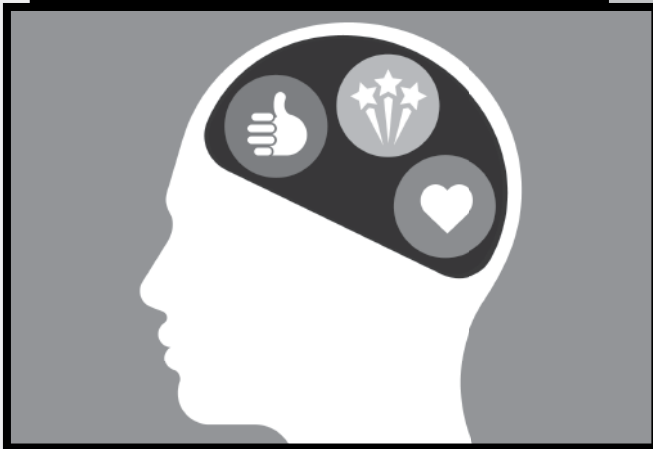


Heads Up: Real News About Drugs and Your Body

Brought to you by Scholastic and the scientists at the National Institute on Drug Abuse, National Institutes of Health, U.S. Department of Health and Human Services

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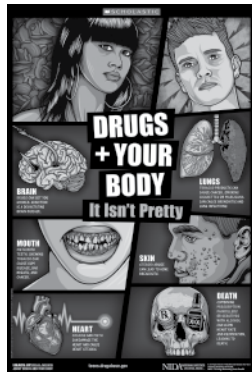


Also available:

Drugs + Your Body: It Isn't Pretty

Web Interactive

scholastic.com/drugs-and-your-body



To Order Free Copies: Call 1-877-643-2644 or visit nida.nih.gov/scholastic.html.

- For this Heads Up **Teacher Edition Compilation** refer to **NIH Pub No. 14-7656**.
- For the accompanying Heads Up **Student Edition Compilation** refer to **NIH Pub No. 14-7655**.



THE AWESOMELY EVOLVED HUMAN BRAIN

The lesson below and the reproducible work sheet on the reverse side reinforce student comprehension of key facts and concepts in the accompanying article, "The Awesomely Evolved Human Brain."

Dear Teacher:

This year's *Heads Up* series focuses on the human brain and gives students an abundance of valuable information through expertly crafted infographics. We start off with an article about the amazing abilities of the human brain in the context of the evolution of the brain's reward system. Unhealthy behaviors, like using drugs and eating large quantities of unhealthy food, can overload the reward system, throwing us out of balance and possibly into jeopardy.

In the accompanying work sheet, we put students' brains to the test and demonstrate for them, in real time, the brain's remarkable ability to make predictions and solve ambiguities, and help students to better understand how drugs might compromise these capabilities.

I encourage you to share these important materials with your students to help them understand how to protect one of their most valuable assets—their brains!



Sincerely,

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

In This Installment:

- **Student article:** Students will understand that the brain's reward system has evolved to help ensure the survival of the species. Drugs can overload the reward system and decrease the brain's protective abilities.
- **Student work sheet:** Students will solve brainteasers and answer critical-thinking questions about how drugs interfere with specific abilities in real-world situations.

Standards Alignment

These *Heads Up* materials are Common Core–ready and are also aligned with Next Generation Science Standards (NGSS). Visit scholastic.com/headsup/standards for a complete standards chart.

Before-Reading Questions:

- How do you think your brain might be involved in making decisions about what to eat?
- What do you know about how your brain processes information and comes to conclusions?
- What do you know about how you can keep your brain's natural chemicals in balance?
- What do you know about how drugs work inside the brain?

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

- What is *homeostasis* and why is it important? (*Homeostasis describes a person's internal environment when that environment is stable and balanced. When in balance, the brain is capable of amazing feats of intelligence, giving people the best chance of succeeding in school and life. Drugs or foods that result in unbalanced dopamine levels can cause physical changes to the brain that detract from achieving success.*)
- How can you keep your brain in balance? (*Keep dopamine levels in balance by eating moderate portions of healthy foods and consuming processed treats on occasion. Avoid drugs.*)
- How might drugs interfere with how the brain works? (*Drugs can turn the natural chemical process that produces healthy dopamine levels to*

reward behaviors into one that releases abnormally high dopamine levels, resulting in compulsive behavior. The unnaturally large dopamine spikes cause your brain to adapt to this new, larger amount of dopamine so that you need large amounts of dopamine just to feel normal.)

- What is the connection between eating unhealthy foods and using drugs? (*Both involve overloading the brain with dopamine and upset the balance of the brain's reward system.*)
- Considering the evolutionary timeline of the human brain, what is unique about the last 500 years? (*The last 500 years are marked by an overload of influences on the brain, the most in the entire evolutionary history of the brain.*)

Student Work Sheet:

Have each student complete the work sheet individually. Evaluate students on their ability to construct evidence-based answers using information from the text and their own inferences.

Work-Sheet Answer Key:

Brainteasers: "Double Take"—*dish, goblet, or table; two profiles.* "Spell Check"—*"Don't even think of eating this! It's cheese with fuzzy mold for my science project!"* **Think It Through:** 1) *Drugs can alter your perceptions and slow your reflexes so that you are unable to adapt to changes as you are driving.* 2) *Drugs can interfere with the processes required to retain information. They can decrease the brain's ability to fill in missing information by seeing patterns, which interferes with problem solving on a test.* 3) *The brain has systems in place for avoiding injury, like the ability to predict potential danger in the environment. Drugs interfere with those capabilities.*

Get Involved!
National Drug Facts Week
Jan. 27–Feb. 2, 2014
drugfactsweek.drugabuse.gov

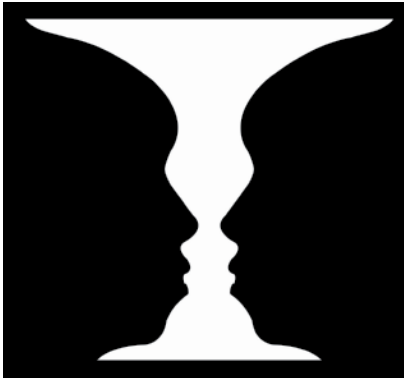
Resources:

- 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 findtreatment.samhsa.gov.

Brain Power!

The brain excels at making predictions and clarifying confusion, thanks to a network of billions of cells called *neurons*. This vast network enables your brain to respond to the unexpected or the unclear. This includes solving puzzles, such as those below, as well as ducking when a ball flies at your head or eating when you feel hungry. Your amazing brain does all of this automatically—without your even having to think about it! Check out the brainteasers below to see the power of the brain in action.

Double Take



Your brain can see things that aren't there. Does that mean you're seeing things? No! Your flexible brain is so good at making sense of patterns that it can see two images in one image.

The image at left is both a _____
and _____.

Spell Check

Your brain also solves mysteries in language. Imagine you find the cryptic note to the right on a food container. Good thing your brain needs only the first and last letter of a word to be in the right place!

Translation: _____

**“Dnot evn thnik of
etaing tihs! It's ceehse
wtih fzuzy mlod for
my scincee prjocet!”**

Think It Through:

Drugs break into the neural network and physically modify brain communication. They can make it hard to process information and make sound decisions. They also slow reflexes, which can lead to accidents and injuries. Considering these facts, answer the questions below on separate paper.

1. How might drugs affect a person's ability to drive?
2. How might drugs affect a person's ability to take a test?
3. How might drugs affect a person's ability to avoid injury?

scholastic.com/headsup/teachers

Dear Teacher:

As a teacher of teens, you are aware of the critical importance of empowering them with facts to make informed decisions that affect their lives.

The second article in this year's *Heads Up* series highlights a very important brain process under way in teens—*synaptic pruning*—in which the brain becomes more efficient by reinforcing connections it uses and needs while also pruning connections it does not use.

Through scientific information, students will see that their choices today can help to shape and “wire” how their brains will operate as adults. They’ll also see the risks that drugs pose during this important time in their lives.

I urge you to share this important article with your students.



Sincerely,

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

In This Installment:

- **Student article:** Students will learn how neurons communicate in the brain to promote learning and skill development.
- **Student work sheet:** Through a deciphering and repetition exercise, students will experience their brain’s ability to become faster at a new skill.

“WIRING” YOUR BRAIN

Lesson and Work Sheet:

The lesson below and the reproducible work sheet on the reverse side will help students understand how the network of neurons in the brain communicates through synapses to create, learn, and shape a skilled and experienced individual. Students will discover that they can have some control over how their brains develop.

Standards Alignment:

These *Heads Up* materials are Common Core–ready and are also aligned with Next Generation Science Standards (NGSS). Visit scholastic.com/headsup/standards for a complete standards chart.

Before-Reading Questions:

- What do you know about how the brain develops in children, teens, and adults? Do you think that there is anything *you* can do to affect your own brain development?
- What do you know about how drugs can affect the way a person’s brain develops?

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

- What is *synaptic pruning*? (*Synaptic pruning is the process by which synapses that are used repeatedly become strengthened and more efficient, while unused synapses die off. Synaptic pruning peaks in childhood and reaches its final stages during a person’s mid-20s through 30s.*)
- What can you do to help your brain improve its ability to learn skills and control emotions? (*Avoid drugs, which alter the brain’s ability to learn and maintain control of emotions, even into adulthood. Repeatedly practice habits and skills that you want to strengthen.*)
- At what time in your life are you best able to learn new things? What is the scientific reason for this? (*The adolescent brain has many more synapses than the adult brain. Synapses activate connections between the different parts of the brain needed to master a skill.*)

Adolescents’ abundance of synapses allows their brains to learn new skills more easily than adults.)

Student Work Sheet:

Students will use an alphabet code to decipher sentences. As they time how long it takes to decode each sentence, they will see how their brains begin to decipher more quickly and accurately each time.

Extension:

Have students work with partners to time each other deciphering the work-sheet codes. Then have them create their own coded sentences—some hard, some easy—and take turns timing and deciphering. Discuss why each time students decipher a sentence, it becomes easier. Some students may even be able to write sentences without looking at the code at all by the end of this exercise.

Work-Sheet Answer Key:

“Code Breaker” scrambled sentences:
1) *Exercise strengthens your body and improves your mind.* 2) *Physical activity produces proteins that improve memory.* 3) *Exercise produces a brain chemical that improves mood.* “Think It Through” suggested answers:
1) *Answers will vary.* 2) *With practice and repetition, I began to learn how to translate the code.* 3) *R zn z hfkvi wvxlwvi. I remembered frequently repeating letters, like vowels, because repetition strengthens corresponding synaptic connections.* 4) *I can practice or repeat activities that help me sharpen learning skills, which can lead to better grades.* 5) *I can practice pausing and thinking through decisions, instead of acting on impulse.*

Resources:

- For more teaching resources and information on drugs, visit 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 findtreatment.samhsa.gov.

Decision-Making Interactive Videos
teens.drugabuse.gov/peer/choose-your-path

Train Your Brain!

Through repetition, you can train your brain to become faster at a new skill. When you process a thought, messages are sent across connections in the brain called *synapses*. Synapses that are used repeatedly become strengthened and more productive. The exercise below will show you the effect of repetition on your brain's synapses.

Directions: Using the code breaker below, decipher each scrambled sentence and record how long it takes you to the nearest second using a clock or timer. Then answer the questions that follow.

Code Breaker

A = Z	E = V	I = R	M = N	Q = J	U = F	Y = B
B = Y	F = U	J = Q	N = M	R = I	V = E	Z = A
C = X	G = T	K = P	O = L	S = H	W = D	
D = W	H = S	L = O	P = K	T = G	X = C	

1. V c v i x r h v h g i v m t g s v m h b l f i y l w b z m w r n k i l e v h b l f i n r m w.

Time it took to solve: _____

2. K s b h r x z o z x g r e r g b k i l w f x v h k i l g v r m h g s z g r n k i l e v n v n l i b.

Time it took to solve: _____

3. V c v i x r h v k i l w f x v h z y i z r m x s v n r x z o g s z g r n k i l e v h n l l w.

Time it took to solve: _____

Think It Through: Write your answers on separate paper.

1. You were likely able to decode the third sentence more quickly than the first one. What was your difference in seconds?
2. If you were able to solve the third sentence more quickly, why do you think that was so?
3. Write the following sentence using the coding key above: "I am a super decoder." You may have written some of the letters in code without looking at the code breaker. Explain the brain process at work.
4. How can you use this knowledge of how your brain works to improve your grades?
5. How can you use this knowledge to improve your ability to stop and think before making a decision?

scholastic.com/headsup/teachers



PUSHING PAUSE

Lesson and Work Sheet:

Students will understand the importance of pausing to think through consequences by analyzing scenarios that highlight when pausing can make a big difference.

Additional Tools:

Visit scholastic.com/headsup/tools for additional tiered tools to support and enrich the lesson below, including:

- Answer key
- Academic and domain-specific vocabulary lists
- Writing prompts
- Paired-text reading suggestions
- Grades 6–12 standards chart (CCSS & NGSS)

Before-Reading Questions:

Grades 6–8:

- Would you prefer to get a small reward right away, or are you the kind of person who can wait a little while for a bigger one?
- Identify a strategy you use when you need to put off getting what you want.

Grades 9–10:

- Think of a time when you did something you wish you could undo. What could you have done in that moment to stop yourself?
- How can an action affect someone's life years later? Give an example.

Grades 11–12:

- Identify a strategy you use to delay getting what you want when there's an advantage to doing so.
- How can childhood actions affect adulthood? Give an example.

After-Reading Questions (have students use **text evidence** to respond):

Grades 6–8:

- Which parts of the brain are involved in decision making, and how does each part contribute?
- Teens can feel an intense emotional drive to act impulsively. What are the pros and cons of this drive?
- What do scientific studies reveal about how self-control in decision making can affect a person's life?

Resources:

- For more teaching resources and information on drugs, visit 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 findtreatment.samhsa.gov.

- Identify strategies for pausing before making a decision. How can a person improve his or her ability to pause?

Grades 9–10:

- Identify three factors that influence decision making, and explain how these factors affect the process.
- Using what you've learned about brain development, explain why the decision-making process is different for teens than for adults, and what this can result in.
- Teens, more than adults, can feel an intense emotional drive to act impulsively. What is an advantage of this drive? What is a disadvantage? Give an example of each.
- What long-term benefits are associated with self-control? Use evidence demonstrated by scientific studies.
- How can a person improve his or her ability to pause?

Grades 11–12:

- Identify three factors that influence decision making, and analyze how these factors are interrelated.
- Using what you've learned about brain development, explain why the decision-making process is different for teens than for adults. What is an advantage of this difference? What is a disadvantage? Give an example of each.
- According to scientific studies, what long-term benefits are correlated with self-control, and how can self-control be improved?

Student Work Sheet:

Have each student use the work sheet individually. Evaluate students on their ability to follow instructions and to integrate text evidence from the student article and work sheet into their responses. See Additional Tools for possible answers.

Drugs + Your Body:
Web Interactive
[scholastic.com/
drugsandyourbody_web](http://scholastic.com/drugsandyourbody_web)

Dear Teacher:

In the final article of this year's *Heads Up* series, students will learn about impulsivity and brain development, and the power of self-control in shaping their futures. Long-term scientific studies show that young people who develop self-control are more likely to avoid problems with drugs, health, poverty, and crime.

The accompanying work sheet provides students with an opportunity to think through how they might react in problematic situations, as well as formulate plans in advance.

We believe your students will find these materials compelling and useful as they discover just how much control they have over their futures.

Sincerely,



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



In This Installment:

- **Student article:** Students will learn about the teen brain's decision-making process, developing impulse control, and scientific research showing that low self-control correlates with drug addiction and other problems.
- **Student work sheet:** Students will analyze scenarios and answer critical-thinking questions to highlight how careful consideration can help them become better decision makers with more successful lives.

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The Power of Pausing

What Would You Do?

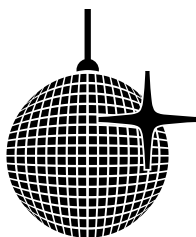
Scientific studies show that people who exhibit self-control in making decisions enjoy greater success in life, as well as minimize negative outcomes. Studies also show that **practicing** pausing is a way to improve your chances of success. In this work sheet, you'll find exercises that help you think about pausing in various situations to consider outcomes or consequences.

Directions: Apply the following three questions to the scenarios further down. For each of the scenarios (A, B, and C), record your answers to the questions on a separate sheet of paper.

Question 1) What do you think you would do?

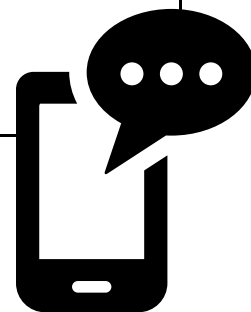
Question 2) What is one way that you could pause in this situation?

Question 3) What is a negative outcome that could happen if you don't pause?



Scenario A:

As you drive some friends home from school, there is a lot of gossip in the car about who's taking who to the prom, and you're waiting to hear if the person you like is still available. Your phone buzzes with an update. You want desperately to see what it says.



Scenario B:

You're at a concert with friends. The person next to you offers you alcohol. It feels like everyone is looking at you.



Scenario C:

You get home from what must have been the craziest night of your life. Your friends made some really bad decisions, and you captured it all on your phone. You want to show your friend who was sick and stayed home. The easiest way is to post it online.

Now Try This:

Refer to the article "Pushing Pause" to answer these questions. Use a separate sheet of paper.

1. Identify a situation in which you find it difficult to pause.
2. Which brain areas are at work in the decision-making process, and what are their roles in making it difficult for you to pause in the situation you identified above?
3. What are three things you could practice doing to help you pause in this situation?
4. What are two positive things that could result from pausing in this situation?

Compilation 2013–14

Teacher Edition

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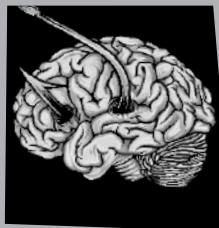


NIDA
DRUGPUBS

RESEARCH DISSEMINATION CENTER

More Teacher Resources:

scholastic.com/headsup/teachers



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