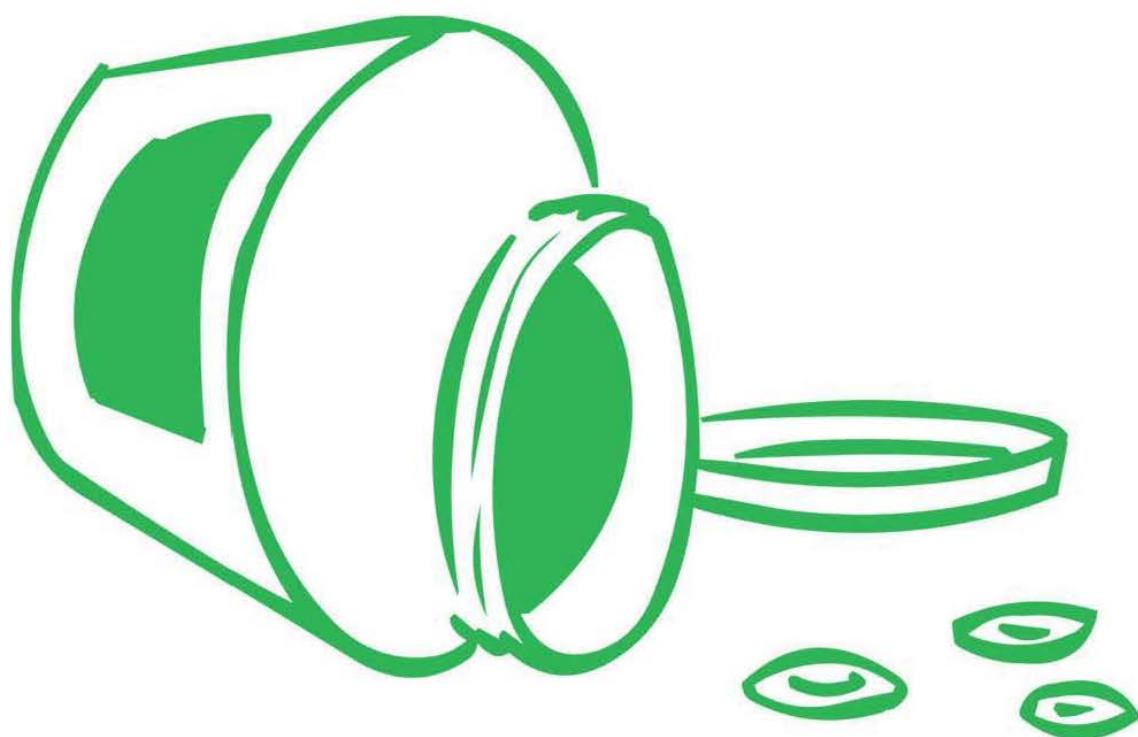


# MEDICINES AND DRUGS: WHAT'S HELPFUL, WHAT'S HARMFUL

Module 4



## Module 4

**Guide to Module 4:****Medicines and Drugs: What's Helpful, What's Harmful****Introduction**

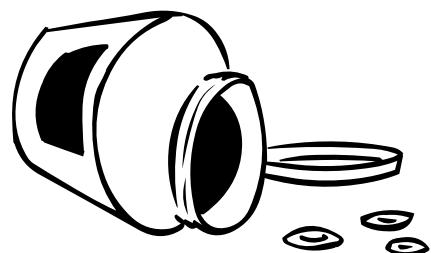
In modules 2 and 3, students learned about the parts of the brain and how information is sent throughout the body. This module focuses on drugs—powerful substances that can change both the way the brain functions and how the brain communicates with the body. Some drugs are helpful when used properly: they fall into the category of medicines. Other drugs may have a harmful effect on the body. The purpose of today's activity is for students to begin to understand how different drugs can affect the body.

**Learning Objectives**

- Students learn about different drugs and how they affect the body.
- Students classify drugs and their effect on the body into two groups: helpful medicines and harmful drugs.
- Students think about whether any drugs can be both helpful and harmful.

**Relationship to the National Science Education Standards**

This mission aligns with two standards identified in the NSES: science as inquiry and science in personal and social perspectives. The charts below identify how the mission aligns with each of these standards.



SCIENCE AS INQUIRY	
<b>Levels K–4</b> Abilities necessary to do scientific inquiry	<b>How Mission is Aligned</b> Students learn about different drugs and how they are used. Then they are invited to question whether they think these substances are helpful or harmful.
SCIENCE IN PERSONAL AND SOCIAL PERSPECTIVES	
<b>Levels K–4</b> Personal health	<b>How Mission is Aligned</b> Students begin to develop an understanding of what drugs are and how they are used so that they can learn how to make decisions that affect their own health.

## Background

When we refer to “drugs” during this module, we divide them into two categories: helpful medicines and harmful drugs. These categories are based on the effect they have on the body. Medicines are helpful only when they are given at the right times in the right amounts by people who care about children—parents, doctors, dentists, and other caregivers. In this module, drugs classified as medicines include the following: aspirin or Tylenol, antibiotics, fluoride, and immunizations. With medicines, however, it is extremely important to follow the dosage prescribed by the health care provider. Taking too much medicine or not enough can be dangerous.

Some drugs may be helpful or harmful. Caffeine is one example. Although caffeine itself isn’t a medicine, it is an ingredient found in some medications. Caffeine in all forms should be used in moderation. Too much of these substances can make people feel uncomfortable and even sick. Nicotine is another substance that may fit into both categories. Nicotine itself is not harmful in the doses found in cigarettes, but it does produce addiction. This is a negative effect because addiction to nicotine causes people to use tobacco products, which

can cause severe health problems with prolonged use. But nicotine is found in very small amounts in some medicines. Finally, some drugs have a harmful effect. These include alcohol and illegal drugs such as cocaine and marijuana.

Using the fact sheets at the back of this guide, students work either in small groups or as a class to identify drugs from riddles. After children guess the name of the substance, ask them whether they think its effect is helpful or harmful. Questions like these will help students better understand whether it is appropriate to take certain substances and, if so, how much is acceptable. They also will consider whether some substances are not good for them at all.

During the discussion portion of the module, you have the option of giving the students a second riddle, which explains how each drug affects the body. The trading cards reinforce the information in both riddles and are an effective way to convey complex, unfamiliar information.

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**Some substances that are acceptable for adults are not acceptable for children because their bodies are smaller and they are still growing. Many substances, however, should be used carefully by adults as well. For example, some people find that drinking a glass of wine with dinner is pleasurable, but drinking a whole bottle of wine could be dangerous.**

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The charts below provide information about the substances studied in the module.

<b>Medicines</b>				
<b>Drug</b>	<b>Other Terms</b>	<b>How it is Used</b>	<b>Effects on the Body</b>	<b>How it Works</b>
<b>Aspirin or Tylenol</b>	Aspirin is also known as salicylic acid acetate and is found in Bayer, Anacin, and Bufferin; Tylenol is made from acetaminophen	Taken orally as a liquid, pill or gum form	Both aspirin and Tylenol reduce fever and ease aches and pains; aspirin can decrease the risk of heart attacks and strokes	Aspirin inhibits the production of some chemicals that play a role in blood clotting; aspirin also inhibits the production of certain types of enzymes that cause inflammation and pain; Tylenol raises the body's threshold for pain by interacting with hormones
<b>Fluoride</b>	Sodium fluoride	Available as tablets, drops, rinses, gels, and paste	Prevents cavities and can also treat osteoporosis	
<b>Immunizations</b>	Vaccinations, inoculations	Injected, taken orally, or inhaled	Boosts the body's resistance to specific diseases	Causes the body to produce antibodies to fight diseases
<b>Antibiotics</b>	Penicillin, cephalosporin, tetracycline	Taken orally as a pill or liquid, or injected	Fights diseases caused by bacteria	Antibiotics kill bacteria by preventing them from constructing cell walls; then bacteria can't reproduce, and die out

<b>Drugs</b>				
<b>Drug</b>	<b>Other Terms</b>	<b>How it is Used</b>	<b>Effects on the Body</b>	<b>How it Works</b>
<b>Alcohol</b>	Ethyl alcohol or ethanol	Consumed by drinking	Impairs concentration, slows reflexes, impairs reaction time, reduces coordination, and causes drowsiness when used in excess	Depresses the central nervous system and can kill brain cells when used in excess
<b>Caffeine</b>	Found in coffee, tea, cocoa, soft drinks, and some medications	Taken orally in pill form or consumed in food and drinks	Increases alertness, reduces fine motor coordination, alters sleep patterns, and can cause headaches, nervousness, and dizziness	Stimulates the central nervous system
<b>Nicotine</b>	Tobacco; found in cigarettes, cigars, and smokeless tobacco	Smoked or chewed	Reduces appetite and can cause nausea and vomiting; increases alertness	Acts as a stimulant, speeding up the heart and raising blood pressure
<b>Illegal drugs (marijuana and cocaine)</b>	Marijuana is referred to as grass, pot, reefer, and weed; cocaine is also called crack	Marijuana is usually smoked but can be baked into brownies or cookies or brewed like tea; cocaine or crack can be snorted, smoked, or injected	Marijuana impairs memory, concentration, perception, and movement; cocaine causes dizziness, headache, anxiety, insomnia, depression, and increased heart rate	Marijuana acts on receptors in the brain, causing decreased blood pressure, sleepiness, and disruption in attention; cocaine stimulates the brain and spinal cord

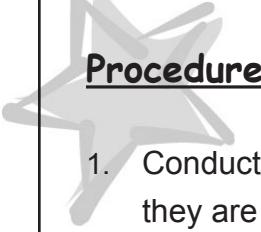
## **Materials**

Drug fact sheets  
NIDA Junior Scientists DVD  
Trading cards  
Log sheets  
Recording sheets  
Instruction sheets  
Paper and pencils

## **Preparation**

1. Decide how you want to conduct this activity. You could do it as a whole-class exercise, by dividing the class into two teams, or by dividing the class into groups of three students each.
  
2. Make copies of each fact sheet as needed. (See Procedure.)

## **Procedure**

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1. Conduct a class brainstorming session about drugs. Ask students what drugs they are familiar with and what they know about each drug. For example, do they know what the drug does? Do they know whether the drug is effective? Write down their responses on a sheet of paper.
  
  2. Tell the students that they will be learning about the following drugs: aspirin/Tylenol, fluoride, immunizations, antibiotics, alcohol, caffeine, nicotine, and illegal drugs. Explain that they will be solving riddles about these substances.

3. Decide how you want to conduct this activity.
  - One option is to read the riddles to the class and have them solve the riddles as a group.
  - Another is to divide the class into teams, read the riddles, and then give a point to whichever team comes up with the correct answer first.
  - You could also divide the students into groups of three and have each student perform one of the following jobs: reader, responder, or recorder. The reader will ask the questions identified on the fact sheet; the responder will answer them; and the recorder will write down the responses on the recording sheet. If you decide to do the activity this way, make sure that each student has a chance to do each job.
4. The fact sheets for each substance are at the end of the guide. If you are going to do the activity as a class, you probably don't have to make extra copies. Depending on your teaching approach, decide whether you are going to distribute them to the class.
5. **THE MISSION IS NOW COMPLETED!**

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Try to have at least one other adult in the room while the children are doing this activity.

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## **Discussion Questions**

1. Use the riddles on the handout “Learn More About Drugs” to give the students more information about each of these substances. Use the teaching strategy that works best with your students.
2. Lead a discussion about the different drugs the students learned about and answer any questions they may have. As a class, make a Venn diagram. One circle should say “Drugs That Help the Body,” and the other circle should say “Drugs That Hurt the Body.”
3. Are there any drugs that are in both circles? Which ones are they? Are some more helpful than harmful? More harmful than helpful? Discuss how a drug can be both helpful and harmful.
4. Have each student or group make a list of the most important things to know about the effects of drugs on the body. Then have each student or group share the lists. Students may want to create a brochure or poster identifying the effects different drugs have on the body. Students can use the trading cards to reinforce what they learned.

## Extensions

The activities listed below provide links to other areas in the curriculum. These activities also make use of the trading cards included in the module.



Language arts



Art



Reading



Math



Science



Drama



1. Make several extra sets of the trading cards. Divide the students into pairs and have them test each other until both students have really grasped the information about each substance. Have students take turns being the “asker” and the “responder.”



2. Have each student select a drug from the group he or she studied. Then have each student make a large drawing showing the setting in which that drug would be used. For example, immunizations may be given at the doctor’s office, a clinic, or the hospital.



3. Have the students write a class play about one of the drugs studied during the mission. The play could be about how a drug was discovered, how it is used, and what impact it has had on our lives.



4. Play drug charades with the class. Have one student act out something about the effect of the drug on the body. Have the rest of the class guess what it is. Try to give as many students a turn as possible.

## **Assessment**

1. As students work on this activity, look for evidence of the following:
  - a. Are students able to understand what each drug does?
  - b. Do students understand the difference between a drug that has a helpful effect and one that has a harmful effect?
  - c. Do students think that their study of drugs has any relevance to their lives? Why or why not?
2. Were students able to answer the riddles? Were they able to grasp the information in the second group of riddles?

## **Additional Activities**

Below are some additional activities that can be used after completion of the fourth mission. These activities are extensions to many other areas of the curriculum.



1. As a class, go to the Library/Media Center and look for books or Web sites about one or more of the drugs studied during the module. Take the books back to the class and read them together. Discuss what they mean and how they apply to what the students learned during the module.
  

A stylized icon of a laboratory flask containing liquid, sitting on a stand.

2. Bring out the list the class generated during module 2, describing what the students wanted to learn about the brain. How much have they learned? What haven't they learned? What additional things have they learned that are not included on the list? Do students have anything they would like to add to the list?
  

A stylized icon of a game show host's desk with a chair and a small podium.

3. Play a "game show" using questions about drugs and how they are used. Students can take turns being the player, and the rest of the class can be the audience. If the player doesn't know the answer, he or she has the option of asking the audience for help. Make sure that everyone has a chance to be the player. Some sample questions are listed on page 4-12.

1. Which drug can help prevent cavities?  
a. Tylenol                          b. Aspirin  
c. Fluoride                        d. Antibiotics
  
  2. Which drug would a person take if he or she had an ear infection?  
a. Immunizations                    b. Fluoride  
c. Marijuana                        d. Antibiotics
  
  3. In what common product is nicotine found?  
a. Cigarettes                        b. Beer  
c. Coffee                             d. Candy
  
  4. Why do people take caffeine?  
a. To help them feel tired    b. To help them feel peppy  
c. To help them feel angry    d. To help them feel sad
  
  5. What do people take for a fever?  
a. Caffeine                            b. Tylenol  
c. Fluoride                            d. Immunizations

Answers: 1-c; 2-d; 3-a; 4-b; 5-b



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  5. Have students think back to what they learned about the parts of the brain in module 2 and neurotransmission in module 3. Have them make up riddles describing the parts of the brain or the process of neurotransmission. Have students see if they can guess the answer to each riddle.

## **Resources**

The lists below include resources for teachers and students.

### **Resources for Teachers**

#### **National Institute on Drug Abuse (NIDA)**

[www.drugabuse.gov](http://www.drugabuse.gov), 301-443-1124

This Web site contains information about drug abuse as well as a section designed specifically for parents, teachers, and students.

#### NIDA Drug Pubs

[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov), 1-877-NIDA-NIH (1-877-643-2644)

Drug Pubs is NIDA's research dissemination center. Visitors can order hard copies of NIDA publications or download electronic versions in multiple formats.

#### **National Institute on Drug Abuse (NIDA)—Mind Over Matter**

<http://teens.drugabuse.gov/mom/index.asp>

This Web site was developed to educate children about the biological effects of drug abuse on the body and brain.

#### National Clearinghouse for Alcohol and Drug Information (NCADI)

<http://store.samhsa.gov>, 1-800-729-6686

NCADI provides information and materials on substance abuse. Many free publications are available here.

#### Eisenhower National Clearinghouse (ENC)

[www.goenc.com](http://www.goenc.com), 1-800-471-1045

This Web site provides useful information and products to improve mathematics and science teaching and learning.

## Resources for Students

Friedman, D. *Focus on Drugs and the Brain*. Frederick, MD: Twenty-First Century Books, 1990. Part of the “Drug-Alert Book” series, gives a good overview of the brain, neurotransmission, the effects of drugs on the brain, and addiction.

Neuhaus, D. & DeStefano, S. *Focus on Medicines*. Frederick, MD: Twenty-First Century Books, 1990.

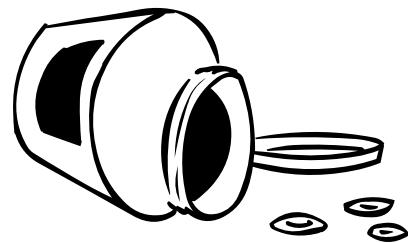
Part of the “Drug-Alert Book” series. Gives a good overview of medicines and how various medicines work with the body and brain to help heal.

Perry, R. & Nehaus, D. *Focus on Nicotine and Caffeine*. Frederick, MD: Twenty-First Century Books, 1990. Part of the “Drug-Alert Book” series. Gives a good overview of nicotine and caffeine and how each of these drugs affects the body and brain.

Neuroscience for Kids

<http://faculty.washington.edu/chudler/neurok.html>

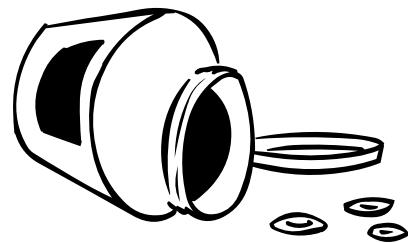
Contains information on the brain and neurotransmission, activities, experiments, pictures, and other resources for students and educators.



Name: \_\_\_\_\_

## Recording Sheet

Use this sheet to record your answers to the riddles.



Name: \_\_\_\_\_

## Recording Sheet

Use this sheet to record your answers to the riddles.

## Drug A

### Which Drug Am I?

You take me when you're feeling sick;  
I fix a headache or fever—quick.  
I come in all sizes and shapes,  
and in flavors bubble gum and grape.  
I come in two different forms—one from the lab and the other  
from willow tree bark.  
So when you're in pain, don't stay in the dark,  
Try me, and I guarantee that you'll feel better fast;  
I'm a painkiller that really lasts.

**The answer to this riddle is one of the words listed below.**

- |                      |            |                 |
|----------------------|------------|-----------------|
| • Aspirin or Tylenol | • Fluoride | • Immunizations |
| • Antibiotic         | • Alcohol  | • Caffeine      |
| • Illegal drugs      | • Nicotine |                 |

Answer: Aspirin or Tylenol

## **Drug B**

### **Which Drug Am I?**

When you were a baby, you got me as a shot;  
It may have hurt, but it did a lot.  
It kept away bad diseases galore  
Like polio, smallpox, and more.  
These shots are also called vaccinations.  
Some say they are one of the best creations.

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Antibiotic
- Illegal drugs
- Fluoride
- Alcohol
- Nicotine
- Immunizations
- Caffeine

Answer: Immunizations

## Drug C

### Which Drug Am I?

These kinds of drugs are very bad for you;  
On top of that, they're illegal, too.  
Some of these drugs people smoke,  
but they're not cigarettes, no joke!  
Another kind is powdery and white,  
and people snort it—what a sight!  
These kinds of drugs make it harder to think;  
They affect your brain, which can really stink!

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Fluoride
- Immunizations
- Antibiotic
- Alcohol
- Caffeine
- Illegal drugs
- Nicotine

Answer: illegal drugs

## Drug D

### Which Drug Am I?

You drink me every day;  
When you turn on the tap,  
I flow down the sink every which way.  
I've made a big difference for each and every tooth;  
Cavities? No, not for this generation of youth!  
So keep this information in your mental file,  
Because I'm the secret to your white, healthy smile.

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Antibiotic
- Illegal drugs
- Fluoride
- Alcohol
- Nicotine
- Immunizations
- Caffeine

Answer: Fluoride

## Drug E

### **Which Drug Am I?**

Whenever a germ gives you an infection,  
I might be the best selection.  
I'm kind of funny, I've been told,  
Because sometimes I am made out of mold!

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Antibiotic
- Illegal drugs
- Fluoride
- Alcohol
- Nicotine
- Immunizations
- Caffeine

Answer: Antibiotic

## Drug F

### Which Drug Am I?

I'm a kind of drug that is in some drinks;  
I, too, can make it harder to think.  
I'm so strong that kids can't drink me until they're 21,  
And even adults should know when enough is enough and  
then be done.

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Antibiotic
- Illegal drugs
- Fluoride
- Alcohol
- Nicotine
- Immunizations
- Caffeine

Answer: Alcohol

## Drug G

### Which Drug Am I?

I am found in many things that are yummy to eat,  
Like chocolate, soda, and other treats.  
Grownups drink me in coffee and tea,  
Now my name, kids, that is the key.

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Antibiotic
- Illegal drugs
- Fluoride
- Alcohol
- Nicotine
- Immunizations
- Caffeine

Answer: Caffeine

## Drug H

### Which Drug Am I?

I am used as an insecticide.  
In tobacco is where I hide.  
I'm not the one that makes people choke,  
But I am the biggest reason people smoke.

**The answer to this riddle is one of the words listed below.**

- Aspirin or Tylenol
- Antibiotic
- Illegal drugs
- Fluoride
- Alcohol
- Nicotine
- Immunizations
- Caffeine

Answer: Nicotine

## **Learn More About Drugs**

On the following pages are a series of riddles giving more information about what each of these substances does to the body. You might want to use these riddles during the “Discussion Questions” part of the mission.

**Drug A: Aspirin or Tylenol**

**What Do I Do to the Body?**

Now you know that I'm aspirin, but do you know what I do?  
If not, here is a clue.

I change the chemicals in your body, you see,  
And then pain and fever disappear for you and for me.

.....

Aspirin or Tylenol makes swelling and pain go away. Aspirin can help prevent older people from having heart attacks and strokes.

## **Drug B: Immunizations**

### **What Do I Do to the Body?**

Do you know what's in that shot?  
The germs in the illness, believe it or not!  
Those germs can also be your friends.  
Can you figure out how this story ends?  
Here is one last clue:  
Those tiny germs make your body work very hard, too.

.....

For an immunization, the germs from the illness are changed and then injected into the body, which teaches the body's own defense system to fight the disease.

## **Drug C: Illegal drugs**

### **What Do I Do to the Body?**

Each kind of me changes the brain;  
Once the brain is changed, it's never quite the same.  
Marijuana is one kind to smoke,  
And the white powder, cocaine, is also called coke.  
Cocaine can make someone feel quite high;  
But watch out, that feeling does die.  
It's not hard to go over the top;  
Then someone will find it too hard to stop.

.....

Marijuana and cocaine are two kinds of illegal drugs. Marijuana affects learning and memory. It also affects the cerebellum, the part of the brain responsible for balance and coordination. Cocaine can take away a person's ability to feel good. It does this by changing how brain cells talk to each other. Both cocaine and marijuana turn on the pleasure center, part of the limbic system, making the body crave the substance.

## **Drug D: Fluoride**

### **What Do I Do to the Body?**

Now you know my name,  
But do you know how I earned my fame?  
I can harden your teeth and make them strong;  
Dentists love me because I keep kids away from the drill for  
so long.

.....

Fluoride hardens and repairs enamel, the covering on teeth,  
and prevents cavities from forming.

## **Drug E: Antibiotics**

### **What Do I Do to the Body?**

I'm a special type of drug;  
I fight diseases that are caused by living bugs.  
When you have strep throat and you feel really sick,  
I kill all the germs—I do the trick.  
Pretty soon, you feel okay;  
Then I've done my job, and the bacteria have gone away.

.....

Antibiotics kill the bacteria causing an infection.

## **Drug F: Alcohol**

### **What Do I Do to the Body?**

I do nothing good for the brain;  
In fact, I make thinking and studying a pain.  
A bad thing I do is kill neurons forever;  
So drinking me, it doesn't seem clever.

.....

Alcohol keeps people from thinking clearly, slows down the ability to respond to danger, makes people sleepy, and can kill neurons.

## **Drug G: Caffeine**

### **What Do I Do to the Body?**

I make it hard for people to sleep.  
Instead, they shake, shiver, and leap.  
That's not all that I do;  
I also can make it harder to write words that are clear, fresh,  
and new.

.....

Caffeine makes people feel more awake but less able  
to write or draw well due to shaky hands. It can cause  
headaches and even dizziness.

**Drug H: Nicotine**

**What Do I Do to the Body?**

Nicotine is my name;  
Getting people hooked is my game.  
I don't mean to make people smoke forever and ever,  
But I guess I'm just oh so clever.

.....

Nicotine takes away people's appetite, speeds up the heart, and changes the brain so that it needs nicotine to work normally.

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**If you do not have a DVD player, read this story to your class to introduce the mission.**

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## **Introductory Story for Module 4**

The *Brain Power!* Club was sad. Brain Teaser hasn't been able to make it to the club for a couple of days because he sprained his ankle. Brain Wave said that Brain Teaser's mom wants him to stay home and rest. He also said that Teaser's mom gave him some aspirin for the pain.

Then, they heard the familiar "Computer Alert! Computer Alert!" Corty jumped out of the computer screen and landed next to the microscope, where Brain Trust was looking at tiny creatures magnified 50 times. "What's up, guys?" said Corty.

"We're just talking about poor Brain Teaser," said Brain Trust. "He can't be here today because he hurt his foot. But his mom gave him some aspirin, and he's feeling a lot better now."

"Funny you should mention aspirin," said Corty. "Today's mission involves aspirin and other substances. In fact, the whole idea is to get you kids thinking about the difference between drugs used as medicines and drugs used for other purposes."

"Wow, I never thought about that," said Brain Trust. "What are the differences?"

"I don't want to tell you too much because then it will give the mission away. But there is something important you should know."

"What?" said Brain Trust and Brain Wave together.

"Pay attention to who gives you medicine," said Corty. "You don't want to take it from just anyone."

"He's right," said Brain Trust and Brain Wave together.

"Oh, and there's one more thing I forgot to mention. You will be learning about medicine and drugs through riddles."

“Riddles!” said Brain Trust. “Can you give us an example?”

“Okay, but then I really must sign off. Here goes:

You can use me on waffles and pancakes,  
I’m brown, sweet, sticky, and with me a mess you can make.  
Who am I?

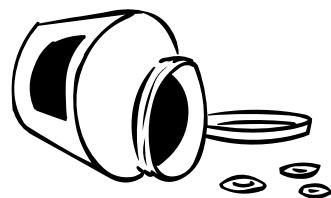
“Oh, I see,” said Brain Wave. “The answer to that one is syrup. We’ll have to answer riddles about aspirin and other things like that.”

“You got it,” said Corty. “Now I really must go. Good luck with the riddles.”

“Thanks. We’re off, ready to meet our latest challenge.”

# Log Sheet

Name: \_\_\_\_\_



**What I learned about medicines and other drugs**

**What I still want to learn about medicines and other drugs**



# BRAIN POWER NEWS

## Parent Newsletter

Volume 1, Number 4

### Medicines and Drugs:

#### What's Helpful, What's Harmful

The goal of module 4 of the NIDA Junior Scientists Program is to introduce children to the topic of medicines and other drugs. During the first three modules, we introduced the parts of the brain and the process of neurotransmission so that now, by module 4, the children have some understanding of the complexity of the central nervous system. Children are learning information about the effects of drugs on the body. Drugs can be divided into two categories: helpful medicines and harmful drugs. One group of drugs, with a beneficial effect on the body, includes medicines that they have probably taken—aspirin/Tylenol, antibiotics, immunizations, and fluoride. The other category, which can have harmful effects on the body, includes alcohol, nicotine, and illegal drugs, such as marijuana and cocaine.

One of the points we emphasize in the module is that all these substances are powerful. Even helpful drugs must be taken under the right conditions and given by trusted individuals—parents or health care professionals, for example. If too much medicine is given, that can be just as dangerous as taking an illegal substance. For example, the drug Adderall is an effective treatment for ADHD, but when it is taken in doses higher than prescribed or without a prescription, it can cause many harmful effects and even death. Drugs and medicines can be both helpful and harmful. Therefore, all substances must be handled with care.

We encourage you to ask your child about this learning experience. Try to find out how much he or she understands and what is still fuzzy. Work with your child to clarify points that he or she hasn't yet grasped. Help provide your child with more knowledge so that when the time comes, he or she will make a solid, science-based decision not to take drugs.

continued



## Science at Home

Discuss certain lifestyle choices made in your home. For example, if you have a glass of wine with dinner, explain that your choice is okay because you are an adult, are drinking in moderation, and are not doing anything dangerous, such as driving after drinking. Emphasize that adults can make these choices, while children are not yet old enough. By learning about how the brain works and about drugs, however, your child is getting a foundation to make thoughtful decisions in the future.



## What Does Your Child Think?

- Have your child draw or write something about drugs.
- 
- 
- 

## Additional Resources

The books and Web sites listed below have more information about drugs.

### National Institute on Drug Abuse (NIDA)

[www.drugabuse.gov](http://www.drugabuse.gov), 301-443-1124

This Web site contains information about drug abuse and a section designed specifically for parents, teachers, and students.

### NIDA Drug Pubs

[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov), 1-877-NIDA-NIH (1-877-643-2644)

Drug Pubs is NIDA's research dissemination center. Visitors can order hard copies of NIDA publications or download electronic versions in multiple formats.

### National Institute on Drug Abuse (NIDA)—Mind Over Matter

<http://teens.drugabuse.gov/mom/index.asp>

This site is designed specifically for young people to learn about the effects of drug abuse on the body and brain.

### National Clearinghouse for Alcohol and Drug Information (NCADI)

<http://store.samhsa.gov>, 1-800-729-6686

NCADI provides information and materials on substance abuse. Many free publications are available here.

Friedman, D. Focus on Drugs and the Brain. Frederick, Maryland: Twenty-First Century Books, 1990. This book provides a good overview of the brain, neurotransmission, the effects of drugs on the brain, and addiction.

Neuhaus, D. & DeStefano, S. Focus on Medicines. Frederick, MD: Twenty-First Century Books, 1990. Part of the "Drug-Alert Book" series. Gives a good overview of medicines and how various medicines work with the body and brain to help heal.

Perry, R. & Nehaus, D. Focus on Nicotine and Caffeine. Frederick, MD: Twenty-First Century Books, 1990. Part of the "Drug-Alert Book" series. Gives a good overview of nicotine and caffeine and how each of these drugs affect the body and brain.

Neuroscience for Kids  
<http://faculty.washington.edu/chudler/neurok.html>

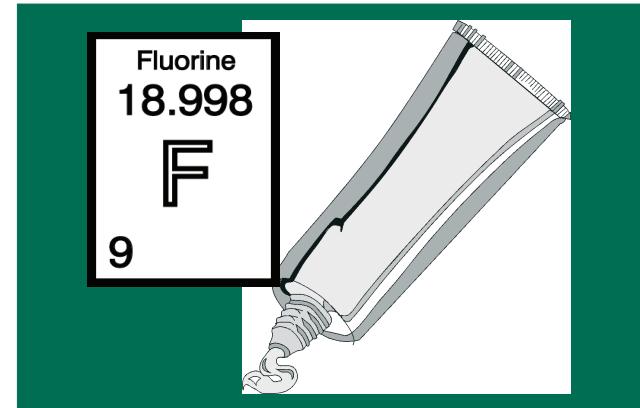
This site contains information on the brain and neurotransmission, activities, experiments, pictures, and other resources.

# ASPIRIN AND TYLENOL



What am I? I am aspirin and Tylenol.  
Where do I come from? The part of aspirin that makes a person better is from the bark of a willow tree. Scientists in labs make Tylenol. You can buy me in a pharmacy.  
What do I do? I am a pill or liquid that makes headaches and fevers disappear. Tylenol is usually better for children than aspirin.

# FLUORIDE



What am I? I am fluoride.  
Where do I come from? Fluoride is found in nature. I can be a gas, like air, or a liquid, like water.  
What do I do? I make children's teeth strong! I am in toothpaste, mouthwash, and even in the water supply.

# WIDA IMMUNIZATIONS



**What am I?** I am immunizations. I can also be called vaccinations, inoculations, or "baby shots."

**Where do I come from?** I am made from just a little bit of the same germs that can make a person sick.

**What do I do?** I help the body fight off those same bad germs. Children all over the world are safe from diseases like measles and mumps because of me.



# WIDA ALCOHOL



**What am I?** I am a clear liquid with a burning taste.

**Where am I found?** I can be found in drinks like beer, wine, and whiskey. I have been around for thousands of years. I'm possibly the world's oldest known drug!

**What do I do?** The blood carries me all over the body. I can mess up parts of the brain that help people move, think, talk, and feel. I am very harmful to children's growing brains.



# SO SODAIDA

CAFFEINE



# SO SODAIDA

NICOTINE



**What am I?** I am a drug found in coffee, tea, cocoa, and most soft drinks.

**Where do I come from?** I come from the parts of some plants, like the coffee bean, tea leaf, kola nut, and cacao pod.

**What do I do?** I make the heart and brain work faster. I also can make a person feel more awake.



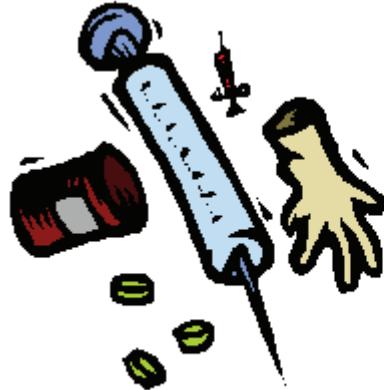
**What am I?** I am usually smoked but can be chewed or inhaled.

**Where do I come from?** I come from the oily liquid substance in tobacco leaves.

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# NIDA ILLEGAL DRUGS



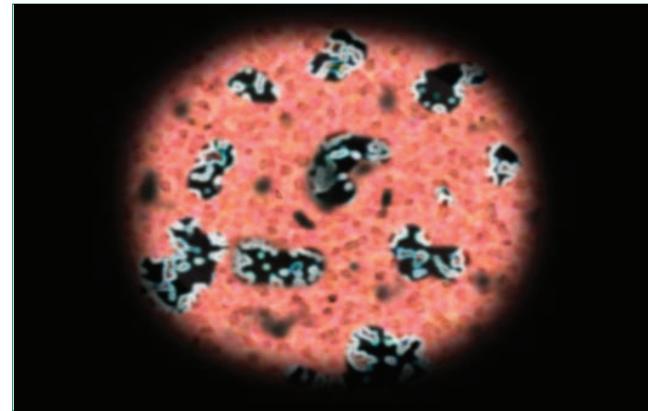
**What am I?** There are laws against using me. I am very harmful to people! There are lots of different kinds of me, like marijuana and cocaine.

**Where do I come from?** I come from many places. Sometimes I am made in labs, and other times I come from plants that grow in nature.

**What do I do?** All of these drugs change the way the body and the brain work. People who use me might not be able to stop taking me, even if they become very, very sick. This is because I am addictive.



# NIDA ANTIBIOTICS



**What am I?** I am antibiotics. Penicillin is a very common type of me.

**Where do I come from?** I am produced by bacteria and molds.

**What do I do?** I can help a sick person fight germs and get better.





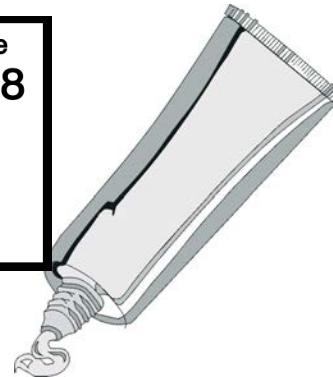
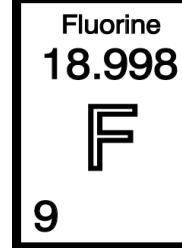
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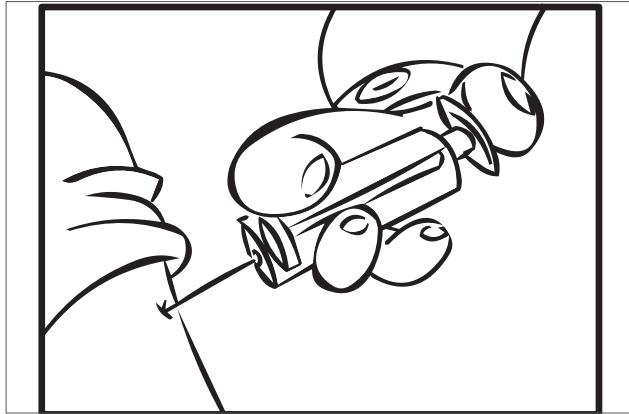


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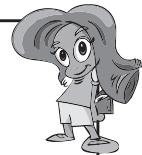




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## CAFFEINE



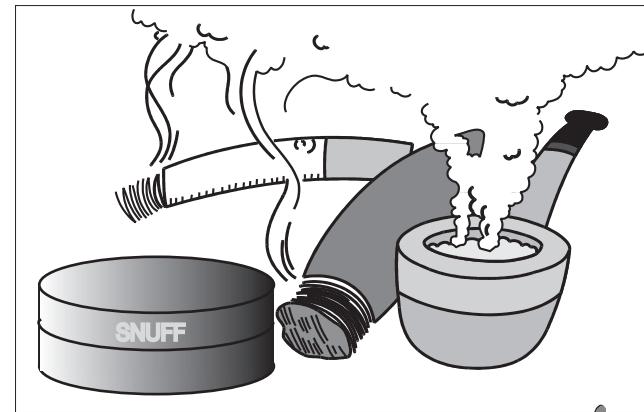
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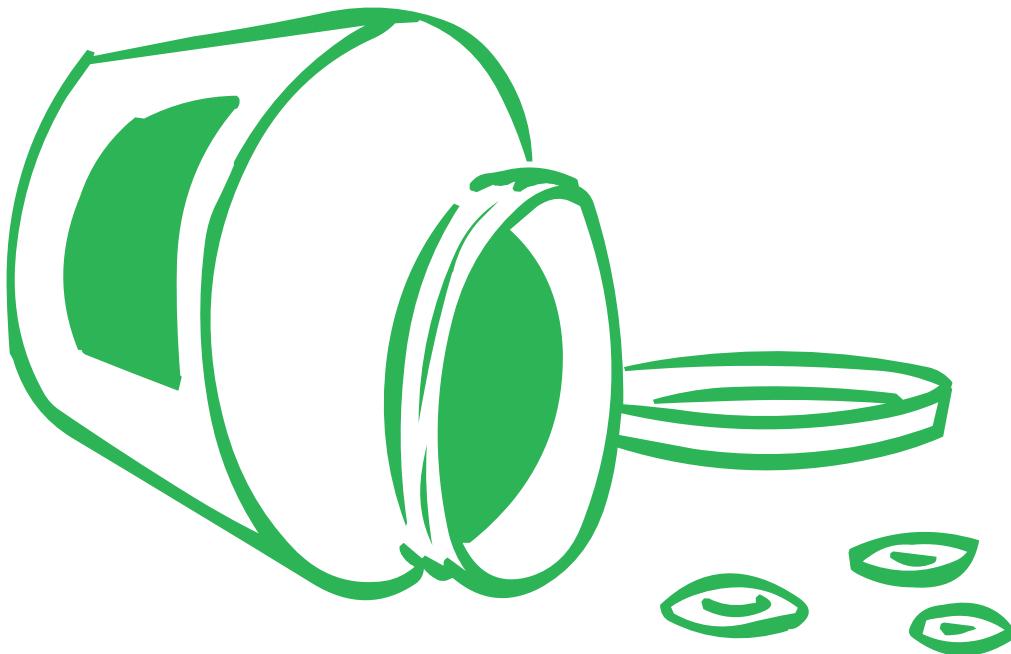
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# MEDICINES AND DRUGS: WHAT'S HELPFUL, WHAT'S HARMFUL



**Helpful Medicines**—are drugs that can help our bodies. They are administered by people who care about children like parents, doctors, dentists, and other care givers. Helpful medicines include aspirin/Tylenol, antibiotics, fluoride, and immunizations.

**Harmful Drugs**—are drugs that can hurt the body. Most of these drugs are illegal for children, and some are even illegal for adults. Harmful drugs include nicotine, alcohol, and illegal drugs such as marijuana and cocaine.

Caffeine is a drug that can be helpful or harmful.

