICOTINE**, the addictive element of tobacco products, is one of the most heavily abused drugs in the United States. Tar in cigarettes increases the risk of lung cancer, emphysema, and bronchial disorders. Secondhand smoke can cause lung cancer in adults and an increased the risk of respiratory illness in children.

**ALCOHOL** is a central nervous system depressant that slows reaction time and impairs complex mental and **motor functions**. It can cause long-term liver failure, cancer, and brain damage. Drinking during pregnancy may result in fetal alcohol syndrome and other abnormalities.

## True or False:

- The diminished ability to think or function as a result of drug use can only occur at high doses or after prolonged use.  
(A) True (B) False
- If a person drinks alcohol, his or her reaction time will be improved.  
(A) True (B) False
- Taking prescription painkillers without a doctor's supervision can result in a high risk of addiction and overdose.  
(A) True (B) False



## Peer Influence

“The teen brain is wired differently from an adult brain when it comes to making decisions,” says Dr. Laurence Steinberg, a researcher at Temple University. How? He notes two main differences: First, teens are drawn to the immediate rewards of a potential choice while being less attentive to the possible risks. And, second, they are still learning to control their impulses, to think ahead, and to mediate the influence of others.

Peer influence is not necessarily a bad thing. Everyone is influenced by peers, both negatively and positively, at any age. As teens become more independent of their parents, peers naturally play a greater role in influencing their thoughts, feelings, and actions. But sometimes, especially in emotional situations, peer influence can be hard to resist. It can become “pressure,” and a person may feel forced to do something he or she is uncomfortable with.

According to Dr. B. J. Casey from the Weill Medical College of Cornell University, teens do exercise good judgment and make thoughtful decisions when given time to think things through. But when decisions have to be made in the heat of the moment or in social situations, teens are often influenced by peers and find it harder to suppress impulsive or risky behaviors.

Learning how to pause in critical situations is an important part of decision making. Pausing can give teens a better chance to evaluate the facts before making a rushed decision.

In evaluating risky situations, the following questions can be helpful for teens to consider before acting:

- ▶ What are the possible consequences?
- ▶ What are the short-term benefits (such as the feeling of fitting in) versus the possible harmful outcomes (to yourself or others)?
- ▶ How could peer pressure be influencing your decision?
- ▶ Where can you turn for additional information or advice, if you need it?

**Imagine This:** Using facts you’ve learned, review the scenarios below and write a paragraph describing how you might respond to each one.

1. As you’re leaving school on Friday, a friend invites you to a party. He says it’s going to be a blast because his parents are away and some friends are bringing a keg. He asks, “So, are you going to come?”
2. Your friends arrive to pick you up for a concert. They’re laughing hysterically as the car pulls up, and you notice some empty beer cans in the front seat. You hesitate as the door swings open, but your friends shout, “Come on, get in!”
3. A friend has started smoking cigarettes. You don’t want to smoke, but she keeps pushing you. “You should have one,” she says, “It’s no big deal. Just take a puff off mine.”
4. You’re at a party and somebody offers you a Vicodin®, saying “Don’t worry, it’s legal. Besides, look at all the celebrities who are doing it.”

**DID YOU KNOW?** When making decisions in the heat of the moment or in social situations, teens are often influenced by peers and find it harder to control their behavior.





**Poster:** Use the poster as a discussion starter about choices and consequences regarding drug abuse. *What are some of the consequences that can result from the choice to use a drug? What are some health risks? Why is having facts important for making smart choices?*

Before displaying the classroom poster, make sure to photocopy all lessons and Student Worksheets on the poster back.

## LESSON 1: The Science of Teen Decision Making

**Objective:** Students will understand the science of teen brain development and how the decision-making process in teens can make them prone to rush decisions.

**Materials:** Worksheet 1

**Time Required:** 20 minutes, with additional time for the Student Worksheet.

**Key Concepts:** Parts of a person's brain continue to mature through a person's early twenties. The prefrontal cortex, the brain's control center for thinking ahead and sizing up risks and rewards, matures well past the teen years. Meanwhile, the brain's limbic system, which controls emotions, matures earlier. When teens make choices in emotionally charged situations, those choices often have more to do with feelings (the mature limbic system) than with logic (the not-yet-mature prefrontal cortex).

**Discussion:** *Have you ever acted before thinking? Did you ever wonder why? Have you ever worried that this might create problems? What are some possible consequences (positive and negative) of acting on the "spur of the moment"? Have students complete the Student Worksheet individually or in small groups.*

**Critical Thinking:** *How does teen brain development influence decision making in teens? What kinds of choices might be affected by different rates of brain development? What are some ways to make smarter choices? (pausing and thinking before acting; comparing harmful outcomes to short-term benefits; getting advice.)*

## LESSON 2: Drugs and Your Brain

**Objective:** Students will understand basic brain structure and the science of how drugs affect the brain, illuminated through the specific effects of marijuana and prescription painkillers.

**Materials:** Worksheet 2

**Time Required:** 20 minutes, with additional time for students to complete Student Worksheet.

**Key Concepts:** The human brain is the most complex organ in the body. To send a message, a brain cell releases a chemical (neurotransmitter) into the space separating two cells called the synapse. The neurotransmitter crosses the synapse and attaches to proteins (receptors) on the receiving brain cell. A neurotransmitter and its receptor operate like a "key and lock" that ensures that each receptor will forward the appropriate message only after interacting with the right kind of neurotransmitter. However, drugs of abuse can be similar in size and shape to neurotransmitters, and this similarity "fools" receptors and allows the drugs to lock onto and activate the nerve cells.

**Discussion:** *How do you think the brain sends and receives messages? Are there other processes outside the body that function in a similar manner? (dominoes, a relay race.) What kind of activities are controlled by the electrical impulses crossing between neurons in the brain? Have students complete the Student Worksheet individually or in small groups.*

**Critical Thinking:** *Have you ever been "fooled" by something? What do you think the long-term effects on the brain would be if it is constantly being "fooled" by drugs? How do you think marijuana would affect learning and schoolwork? What dangers are there in using prescription pain medications without a doctor's supervision?*

## LESSON 3: Drugs and Your Body

**Objective:** Students will understand how a wide range of drugs can affect the body, including short- and long-term effects.

**Materials:** Worksheet 3

**Time Required:** 20 minutes, with additional time for students to complete Student Worksheet.

**Key Concepts:** The effects of drug abuse on the body can be far-reaching. Cardiovascular disease, stroke, cancer,

HIV/AIDS, hepatitis, and lung disease can all be consequences of drug abuse. Some of these effects occur when drugs are used at high doses or after prolonged use; however, some may occur after just one use.

**Discussion:** *If drug use changes how the brain works, do you think it causes other changes in the body? What changes do you think could be caused by alcohol? Marijuana? Nicotine? Have students complete the Student Worksheet individually or in small groups.*

**Critical Thinking:** *After reviewing the effects of drug abuse on the body, consider how you would respond to someone who says, "As long as you're not addicted to drugs, or don't overdose, drugs can't cause much harm?"*

## LESSON 4: Peer Influence

**Objective:** Students will understand the effects peer influence can have on making choices. Then, using facts they've learned about the brain, decision making, and the health effects of drugs, will develop responses for reacting to situations involving drugs and alcohol.

**Materials:** Poster Front and Worksheet 4

**Time Required:** 20 minutes, with additional time for the Student Worksheet.

**Key Concepts:** Science shows that teens are capable of making quick and accurate judgments on their own, but are more likely to make better decisions when they have time to think. However, when they have to make decisions in the heat of the moment while in a social situation, their decisions are often influenced by external factors such as peers.

**Discussion:** *What are some influences on teens when they make decisions? Do you think influences on teens are different than influences on adults? Have students complete the Student Worksheet in small discussion groups.*

**Critical Thinking:** *What are some of the strategies and resources people use to abstain from drug use? How can you help yourself to pause before making a decision? What does it feel like to make decisions that are unpopular?*

**ASSESSMENT TOOL:** Use Worksheet 5 as an assessment quiz to determine what students have learned throughout the lessons.