

DRUGS AND THE BRAIN

Lesson and Work Sheet

The lesson below and the reproducible work sheet on the reverse side reinforce student comprehension of key facts and concepts in the accompanying article "Drugs + Your Brain."

Alignment With National Standards

- *Science (NSES):* Life Science: Structure and Function in Living Systems; Science in Personal and Social Perspectives: Personal and Community Health
- *Life Skills (McREL):* Self-Regulation; Thinking and Reasoning
- **Prescription stimulants can cause anxiety and hostility when abused. Which area of the brain do prescription stimulants affect?** (*Prescription stimulants affect the amygdala, which controls emotions.*)
- **How does marijuana affect a person's ability to drive or play sports?** (*Marijuana affects the cerebellum, which controls coordination. It also affects attention and reaction time. A person needs all of these faculties to drive or play sports safely.*)

Before-Reading Questions:

- What do you know about how different drugs affect the brain and body?
- What do you know about how the brain controls the body?
- What do you know about addiction and its causes?

After-Reading Questions (factual responses in *italics*):

- **How are drugs addictive?** (*Drugs act on a region of the brain that causes feelings of pleasure. Drugs alter the way the brain communicates and actually cause physical changes to brain wiring. These changes can cause cravings and other problems controlling behavior that make it hard to stop using drugs despite harmful consequences, which is addiction.*)
- **How does abusing prescription pain medications interfere with a person's ability to breathe?** (*Prescription painkillers act on the brain stem, which controls the lungs and heart. Abuse of these drugs can decrease breathing and heart rate, leading to coma or even death.*)

Work Sheet: Have each student use the work sheet and student article to answer the fill-in-the-blank questions under the illustration.

Answer Key: 1. brain stem; 2. limbic system, prefrontal cortex, ventral striatum, cerebellum; 3. amygdala within the limbic system; 4. cerebellum; 5. brain stem; 6. prefrontal cortex and hippocampus. **Think It Through** (Answers may vary but should include the conclusion that abusing drugs affects the brain while it is still developing. Conversations with students should highlight that the teen brain is still developing and that making a commitment not to use drugs before entering a high-pressure situation will help them make better decisions about avoiding drug use.)

Dear Teacher:

Providing teens with scientific information about how abusing drugs interferes with the development and functioning of their brains and bodies can help them make better decisions.

The *Heads Up* student article "Drugs + Your Brain" and accompanying student work sheet "Mission Control" focus on the consequences of drug abuse as it affects a person's brain. Future articles in the series will highlight the effects of drugs on the body's major organs, as well as on a person's behavior—affecting not just the individual, but also family, friends, and communities.

By sharing this article and working through these exercises with your students, you are providing them with important information on the brain-body connection and the many risks they expose themselves to if they abuse drugs.



Sincerely,

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

In This Installment:

- **Student article:** Facts for teens about the effects of drug abuse on the body, with an emphasis on the brain.
- **Student work sheet:** Students learn about different systems of the brain, their connections with how the body functions, and how abusing drugs can interfere with normal functioning.

More Information

- For more information on drugs, go to teens.drugabuse.gov or scholastic.com/headsup.
- For immediate help with a crisis, call 1-800-273-TALK.
- To locate a treatment center, call 1-800-662-HELP or visit <http://findtreatment.samhsa.gov>.

For printable past and current articles in the **HEADS UP** series, go to scholastic.com/headsup/teachers. For other activities and teaching support, go to drugabuse.gov/parents-teachers.

Mission Control

Understanding the Brain's Central Control System

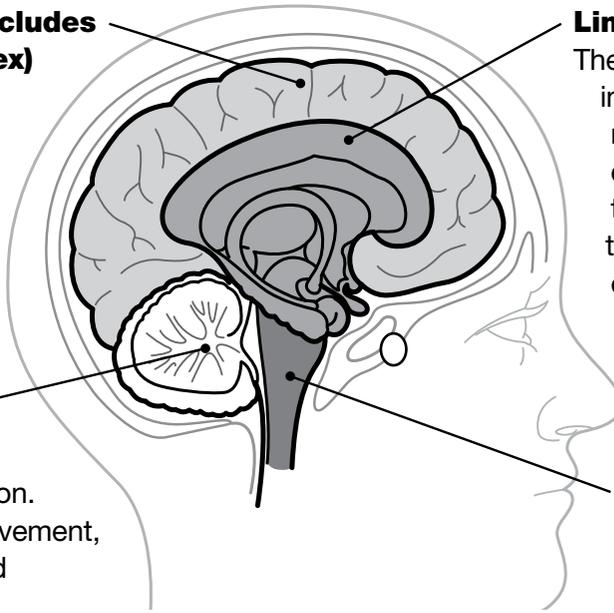
Study the information and diagram on this page, as well as the information from the article "Drugs + Your Brain." Then read the health effects caused by drug abuse (below the illustration), and write the name of the brain area involved in creating the health effect.

Cerebral Cortex (includes the prefrontal cortex)

Allows us to be aware of, pay attention to, and respond to our surroundings. Powers the ability to think, plan, solve problems, and make decisions.

Cerebellum

The center for motor control and coordination. Controls muscular movement, as well as balance and posture.



Limbic System

The collection of structures involved in emotion, motivation, memory, and other functions critical to survival. It includes the hippocampus (memory), the amygdala (fear and other emotions), the ventral striatum (reward), the hypothalamus (appetite, thirst, body temperature), and parts of the cortex.

Brain Stem

Controls basic functions critical to life: heart rate, breathing, sleeping.

1. Abusing prescription painkillers or sedatives can slow and stop breathing: _____
2. Many parts of the brain are affected over time with repeated drug use, leading to addiction.
Name two: _____
3. Steroids and methamphetamine can lead to aggressive behavior: _____
4. Marijuana and alcohol can affect coordination and movement: _____
5. Combining sedatives with alcohol can slow the heart rate: _____
6. Marijuana impairs the ability to think clearly: _____

Think It Through: The cerebral cortex does not fully develop until a person is about 25 years of age. Why is this important for teens to know when it comes to decisions involving drugs? Explain your reasoning.