

# National Institute on Drug Abuse (NIDA) Brain Power: Grades K-1

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<https://www.drugabuse.gov>

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# You Could Be A Scientist (Module 1)

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You can also download this entire module in PDF format by clicking the following link: [Module 1 \(PDF, 1.3MB\)](#)

## Introduction

Young children are naturally interested in science. They are curious about what things are made of, how they work, why it rains, and countless other questions about the world. Yet, even children in kindergarten and first grade are old enough to have developed misconceptions about scientists and the work that they do.

The purpose of today's lesson is to find out students' ideas about scientists, talk about different kinds of scientists, and identify some characteristics of people who choose this profession. After discussing scientists and what they do, students will be introduced to Corty, the mascot of the Brain Power!Club, and to the older members of the club. Students will be able to become members of the club by working on the program's five modules.

## Learning Objectives

- Students discuss who scientists are and the work that they do.
- Students discover their own ability to do the work of scientists.

## Relationship to the National Science Education Standards

The activities in this lesson align with the following standard identified in the NSES: history and nature of science.

## History and Nature of Science

<b>Levels K–4</b>	<b>How Mission Is Aligned</b>
Science as a human endeavor	Students begin to understand that science encompasses many disciplines. Because they, too, will be working as scientists, they also start to realize that anyone who asks questions and tries to find the answers to these questions is a scientist.

## Background

By the time children are in kindergarten and first grade, they have already developed many misconceptions about the world. Often, children this age believe that scientists are white, old men who work in a laboratory—like Einstein. One of the goals of this lesson is to dispel this myth and show students that anyone can be a scientist, even kids their age.

Students first explore their current ideas about scientists by drawing a picture of what they think a scientist looks like. Then, they go beyond these stereotypes by looking at pictures of different scientists and developing a list of characteristics that scientists share. These activities set the stage for Module 2, during which students learn about the specific work of scientists involved in research about the brain.

In the United States alone, there are more than 11 million scientists and engineers. Of this number almost 4 million are women; nearly 9 million are Caucasian; 597,100 are African American; 417,200 are Hispanic and 805,900 are Asian. These scientists work in a variety of disciplines, including biology, biochemistry, chemistry, physics, mathematics, engineering, and the earth sciences. As more and more discoveries are being made, additional disciplines in the sciences are emerging. (Source: National Science Foundation 2002)

## Materials/Preparation

## Materials

- Crayons or markers
- Paper
- Newsprint
- Videotape and VCR, or [online video](#)

## Preparation

- Preview the videotape and lesson before doing this activity. Make necessary adjustments according to the needs and interests of your students.
- Make copies of the [black-and-white trading cards \(PDF, 449KB\)](#) found at the back of the Module 1 Teacher's Guide so that each student has a copy of each card.

# Procedures/Discussion Questions

## Procedures

1. Begin the lesson by asking students to draw a picture of what they think a scientist looks like. Tell them to include details, such as clothes the scientist wears, the setting in which that person works, and the tools and equipment used. Give students about 10 minutes to complete their drawings.
2. Collect the drawings and display them around the class. Do the drawings show a combination of men and women? Are the scientists from different ethnic groups? Are the scientists working in different settings? If students' drawings reflect the stereotype of a scientist as a white male in a laboratory, lead a discussion about the tremendous variety of scientists.
3. Discuss with students the characteristics of scientists. First, ask students for their ideas. What words would students use to describe scientists? Help them understand that such phrases as curious, asking a lot of questions

(inquisitive), adventurous, thoughtful, careful, and thorough are good ways to describe scientists. Keep a list of these phrases around the classroom so that students can add to them as they work on the modules in the program.

4. Tell students that all scientists share one thing in common—a desire to find answers to their questions. Ask students how they think scientists go about finding out what they need to know. Keep a list of their ideas.
5. Ask students if they would like to work on solving problems, just as scientists do. Tell them that they will have an opportunity to do so by working with older students, shown in the video; they will have the opportunity to become members of the Brain Power!Club.
6. To conclude, show students the Module 1 segment of the videotape. They will see an animated character named Corty. Tell students that Corty will help guide them through the problems presented in the modules.

## Discussion Questions

1. Ask students if their ideas about scientists and science have changed as a result of working on this module. If so, how have their ideas changed? Do they now have a different image of who scientists are and what they do?
2. To help students solidify their new ideas about scientists, ask them to draw a second picture of what they think scientists look like, where they work, and the tools that they use. As a class, compare the two pictures. What do the new pictures reveal about students' changing ideas about scientists?

## Extensions

The activities listed below provide a link to other areas in the curriculum.

1. Have the students talk about what kind of scientist they might want to be. Have them provide as many details as possible, such as the type of scientist, the work setting, the kind of work done, and major findings.
2. Take a class survey of the different kinds of scientists that students are familiar with. Then, make a bar graph illustrating class results. Which kind of

scientist are students most familiar with? What kind of work does that particular scientist do?

3. Make picture cards showing different kinds of scientists and the work they do. Display the cards around the class.

## Assessment

The purpose of this activity is to find out what students' ideas about science and scientists are so that you know what misconceptions students have as they begin these modules. At this point, if students are attentive, engaged by the activity, and participate in class discussions, then they have completed the module successfully.

## 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 and a section designed specifically for parents, teachers, and students.
- NIDA DrugPubs Research Dissemination Center  
[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov) , 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228)  
Order our materials free of charge in English or Spanish.
- National Clearinghouse for Alcohol and Drug Information (NCADI)  
[store.samhsa.gov/home](http://store.samhsa.gov/home), 1-800-729-6686  
NCADI is operated by the Substance Abuse and Mental Health Services Administration (SAMHSA). Many free publications are available here.
- Eisenhower National Clearinghouse (ENC)  
[www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-](http://www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-)

### [math-science-education](#)

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

- National Science Teachers Association (NSTA)  
[www.nsta.org](http://www.nsta.org), 703-243-7100  
Provides resources and information for science teachers.

## Resources for Students

- Want to be a Scientist?  
[www.ars.usda.gov/is/kids/](http://www.ars.usda.gov/is/kids/)  
This site describes careers of scientists and presents an opportunity to email scientists and ask them questions.
- Lehn, B. *What is A Scientist?* Brookfield, CT: Millbrook Press, 1999.  
This book explains what it is to be a scientist by including pictures of children as scientists in the classroom doing scientific experiments and having a great time.
- Sabin, F. *Louis Pasteur: Young Scientist*. Memphis, TN: Troll Communications, 1983.  
This book focuses on the life of the famous scientist Louis Pasteur. It is informative and easy to read.
- Brandt, K. *Marie Curie: Brave Scientist*. Memphis, TN: Troll Communications, 2002.  
This book focuses on the life of the famous scientist Marie Curie. It is part of the Easy Biographies series.
- Purwin, P. *Grampa's a Scientist*. Los Angeles, CA: Collage Storybook Press, 1999.  
This is a story about a visit from a grandfather to his twin grandchildren and their magical, scientific adventure.
- Trumbauer, L. *Everyone is a Scientist*. Mankato, MN: Pebble Books, 2000.  
This is an elementary book that shows how anyone, even the youngest of children, can be a scientist.

# Introductory Story for Module 1

"Hi, everyone. I'm Juan, and this is a fellow Junior Scientist, Beth. We're in a really cool club called 'Brain Power!' NIDA Mission Control sends us missions to solve. We go on these missions with Corty."

"Hey, what about us?!" ask Max and Julia. "We go on missions with Corty, too."

Beth says, "Of course! We were going to introduce you two. This is Max and Julia. They are working to become Junior Scientists just like Juan and me. Now, where were we Juan?" asks Beth.

"Let's see. Biologists, neuroscientists, zoologists..." says Juan.

"... immunologists, physicists..." Beth continues.

"What are you two doing?" asks Julia.

"We're trying to think of as many different kinds of scientists as we can. Did you realize that there are so many different kinds of scientists and that they perform many different jobs?" asks Beth.

Julia and Max both shake their heads. "No way! We had no idea."

"I've got an idea—let's see if we can find some scientists on the Internet," suggests Juan. "An oceanographer studies the oceans and the fish, plants, and other creatures that live there. Drug abuse researchers do PET scans to find out how some harmful substances affect people's brains and bodies, so that they can help them get well again."

"Wait a minute. Women can be scientists, too?" asks Julia, as she notices one of the pictures on the Internet.

Juan and Beth laugh. "Anyone can be a scientist, Julia—men, women, and people of all races. And scientists work in all kinds of places. The drug abuse researcher does some work in a laboratory and some out with animals," explains Beth.

"The oceanographer works in the water, and other scientists work in fields or forests, or even outer space," says Juan.

"Wow! We didn't know there are so many different types of scientists!" exclaims Max.

"Okay, here's a quiz. What do you call a scientist who studies the brain and all the interesting things your brain can do?" asks Juan.

"A Brainologist?" suggests Max.

Beth and Juan laugh. "That's a good guess, but the real word is neuroscientist!" explains Juan.

"Wow! I would like to do that. It would be fun to study the brain and how it helps us think!" says Max.

"I told you being a scientist is fun," replies Juan.

Corty says, "Okay, I have a question for you. What do these scientists have in common?"

What makes them all good at being scientists?"

"Do they wonder how things work?" asks Julia.

"Are they curious about things?" asks Max.

"Do they love animals?" asks Julia.

"Do they like to read?" asks Max.

"Stop! You're both right!" says Beth. "Scientists have all those things in common. But most of all, they love to ask questions and find the answers."

"Yeah, and you two are really good at asking questions. So you know what that means?" asks Juan. "You have just earned the title of Junior Scientists. Congratulations!"

"Congratulations, Dr. Max," says Julia.

"Congratulations to you, too, Dr. Julia," says Max.

Max and Julia both take a big bow.

## **Brain Power News**

*Parent Newsletter*

*Volume 1, Number 1*

### **Introducing the NIDA Junior Scientists Program**

Your child has been working on the first module of the National Institute on Drug Abuse (NIDA) Junior Scientists Program. Geared to students in kindergarten and first grade, the program discusses the following topics:

- Different kinds of scientists and the characteristics they all share;
- The research of specific scientists;
- The different functions of the brain;
- How to keep the brain healthy; and

- How to protect the brain.

The overall purpose of the program is to introduce young students to two key concepts—who scientists are and why their work is important, and the many functions of the brain. At the end of the program, students learn about the differences between helpful medicines and harmful substances. This background lays the foundation for a more in-depth study, during second through fifth grades, of the brain and how harmful drugs can affect it.

Although these children are very young, it is not too soon to begin educating them about drugs. Research has shown that having a foundation in the early grades helps children be better prepared to make good decisions when they are older. You will find that your child will be fascinated with what he or she is learning and capable of absorbing the information because it is being presented in a fun, age-appropriate way.

This newsletter is designed to provide you with information so you can reinforce at home what your child has been learning in school. Each module has a parent newsletter that includes the following:

- The content of the module;
- Activities you can do at home; and
- Additional resources.

We hope that you and your child enjoy working on the program together and that the knowledge gained now will serve your family well in the future.

## **What Do Scientists Do?**

In this first module, students drew pictures of scientists and then discussed their ideas about them. Through this activity, students realized that scientists aren't always white men who work in a laboratory, like Albert Einstein or the "mad" scientists shown in cartoons. Rather, scientists can be men and women from any ethnic group working in a variety of places—in the ocean, in the field, in

brain imaging labs, and even in outer space. But all scientists share two key characteristics: curiosity and a desire to find answers to their questions about the world.

This activity aligns with a standard identified in the National Science Education Standards, “history and nature of science.” These guidelines were developed in 1996 by the National Academy of Sciences to help schools know what information should be covered in kindergarten through high school. The standards stress the importance of teaching students that science encompasses many disciplines, but scientists in all areas develop questions and then strive to find the answers to them.

## **Science at Home**

How many different kinds of scientists can you name? Try to think of as many as you can with your child. Examples include: psychologist, biologist, chemist, neuroscientist, physicist, geologist, seismologist, oceanographer, and astronomer. Ask your friends for more examples. See how long your list can be!

## **What Does Your Child Think?**

Help your child write or draw his or her ideas about scientists and how those ideas have changed as a result of working on this activity.

## **Additional Resources**

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. Publications and other materials are available free of charge.

National Clearinghouse for Alcohol and Drug Information (NCADI) —  
[store.samhsa.gov](http://store.samhsa.gov)  
1-800-729-6686

NCADI is the world’s largest resource for information and materials concerning

substance abuse. Many free publications are available here.

[Parent Newsletter \(PDF, 147KB\)](#)

## **Brain Power News (Español)**

### **Noticias Sobre El Poder Del Cerebro**

*Boletín Informativo Para Padres*

*Volumen 1, Número 1*

### **Introducción al Programa Pequeños Científicos del Instituto Nacional Sobre el Abuso de Drogas**

Su hijo ha estado trabajando en el primer módulo del Programa Pequeños Científicos (Junior Scientists Program) del Instituto Nacional Sobre el Abuso de Drogas (National Institute on Drug Abuse o NIDA). Dirigido a estudiantes del kinder y del primer grado, el programa explica los siguientes temas:

- Las diferentes clases de científicos y las características que comparten;
- Las investigaciones de científicos específicos;
- Las diferentes funciones del cerebro;
- Cómo mantener saludable al cerebro; y
- Cómo proteger al cerebro.

El propósito general del programa es presentar a los pequeños estudiantes dos conceptos clave: quiénes son los científicos y por qué su trabajo es importante, y las muchas funciones del cerebro. En el módulo final del programa, los estudiantes aprenden las diferencias entre medicinas útiles y sustancias dañinas. Estos conocimientos establecen la base para un estudio más profundo del cerebro y de cómo pueden afectarlo las drogas dañinas, el mismo que se lleva a cabo desde el segundo al quinto grado.

Aunque estos niños son muy pequeños, no es demasiado pronto para comenzar a educarlos sobre las drogas. Las investigaciones han demostrado que cuando los niños tienen una base en los primeros años de la escuela, están mejor preparados para tomar buenas decisiones cuando son más grandes. Debido a que el programa se presenta de un modo divertido y apropiado para la edad, verá que su hijo estará fascinado con lo que aprende y será capaz de asimilar la información.

Este boletín informativo está diseñado para brindarle información para que usted refuerce en el hogar lo que su hijo ha estado aprendiendo en la escuela. A cada módulo le corresponde un boletín informativo para padres que incluye lo siguiente:

- El contenido del módulo;
- Actividades que puede realizar en su hogar; y
- Recursos adicionales.

Esperamos que usted y su hijo disfruten trabajando juntos en el programa y que en el futuro su familia pueda beneficiarse del conocimiento adquirido ahora.

## **¿Qué hacen los científicos?**

En el primer módulo, los estudiantes realizaron dibujos de científicos y luego platicaron acerca de las ideas que tienen sobre ellos. A través de esta actividad, los estudiantes se dieron cuenta de que los científicos no siempre son hombres blancos que trabajan en un laboratorio, como Albert Einstein o como los científicos “locos” que se ven en los dibujos animados. Al contrario, los científicos pueden ser hombres y mujeres de cualquier grupo étnico que trabajan en una variedad de lugares: en el océano, en el campo, en laboratorios de imágenes cerebrales e incluso en el espacio. Pero todos los científicos comparten dos características clave: la curiosidad y un deseo de encontrar respuestas a sus preguntas acerca del mundo.

Esta actividad se ajusta a un estándar identificado en los Estándares

Nacionales de Educación Científica (National Science Education Standards), como “la historia y naturaleza de la ciencia”. Estas pautas fueron desarrolladas en 1996 por la Academia Nacional de Ciencias (National Academy of Sciences) para ayudar a las escuelas a conocer qué información se debe cubrir desde el kínder hasta la escuela secundaria. Los estándares recalcan la importancia de enseñar a los estudiantes que la ciencia abarca muchas disciplinas, pero que los científicos de todas las áreas se hacen cuestionamientos y luego trabajan para encontrar las respuestas.

## **La ciencia en el hogar**

¿Cuántos tipos distintos de científicos puede nombrar? Con su hijo, trate de pensar en todos los que pueda. Algunos ejemplos pueden ser: psicólogo, biólogo, químico, neurocientífico, físico, geólogo, sismólogo, oceanógrafo y astrónomo. Pídeles más ejemplos a sus amigos. ¡Observe cuán larga puede ser su lista!

## **¿Qué piensa su hijo?**

Ayude a su hijo a escribir o dibujar sus ideas acerca de los científicos y cómo esas ideas han cambiado como consecuencia de trabajar en esta actividad.

## **Recursos adicionales**

National Institute on Drug Abuse (NIDA) — [www.drugabuse.gov](http://www.drugabuse.gov)

301-443-1124

Este sitio Web tiene información acerca del abuso de drogas y una sección destinada específicamente a padres, maestros y estudiantes.

National Clearinghouse for Alcohol and Drug Information (NCADI) —

[store.samhsa.gov](http://store.samhsa.gov)

1-800-729-6686

El NCADI es el recurso mundial más grande para información y materiales relacionados con el abuso de sustancias. Aquí se pueden obtener muchas publicaciones gratuitas.

[Parent Newsletter \(Español, PDF, 230KB\)](#)

# Meet the Scientists (Module 2)

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You can also download this entire module in PDF format by clicking the following link: [Module 2 \(PDF, 1.6MB\)](#)

## Introduction

In [Module 1](#), students discussed their ideas about scientists and the kind of work that they do. The students also became aware of their misconceptions about scientists and realized that scientists work in a wide range of specialties and come from all walks of life.

In today's lesson, students will watch a video introducing them to specific scientists. The scientists will explain their research by identifying what problems they set out to solve, how they solved—or attempted to solve—the problems, and what conclusions they were able to draw from their experiments. Students will then develop posters explaining each scientist's work in terms of the four steps of inquiry:

- *Observe* - Check out the problem.
- *Predict* - Time to make a good guess.
- *Experiment* - Is your guess right? Find out by doing an experiment.
- *Conclude* - Put the pieces together to figure out what's really going on.

After completing their posters, students will discover that all these scientists have one thing in common: They are all studying the brain and how it works.

## Learning Objectives

- Students learn about specific scientists and the work that they do.
- Students develop posters explaining the work of each scientist in terms of the steps of scientific inquiry.

- Students discover that all the scientists they learned about are studying the brain.

## Relationship to the National Science Education Standards

The activities in this lesson align with two standards identified in the NSES: history and nature of science and science as inquiry.

### History and Nature of Science

Levels K–4	How Mission Is Aligned
Science as a human endeavor	Students begin to understand that science encompasses many disciplines. They also start to realize that scientists ask questions and try to find the answers to these questions to do their jobs.

### Science as Inquiry

Levels K–4	How Mission Is Aligned
Abilities necessary to do scientific inquiry	Students learn how scientists use the steps of scientific inquiry to solve a problem.

## Background

The scientists discussed below are doing research on the brain. Students will have an opportunity to hear from these scientists by watching the video accompanying this module. Following the description of each scientist’s work is a brief explanation of how each uses the steps of scientific inquiry to solve problems.

### Eric Chudler, Ph.D.

A neurophysiologist from the University of Washington in Seattle, Washington, Dr. Chudler is currently studying why people with an illness called Parkinson's disease experience significant pain. Parkinson's disease affects a small area of neurons in a certain part of the brain. These neurons are responsible for coordinating smooth and balanced muscle movement. Parkinson's disease causes these nerve cells to die, and, as a result, body movements are affected. The person becomes shaky and finds it hard to speak. Dr. Chudler is conducting his research with rats and trying to understand the activity of neurons, or nerve cells, in the area of the brain affected by Parkinson's disease.

## **Understanding Dr. Chudler's Research in Terms of the Steps of Scientific Inquiry**

*Observe:* Dr. Chudler observed that people with Parkinson's disease also experience a lot of pain. He was puzzled by this because Parkinson's is a disease of movement and not typically associated with pain. He wanted to find out what was causing the pain in people with Parkinson's disease.

*Predict:* Dr. Chudler believes that a specific part of the brain is involved in both Parkinson's disease and pain. When this part of the brain is affected, people get the movement problems of Parkinson's disease, as well as the pain they experience.

*Experiment:* Using rats, Dr. Chudler measures the activity of neurons in the part of the brain responsible for Parkinson's disease to see if the pain is originating in the brain. If he can find where the pain is coming from, it will be easier to develop a treatment for this problem.

*Conclude:* From his research, Dr. Chudler hopes to find the area or pathways in the brain that cause pain in people with Parkinson's disease. Once this area or pathway is discovered, new treatments can be developed.

## **Michael Byas-Smith, M.D.**

Dr. Byas-Smith is an anesthesiologist at Emory University School of Medicine in

Atlanta, Georgia. He is working with other scientists to determine whether chemical changes that take place in the brain make certain individuals more likely to become addicted to drugs. To answer this question, Dr. Byas-Smith and his team are working with rats, monkeys, and humans.

### **Understanding Dr. Byas-Smith’s Research in Terms of the Steps of Scientific Inquiry**

*Observe:* Dr. Byas-Smith wondered how specific chemicals in the brain behave when drugs or medications are given to people. These special chemicals are important because they help create habits in people. Some habits are good, like keeping your room neat or getting a good night’s sleep. Other habits can be bad, like eating too much food even when you are not hungry.

*Predict:* Dr. Byas-Smith predicts that these chemicals act as a “switch” for addictive behavior. He wants to find the switch and figure out how to turn it off.

*Experiment:* Different experiments are being conducted on various systems in the brain to see whether there is an “addiction switch.” Dr. Byas-Smith uses a Positron Emission Tomograph or “PET” scanner to take a picture of the brain while it’s working.

*Conclude:* If Dr. Byas-Smith and his staff are able to find out how the brain chemicals work, they may be able to make medications that can help people stop bad habits and help those who might be more likely to develop bad habits.

### **Denise Jackson, Ph.D.**

Dr. Jackson is the Director of the Undergraduate Behavioral Neuroscience Program at Northeastern University in Boston, Massachusetts. She studies rats to look at the effects of cocaine on how the brain grows even before the rat is born.

### **Understanding Dr. Jackson’s Research in Terms of the Steps of Scientific Inquiry**

*Observe:* Dr. Jackson wonders how cocaine affects the growth of the rats' brains at different times before they are born.

*Predict:* She predicts that giving a mother rat cocaine will have a different effect on the brains of her baby rats than on the mother rat herself. Different amounts of cocaine will also produce different effects.

*Experiment:* She uses specific tools and instruments to see how the brains of unborn rats are affected by cocaine. She is trying to learn if the neurons are where they are supposed to be in the developing brain.

*Conclude:* By testing these predictions on rats, Dr. Jackson is able to further understand brain development in humans. She hopes that as this begins to be understood, we may be able to make discoveries and develop ways to correct the problems in babies whose mothers take drugs like cocaine before they are born.

## **Alane Kimes, Ph.D.**

Dr. Kimes is a drug abuse researcher. She works at the NIDA Research Program in Baltimore, Maryland. She is interested in finding out how drug abuse changes the way the brain works. From her research with animals and people, she hopes to find ways to help people stop using drugs.

### **Understanding Dr. Kimes' Research in Terms of the Steps of Scientific Inquiry**

*Observe:* The purpose of Dr. Kimes' research is to study how the brain functions in normal people in comparison to how the brain functions in drug abusers or smokers.

*Predict:* Dr. Kimes believes that if she is able to find out what is different about the way drug abusers' brains work, she may be able to find out ways to help their brains and make them work more like the brains of people who don't abuse drugs.

*Experiment:* Dr. Kimes uses a scanner to see what parts of the brain are working harder than other parts when people play special games or take little tests. The brains of people who have taken drugs like cocaine, heroin, or marijuana or who smoke cigarettes sometimes work differently than people who don't take these drugs.

*Conclude:* So far, Dr. Kimes has found that the parts of the brain involved in making risky decisions don't work as well in drug abusers when compared to people who don't abuse drugs. She hopes to find out more so she can change the way the brain works and help people make better decisions to not use drugs.

## Materials/Preparation

### Materials

- Videotape and VCR, or [online video](#)
- Markers
- Poster board
- Paper and pencils
- [Resume form \(PDF, 48KB\)](#)

### Preparation

1. Preview the videotape so that you are familiar with the scientists.
2. Write the steps of scientific inquiry (Observe, Predict, Experiment, and Conclude) on pieces of poster board in preparation for the discussion on the work of the scientists showcased in the video.
3. Make copies of the [black-and-white trading cards \(PDF, 151KB\)](#) found at the back of the Module 2 Teacher's Guide so that each student has a copy of each card.

# Procedures/Discussion Questions

## Procedures

1. Begin the lesson by reviewing with students their ideas about scientists, which they discussed during Module 1. Take a second look at the pictures they drew in Module 1 and go over the list of characteristics of scientists that they developed.
2. To learn more about scientists and the work they do, tell the students that they are going to watch a video about the research of a few scientists. After watching the video, they will work on their first mission with the Brain Power! Club. The goal of the mission is to help students understand the work of these scientists and the process of scientific inquiry.
3. As a class, watch the section of the video about scientists, then turn off the tape and show students the pieces of poster board you prepared with the steps of scientific inquiry. Then, go over with the class what these steps mean; they are defined below:
  - *Observe* - Take note of a particular situation and check key aspects of it, such as what something looks like, feels like, smells like, and other salient characteristics. For a researcher, this might be studying problems in the world.
  - *Predict* - Develop an idea about why a problem exists or an explanation of a particular phenomenon.
  - *Experiment* - Conduct investigations to try to solve the problem or explain the phenomenon.
  - *Conclude* - Summarize what was learned from the experiment.
4. Make a chart that lists the scientists in the video and the work they do. Discuss with your students how the scientists in the video used the different steps of scientific inquiry. How are the scientists' research programs similar? How are they different?
5. If time allows, have each child in the class fill out the [resume form \(PDF, 48KB\)](#) (included in the back of this module of the Teacher's Guide) as

though he or she wants to be a scientist. Have them answer each of the questions on the form, in pictures or in words, about what kind of research he or she would like to do.

6. To conclude the mission, ask students what one thing all the researchers in the video have in common. Help them realize that all the scientists are studying the brain. Then, tell students that during the next mission, they, too, will be learning about the brain and how it works.
7. Tell students to give themselves a round of applause. They have just completed the second mission of the NIDA Brain Power!Program.

## Discussion Questions

1. Go over the work of the scientists shown in the video. Make sure students understand what field the scientists are in, what they study, how they are solving their research problems, and that research is an ongoing venture that continually yields new questions and solutions.
2. Ask students what they know about the brain and what it does. Write down their ideas on a piece of newsprint. You may want to refer to it during the next module, when students focus on the brain.

## Extensions

The following activities provide a link to other areas in the curriculum. They also help reinforce what was learned during the module and make use of the trading cards.

1. Have the students, either individually or in groups, draw a picture of the brain. Have them label each part and identify at least one function of each part.
2. Have the students, either individually or in groups, write a couple of sentences in response to the following prompt: "My brain is amazing because..."
3. Divide the class into pairs. Have one student give clues to the other about

each part of the brain. Students may want to act out what that part of the brain does. Have students use the trading cards to play.

4. Have students, either individually or in groups, create new trading cards about the brain. They can be on different parts of the brain, scientists who study the brain, or different activities the brain enables us to do.

## Assessment

As students work on the activity, look for the following:

- Have students grasped the concept that there are many different kinds of scientists who work in many different fields? For example, do students understand that some scientists work in a laboratory, while others work with people in a natural setting?
- Did students understand the steps of scientific inquiry?
- Were students able to figure out how the scientists in the videotape used these steps as a framework for their own research programs?

## 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 and a section designed specifically for parents, teachers, and students.
- NIDA DrugPubs Research Dissemination Center  
[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov) , 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228)  
Order our materials free of charge in English or Spanish.

- National Clearinghouse for Alcohol and Drug Information (NCADI)  
[store.samhsa.gov/home](http://store.samhsa.gov/home), 1-800-729-6686  
NCADI is operated by the Substance Abuse and Mental Health Services Administration (SAMHSA). Many free publications are available here.
- Eisenhower National Clearinghouse (ENC)  
[www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education](http://www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education)  
This Web site provides useful information and products to improve mathematics and science teaching and learning.

## Resources for Students

- The Why? Files - [whyfiles.org](http://whyfiles.org)  
Explanations for scientific phenomena discussed in the news.
- Tiner, J. *100 Scientists Who Shaped World History*. San Mateo, CA: Bluewood Books, 2000.  
This book talks about great men and women of science who significantly contributed to our understanding of the physical world around us.
- Kramer, S. *How to Think Like a Scientist: Answering Questions by the Scientific Method*. New York, NY: HarperCollins Children's Books, 1987.  
This book shows how scientists use questions to learn about things. It teaches how the scientific method can help find answers to many questions people are curious about.
- Kramer, S. *Hidden Worlds: Looking Through a Scientist's Microscope (Scientists in the Field)*. Boston, MA: Houghton Mifflin Co., 2003.  
This book shows how scientists study the world and includes many behind-the-scenes pictures of the life of a scientist.

## Introductory Story for Module 2

"Hey, kids! How doodle-dee-doo?" asks Corty. "Have you got some time to help me out with something?"

"We always have time for you, Corty!" smiles Julia.

"Great! Because I just got four emails from four different scientists. Each email has a word with a description, and I'm not sure what to do with them," says Corty. "The words are Observe, Predict, Experiment, and Conclude."

Julia and Max look at the words to try to figure out what they mean. They write each word on a different piece of poster board.

"Maybe they are in the wrong order or something. Let's try moving them around," Max suggests.

The kids start moving the pieces of poster board and rearranging them in different combinations. Finally, they stop, lean the boards against the wall, and slump down in their chairs.

"I'm more confused now than when we started," sighs Julia.

Just then, Beth and Juan come into the club house. "What's wrong with you two? You look exhausted," says Beth.

"Corty gave us these definitions in some emails, and we're trying to figure out what they mean," says Max.

"Let's look them up on the computer. You can find just about anything on the Internet," suggests Juan.

The kids all crowd around the computer screen, and Beth starts typing. Corty immediately pops up.

"Hi, Junior Scientists!" says Corty. "I know this is a tough challenge, so I'm going to introduce you to some of my friends—they're scientists. They study different drugs and how they affect our brains and bodies."

"What does that have to do with the definitions of those words?" asks Julia.

"Let's sign on and find out!" says Corty. "One of the first things scientists do is OBSERVE. Dr. Chudler does this when he begins solving any problem. He looks at the problem very carefully and writes down what he sees. Dr. Chudler is trying to help people with Parkinson's disease, which affects the nerves and the brain. He is doing research to try and help these people get better and not feel pain."

Corty continues, "Another one of the words is PREDICT. When Dr. Byas-Smith has a problem, he has to make guesses about how to solve it. Predicting is like making a good guess. Dr. Byas-Smith studies certain chemicals in the brain and tries to figure out how we can avoid developing bad habits or stop bad habits when they develop."

Corty then introduces them to Dr. Jackson. "Another word is EXPERIMENT. Dr. Jackson experiments in her lab to find out if her guesses are right. She studies the effects of cocaine on unborn rats. Dr. Jackson is trying to find out how the drug affects the way the brain grows."

"And the last word we have is CONCLUDE," says Corty. "Dr. Kimes has spent a lot of time working on a problem and experimenting. She uses all of the information she's collected to CONCLUDE—to come up with an answer. Dr. Kimes works with a PET scanner. This is a machine that takes pictures of the brain. She studies the pictures to look for ways to help people stop using drugs."

"Have you figured out what order the words should be in?" asks Corty.

"When you're a scientist, the first thing you do is observe. You check out a problem. Just like we did when we had the problem of finding out what these definitions were," explains Beth.

"Then, we predicted—we made a good guess at what the answer was. We guessed that the words maybe had something to do with science," says Max.

Julia chimes in, "Next, we experimented. The experiment tells you if your guess is right. We experimented by checking in with some scientists."

"And finally, we concluded—we put the pieces together to figure out what they meant. And then we had the answer to the question we started out with. Ta-da!" shouts Juan.

Julia admits, "I didn't realize that scientists did so many things."

"Yeah, or that science could be so much fun!" says Max.

## Brain Power News

*Parent Newsletter*  
*Volume 1, Number 2*

### Meet the Scientists

Your child has been learning all about scientists. He or she watched a video highlighting the work of four prominent scientists. Each scientist explained his or her work by focusing on the steps of scientific inquiry. These steps are a systematic way of approaching a problem and include the following:

- Observe—Check out the problem.
- Predict—Time to make a good guess.
- Experiment—Is your guess right? Find out by doing an experiment.
- Conclude—Put the pieces together to figure out what's really going on.

These steps are recommended for problem solving and scientific experimentation in the National Science Education Standards.

The following chart describes the scientists that were featured in the video.

Alane Kimes, Ph.D.	Dr. Kimes works at the National Institute on Drug Abuse Research Program in Baltimore, Maryland. Her research focuses on the effects of drugs on the brain. She is interested in finding out how drug abuse changes the way the brain works, so she can find ways to help people stop using drugs.
Michael Byas-Smith, M.D.	Dr. Byas-Smith is an anesthesiologist at Emory University School of Medicine in Atlanta, Georgia. He is working with other scientists to determine whether chemical changes that take place in the brain make certain individuals more likely to become addicted to drugs.
Eric Chudler, Ph.D.	Dr. Chudler is a neurophysiologist from the University of Washington in Seattle, Washington. He is currently studying why people with Parkinson's disease experience significant pain. Dr. Chudler is conducting his research with rats and trying to understand the activity of neurons, or nerve cells, in the area of the brain affected by Parkinson's disease.
Denise Jackson, Ph.D.	Dr. Jackson is the Director of the Undergraduate Behavioral Neuroscience Program at Northeastern University in Boston, Massachusetts. She studies the effects of cocaine on unborn rats. Dr. Jackson is trying to find out how the drug affects the way the brain grows.

## Science at Home

Ask your child which scientist he or she thought was working on the most interesting project in the video. Discuss with your child all the interesting things these scientists do. You can also talk about the wide variety of places where they work. If there are scientists in your family, talk about the work they do.

## What Does Your Child Think?

Help your child write one sentence about the value of the work of scientists. Try to include something new that he or she has learned about scientists.

## Additional Resources

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. Publications and other materials are available free of charge.

National Clearinghouse for Alcohol and Drug Information (NCADI) —  
[store.samhsa.gov](http://store.samhsa.gov)  
1-800-729-6686

NCADI is the world's largest resource for information and materials concerning substance abuse. Many free publications are available here.

The Why? Files — <http://whyfiles.org>  
Explanations for scientific phenomena discussed in the news.

Tiner, J. *100 Scientists Who Shaped World History*. San Mateo, CA: Bluewood Books, 2000. This book talks about great men and women of science who significantly contributed to our understanding of the physical world around us.

Kramer, S. *How to Think Like a Scientist: Answering Questions by the Scientific Method*. New York, NY: HarperCollins Children's Books, 1987. This book shows how scientists use questions to learn about things. It teaches how the scientific method can help find answers to many questions people are curious about.

Kramer, S. *Hidden Worlds: Looking Through a Scientist's Microscope (Scientists in the Field)*. Boston, MA: Houghton Mifflin Co., 2003. This book shows how scientists study the world and includes many behind-the-scenes pictures of the life of a scientist.

[Parent Newsletter \(PDF, 228KB\)](#)

## Brain Power News (Español)

# Noticias Sobre El Poder Del Cerebro

*Boletín Informativo Para Padres*  
*Volumen 1, Número 2*

## Conozca a los científicos

Su hijo ha estado aprendiendo sobre los científicos. Vio un video que destaca el trabajo de cuatro científicos prominentes. Cada científico explicó su trabajo, concentrándose en las etapas de la investigación científica. Estas etapas constituyen un modo sistemático de enfocar un problema e incluyen lo siguiente:

- Observe – Examine el problema.
- Pronostique – Es el momento para hacer una buena conjetura.
- Experimente – ¿Es correcta su conjetura? Averíguelo realizando un experimento.
- Concluya – Junte las piezas para averiguar qué es lo que realmente está sucediendo.

Los Estándares Nacionales de Educación Científica (National Science Education Standards) recomiendan estos pasos para la resolución de problemas y la experimentación científica.

El siguiente cuadro describe a los científicos que fueron presentados en el video.

<p>Alane Kimes, Ph.D.</p>	<p>La Dra. Kimes trabaja en el Programa de Investigaciones del Instituto Nacional Sobre el Abuso de Drogas (National Institute on Drug Abuse Research Program) en Baltimore, Maryland. Su investigación se concentra en los efectos de las drogas en el cerebro. Está interesada en descubrir cómo el abuso de drogas cambia el modo en que funciona el cerebro, a fin de encontrar la forma de ayudar a que la gente deje de consumir las drogas.</p>
<p>Michael Byas-Smith, M.D.</p>	<p>El Dr. Byas-Smith es anestesiólogo de la Escuela de Medicina de la Universidad de Emory en Atlanta, Georgia. Está trabajando con otros científicos para determinar si los cambios químicos que ocurren en el cerebro hacen que determinadas personas sean más propensas a convertirse en adictos a las drogas.</p>
<p>Eric Chudler, Ph.D.</p>	<p>El Dr. Chudler es neurofisiólogo de la Universidad de Washington en Seattle, Washington. Actualmente está estudiando la razón por la cual las personas con la enfermedad de Parkinson sienten mucho dolor. El Dr. Chudler lleva a cabo su investigación con ratas e intenta entender la actividad de las neuronas o células nerviosas en el área del cerebro afectada por la enfermedad de Parkinson.</p>
<p>Denise Jackson, Ph.D.</p>	<p>La Dra. Jackson es la Directora del Programa Universitario de Neurociencia de la Conducta (Undergraduate Behavioral Neuroscience Program) de la Universidad Northeastern en Boston, Massachusetts. Estudia los efectos de la cocaína en ratas que están por nacer. La Dra. Jackson está tratando de descubrir cómo la droga afecta la forma en que se desarrolla el cerebro.</p>

## La ciencia en el hogar

Pregúntele a su hijo cuál de los científicos del video, en su opinión, trabaja en el proyecto más interesante. Comente con su hijo todas las cosas interesantes

que hacen estos científicos. También puede hablar acerca de la gran variedad de lugares en los que trabajan. Si hay científicos en su familia, conversen sobre lo que hacen.

## ¿Qué piensa su hijo?

Ayude a su hijo a escribir una oración acerca del valor del trabajo de los científicos. Trate de incluir algo nuevo que haya aprendido acerca de los científicos.

## Recursos adicionales

National Institute on Drug Abuse (NIDA) — [www.drugabuse.gov](http://www.drugabuse.gov)  
301-443-1124

Este sitio Web tiene información acerca del abuso de drogas y una sección destinada específicamente a padres, maestros y estudiantes.

National Clearinghouse for Alcohol and Drug Information (NCADI) —  
[store.samhsa.gov](http://store.samhsa.gov)  
1-800-729-6686

El NCADI es el recurso mundial más grande para información y materiales relacionados con el abuso de sustancias. Aquí se pueden obtener muchas publicaciones gratuitas.

The Why? Files — <http://whyfiles.org>

Explicaciones de fenómenos científicos reportados en los medios de comunicación.

Tiner, J. *100 Scientists Who Shaped World History*. San Mateo, CA: Bluewood Books, 2000. Este libro habla de los grandes hombres y mujeres de ciencia que contribuyeron de modo significativo a nuestra comprensión del mundo físico que nos rodea.

Kramer, S. *How to Think Like a Scientist: Answering Questions by the Scientific Method*. New York, NY: HarperCollins Children's Books, 1987. Este libro

muestra cómo los científicos usan las preguntas para aprender sobre las cosas. Enseña cómo el método científico puede ayudar a encontrar respuestas a muchas de las preguntas que se hacen las personas.

Kramer, S. *Hidden Worlds: Looking through a Scientist's Microscope (Scientists in the Field)*. Boston, MA: Houghton Mifflin Co., 2003. Este libro muestra cómo los científicos estudian el mundo e incluye muchas imágenes de la vida cotidiana de un científico.

[Parent Newsletter \(Español, PDF, 243KB\)](#)

# Your Amazing Brain (Module 3)

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You can also download this entire module in PDF format by clicking the following link: [Module 3 \(PDF, 2.8MB\)](#)

## Introduction

During the first two modules of the Brain Power! Program, students learned about scientists, the work they do, and the steps they use to solve problems. Now, students will focus on the one subject that all the scientists showcased in Module 2 have in common—the brain. During this mission, students discover that the brain plays an important role in everything we do, from thinking to playing and feeling to breathing.

Students will be introduced to the brain by working in groups to make outlines of the body. After the outlines are completed, students will cut out pictures of the brain and paste them onto the heads of the body outlines. Then, they will find pictures in magazines showing examples of the brain's many functions. Next, students will use pictures of different facial expressions, such as happy, sad, and angry, to learn that the brain is also responsible for our emotions. Finally, students will discuss the role of the senses as a way the brain gets important information.

## Learning Objectives

- Students learn about the brain and its different functions.
- Students learn that the senses are a key way the brain receives information.
- Students discover that the brain is responsible for our ability to experience emotions.

## Relationship to the National Science Education Standards

The activities in this lesson align with two standards identified in the NSES: unifying contents and processes and the life science content standards.

#### Unifying Concepts and Processes

<b>Levels K–4</b>	<b>How Mission Is Aligned</b>
Systems, order, and organization	This mission introduces students to the idea that the brain is one system that is part of a larger system—the human body—and that both systems work together to enable people to function.

#### Life Science Standards

<b>Levels K–4</b>	<b>How Mission Is Aligned</b>
Characteristics of organisms	This mission introduces students to the concept that all organisms have basic needs. One need of humans is to have a brain to perform many key functions of living.

## Background

Although students will not be learning about specific parts of the brain, it might be useful for you to have this information available. The following section explains the four major parts of the brain in more detail. These parts are the cerebral cortex, composed of the right hemisphere and the left hemisphere; the cerebellum; the brain stem; and the limbic system. Each part controls different things.

### Cerebral Cortex: Left Hemisphere and Right Hemisphere

The cerebral cortex is the brain's largest part, making up more than 3/4 of the brain in people. It has two hemispheres. The left hemisphere, which controls the right side of the body, is largely responsible for analytical thinking, such as solving problems and comparing information needed to make decisions. It also is the brain's language center.

The right hemisphere, which controls the left side of the body, is largely responsible for artistic expression and understanding relationships in space. A bundle of fibers called the corpus callosum serves as a bridge to pass messages back and forth between the two hemispheres. The cerebral cortex controls the five senses: seeing, hearing, feeling, tasting, and smelling. The senses are a key way the brain receives information.

## **Cerebellum**

The cerebellum controls posture, movement, and the sense of balance. Such activities as playing ball, picking up objects, and balance fall under its domain.

## **Brain Stem**

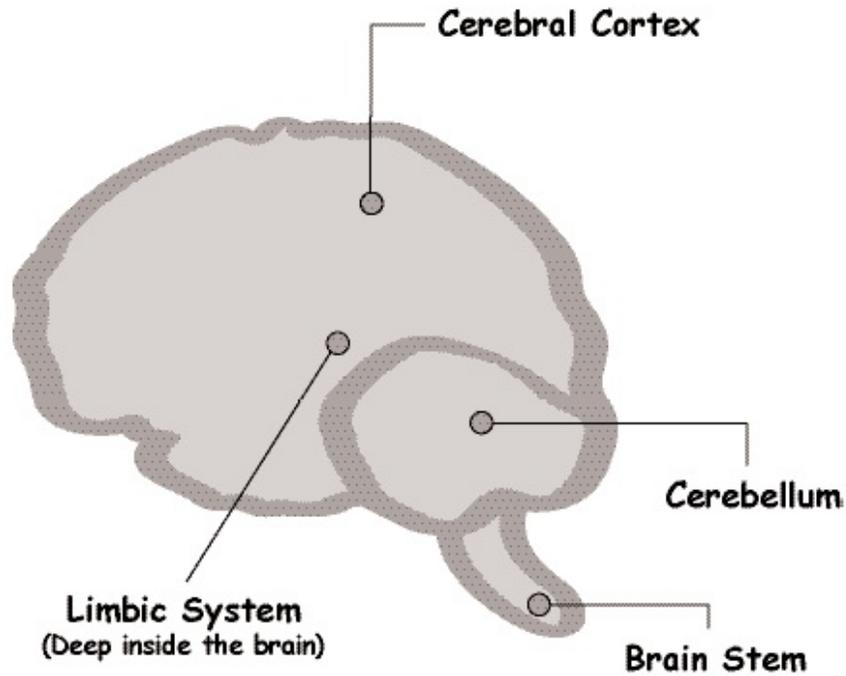
The brain stem is the lower part of the brain that connects to the spinal cord. Its two main parts are the pons and the medulla. The pons contains fibers that link the cerebral cortex with the cerebellum and the spinal cord. It also controls sleep, awakening, and dream impulses.

The medulla controls heart rate, respiration, and blood pressure. The medulla also is responsible for temperature control; simple reflexes, such as coughing and sneezing; and digestion.

## **Limbic System**

The two main parts of the limbic system are the hippocampus and the amygdala. The hippocampus is mainly responsible for learning and memory. The amygdala plays an important role in emotional behavior. All of the limbic system is greatly affected by drugs.

## Side View of Brain



Part of Brain	Function
Brain Stem	Sleeping, dreaming, coughing, sneezing, breathing, heart rate, digesting food
Limbic System	Learning new words, remembering names, crying, laughing, getting angry
Cerebral Cortex	Solving math problems, deciding on an ice cream flavor, talking, singing
Cerebellum	Sitting up straight, jumping, running, throwing a ball, dancing, walking

## Materials/Preparation

### Materials

- Videotape and VCR, or [online video](#)
- Large sheets of paper
- Pencils and markers
- Crayons
- [Outline of the brain \(PDF, 66KB\)](#)
- Magazines and other sources of pictures
- [Limbic System Trading Cards, black and white \(PDF, 2.3MB\)](#)
- Scissors
- Tape
- Paste

## Preparation

1. Preview the videotape to familiarize yourself with the activity.
2. Make enough copies of the [Outline of the brain \(PDF, 66KB\)](#) found at the back of the Teacher's Guide so that each student has his or her own copy.
3. Collect magazines, newspapers, and other sources of pictures showing examples of the different functions of the brain (sleeping, talking, playing ball, and so forth).
4. Make copies of the [black-and-white trading cards \(PDF, 2.3MB\)](#) found at the back of the Module 3 Teacher's Guide so that each student has a copy of each card.

## Procedures/Discussion Questions

### Procedures

1. Begin the lesson by telling students that they will be learning about the brain and what it does, then show the class a small clip from the videotape that

highlights Corty. Have students watch while Corty introduces himself and explains a little about the functions of the brain. Make a class list of these different functions.

2. When the video is finished, split the class into small groups. Each group will complete a body outline to work with throughout the lesson. Then, take a large piece of paper and lay it on the floor. Have one child from each group lay on a piece of paper while either parent volunteers, instructional assistants, or the other children begin making outlines of the students by tracing the body.
3. When the groups have completed their body outlines, pass out the outlines of the brain. Tell them to cut it out and color it in. Then, have them put the brain outlines aside until their body outlines have been done. Students can begin looking through magazines for pictures illustrating the brain's different activities.
4. When all the body outlines have been done and decorated, and all the brain outlines cut out, work with the other adults to tape the outlines around the room. Then, ask the students where they should put the outline of the brain. Most will know to put it in the head of the body outlines. Tell them to tape the brain outline where it belongs.
5. Have a brief discussion with students about what the brain does. Remind students that the brain is responsible for many activities, including thinking, talking, running, jumping, breathing, digesting food, and experiencing emotions. Give students a few minutes to look for pictures in magazines illustrating these different activities.
6. After the groups have found several pictures, have the students cut them out and paste them on their body outlines. Students can then draw a line from their brain to the picture, indicating that the brain plays a role in the activity shown.
7. Show students the pictures of the different faces illustrating different emotions, which are found on the Limbic System Trading Card. Ask students what these pictures tell them. Help students recognize that the images show emotions, which the brain is also in charge of.
8. On a separate piece of paper, ask the students to draw a face showing how they feel right now. Have them paste the face onto their body outlines. Tell

students that every day, they will have a few minutes to look at their face and either keep it or change it to reflect their feelings that day. In this way, students will come to see that emotions change all the time and are an important element of who we are as individuals. Keep the body outlines for the Module 5 activity.

9. The students have just completed the third mission of the NIDA Brain Power! Program.

## Discussion Questions

1. Ask students to name the most surprising thing they learned about the brain during the lesson. Did most students name the same thing or was there a wide range of ideas? Overall, were students surprised about everything the brain can do?
2. Discuss with students what happens each day to cause their emotions to change. For example, if they have candy in their lunchboxes, they will probably be happy. But if a friend ignores them at recess, they will probably feel sad. Make a list of the different emotions students experience each day. How many emotions were on the list? Were students surprised at the number?
3. Focus on the senses of taste and smell. Ask students why they are important. Discuss how they work together to give us important information.

## Extensions

The activities listed below provide a link to other areas in the curriculum.

1. Write a class play about the brain. The class can focus on several functions of the brain or zero in on one or two. Students can then perform the play for other classes in the school.
2. Make a class bar graph illustrating how many emotions students experience each day. Have the x-axis represent different emotions and the y-axis represent the number of students. Each bar can represent just 1 day or the

average of a week's emotions. Or you can make different graphs for each day, and then compare them at the end of the week.

3. Have students make a booklet focusing on the senses. Tell them to create one page for each sense. The page can include only drawings or a drawing and a sentence about what the sense does. If students would like to include writing and need help, make sure an adult is available to work with them.

## Assessment

As students work on the activities in the module, look for the following:

- Have students grasped the concept that the brain is responsible for a wide range of activities?
- Are students beginning to understand the relationship between the senses and the brain?
- Were students able to complete the body outline with the accompanying pictures?
- Were students able to express their feelings and show their “face” accordingly?
- Did students participate in class discussions?

## 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 and a section designed specifically for parents, teachers, and students.
- NIDA DrugPubs Research Dissemination Center

[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov) , 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228)

Order our materials free of charge in English or Spanish.

- National Clearinghouse for Alcohol and Drug Information (NCADI)  
[store.samhsa.gov/home](http://store.samhsa.gov/home), 1-800-729-6686  
NCADI is operated by the Substance Abuse and Mental Health Services Administration (SAMHSA). Many free publications are available here.
- Eisenhower National Clearinghouse (ENC)  
[www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education](http://www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education)  
This Web site provides useful information and products to improve mathematics and science teaching and learning.
- Woolsey, T., Hanaway, J., and Gado, M. *The Brain Atlas: A Visual Guide to the Human Central Nervous System*. Bronxville, NY: Fitzgerald Science, 2002.  
This book is a comprehensive and accurate atlas of the brain. It includes nearly 400 images of the brain and its pathways.

## Resources for Students

- Neuroscience for Kids  
[faculty.washington.edu/chudler/neurok.html](http://faculty.washington.edu/chudler/neurok.html)  
This Web site contains information on the brain and neurotransmission, activities, experiments, pictures, and other resources for students and educators.
- Rowan, P. *Big Head! A Book About Your Brain and Your Head*. New York, NY: Alfred A. Knopf, 1998.  
This book gives an overview of the different parts of the brain and contains detailed color pictures and transparencies.
- Treays, R. *Understanding Your Brain (Science for Beginners Series)*. Newton, MA: EDC Publications, 1996.  
This book describes the parts of the brain and their functions.

## Introductory Story for Module 3

The kids are all sitting around the club house when Corty appears. "Hi, kids! It's time to get your brains in gear. I want you to find out how your body knows how to think and move and breathe, and what kind of mood you are in."

"Wow, that's a hard one," Juan says.

Beth chimes in, "Well, our bodies must get information from somewhere. But where do they get the message that tells them what to do and how to feel?"

The kids are stumped, so Corty comes to the rescue. "Here are some hints:

I live in your head, but I'm not your eyes,  
Though without me, you couldn't see.  
I'm not your nose, but without me, you couldn't breathe.  
And I'm not your mouth, but without me, you couldn't speak."

"I know! You're a brain!" exclaims Julia.

"And it's our brain that tells our bodies what to do!" says Beth.

Corty gives a wink and disappears.

"Now, we need to use our own brains to figure out what kinds of things our brains tell our bodies to do," says Juan.

Beth says, "I have an idea. But we need a big piece of paper, some scissors, crayons, paste, magazines, and . . . Max!"

Max lies down on the floor, and Beth traces the outline of his body. Julia and Juan cut pictures out of magazines. When Beth is finished, Max gets up and

Beth draws a brain in the head of Max's body outline.

"Now, what kinds of pictures do you have showing what our brains tell us to do?" asks Beth.

Julia gives Beth a picture of someone sleeping, and Beth puts it near the brain on the outline. "Our brains tell us when to sleep," says Julia.

Max gives Beth a picture of a math problem and says, "Our brains help us think and solve problems."

Juan gives Beth a picture of a soccer player and says, "Our brains tell us how and when to kick and run, so we can play soccer."

Julia hands Beth a picture of people at a birthday party and says, "Our brains tell us when we're happy—or sad."

Max hands Beth a picture of someone eating and says, "And they tell us when we're hungry and what we want to eat."

Beth says, "Wow, our brains are pretty busy and very important. Without them, we wouldn't be alive because our brains tell our lungs when to breathe and our hearts when to beat."

"And that's why we have to keep our brains healthy," says Juan.

"How do we do that?" asks Max.

"That's our next mission, so stay tuned," says Beth.

## **Brain Power News**

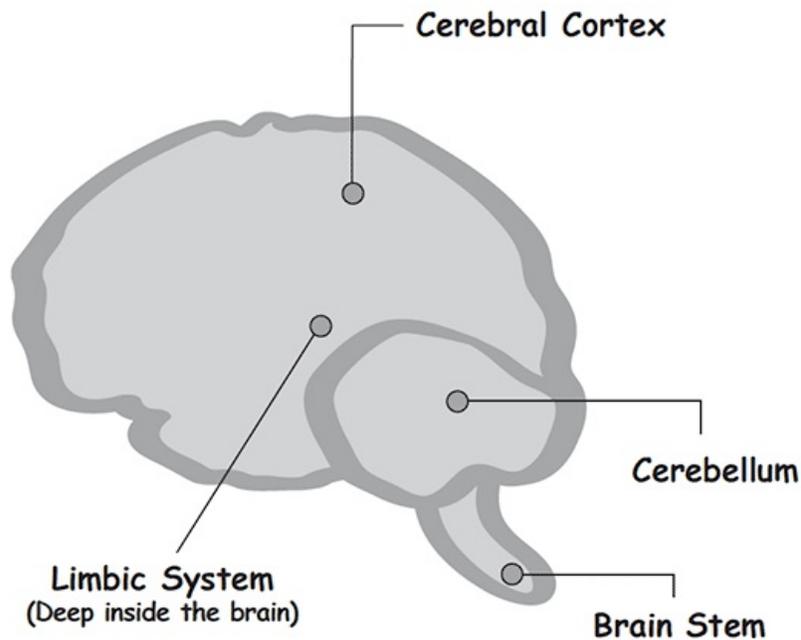
*Parent Newsletter*

## All About the Brain

During Module 3, students learned about the brain and all it can do. They discovered that not only does the brain help them think, but it also is responsible for just about everything else—regulating heartbeat and breathing, moving and playing, controlling emotions, and expressing themselves through words or pictures. Learning about all the essential functions of the brain sets the stage for teaching children about the importance of taking care of the brain and protecting it from harm.

Although students will not be learning the technical names of the different parts of the brain, these terms are provided here if your child is interested, or you would like to introduce him or her to these terms.

### Side View of Brain



<b>Part of the Brain</b>	<b>Function</b>
Brain Stem	Sleeping, dreaming, coughing, sneezing, breathing, heart rate, digesting food
Limbic System	Learning new words, remembering names, crying, laughing, getting angry
Cerebral Cortex	Solving math problems, deciding on an ice cream flavor, talking, singing
Cerebellum	Sitting up straight, jumping, running, throwing a ball, dancing, walking

This module aligns with the standards “unifying concepts and processes” and “life science standards” from the National Science Education Standards. The activity helps students understand that the human body is a complex system. The brain is an integral part of this system.

### **Science at Home**

Keep a log of your daily activities at home on a typical day. Next to each activity, write which part or parts of the brain enable you to do everything you need to do. Discuss what an amazing organ the brain is.

### **What Does Your Child Think?**

Ask your child to draw a picture of the brain, and then have him or her fill the brain with pictures of all its numerous functions.

### **Additional Resources**

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. Publications and other materials are available free of charge.

National Clearinghouse for Alcohol and Drug Information (NCADI) —

[store.samhsa.gov](http://store.samhsa.gov)

1-800-729-6686

NCADI is the world's largest resource for information and materials concerning substance abuse. Many free publications are available here.

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

This Web site contains information on the brain, activities, experiments, pictures, and other resources for students and educators.

Rowan, P. *Big Head! A Book About Your Brain and Your Head*. New York, NY: Alfred A.Knopf, 1998. This book gives an overview of the different parts of the brain and contains detailed color pictures and transparencies.

Treays, R. *Understanding Your Brain (Science for Beginners Series)*. Newton, MA: EDC Publications, 1996. This book describes the parts of the brain and their functions.

[Parent Newsletter \(PDF, 179KB\)](#)

## Brain Power News (Español)

### Noticias Sobre El Poder Del Cerebro

*Boletín Informativo Para Padres*

*Volumen 1, Número 3*

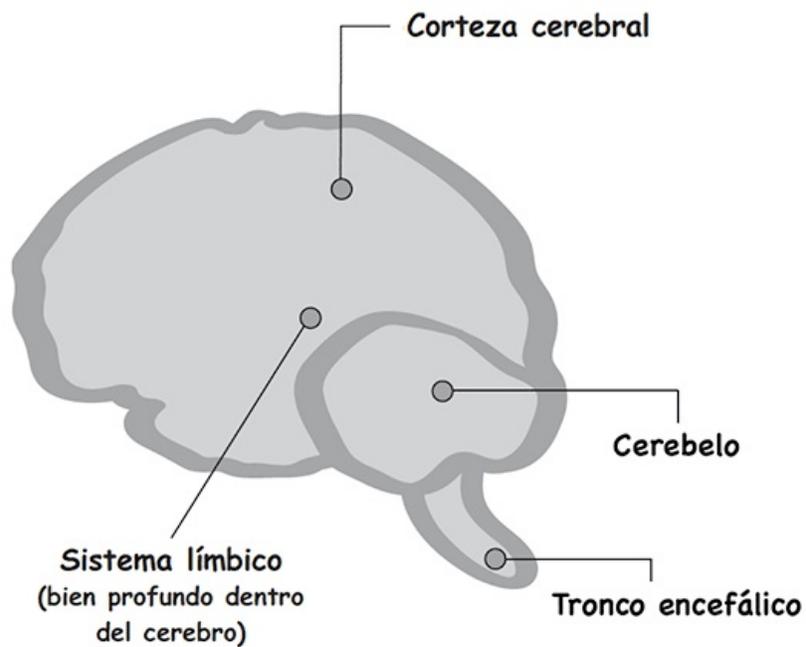
### Todo lo relacionado al cerebro

En el módulo 3, los estudiantes aprendieron sobre el cerebro y todo lo que puede hacer. Descubrieron que no solamente los ayuda a pensar, sino que

también es responsable de casi todo lo demás: regula los latidos del corazón y la respiración, el movimiento y el juego, el control de las emociones y la comunicación a través de palabras o dibujos. El aprendizaje de las funciones esenciales del cerebro crea las condiciones para enseñar a los niños la importancia de cuidar el cerebro y protegerlo del daño.

Aunque los estudiantes no van a aprender los nombres técnicos de las diferentes partes del cerebro, estos términos se ofrecen a continuación en caso de que a su hijo le interesen o usted se los quiera enseñar.

### Vista lateral del cerebro



<b>Part of the Brain</b>	<b>Function</b>
Tronco encefálico	Dormir, soñar, toser, estornudar, respirar, regular la frecuencia cardiaca, digerir alimentos
Sistema límbico	Aprender palabras nuevas, recordar nombres, llorar, reír, enojarse
Corteza cerebral	Resolver problemas matemáticos, decidir el sabor de un helado, hablar, cantar
Cerebelo	Sentarse derecho, saltar, correr, lanzar una pelota, bailar, caminar

Este módulo se ajusta a los estándares de "la unificación de conceptos y procedimientos" y "los estándares de las ciencias biológicas" de los Estándares Nacionales de Educación Científica (National Science Education Standards). Esta actividad ayuda a los estudiantes a comprender que el cuerpo humano es un sistema complejo y que el cerebro es una parte integral de este sistema.

## **La ciencia en el hogar**

Mantenga un registro de sus actividades diarias en el hogar durante un día típico. Al lado de cada actividad, escriba qué parte o partes del cerebro le permiten hacer todo lo que necesita hacer. Comente sobre lo asombroso que es el cerebro.

### **¿Qué piensa su hijo?**

Pida a su hijo que dibuje el cerebro y que luego en su dibujo represente, con más dibujos, todas las numerosas funciones del cerebro.

## **Recursos adicionales**

National Institute on Drug Abuse (NIDA)—[www.drugabuse.gov](http://www.drugabuse.gov)

301-443-1124

Este sitio Web contiene información acerca del abuso de drogas y una sección destinada específicamente a padres, maestros y estudiantes.

National Clearinghouse for Alcohol and Drug Information (NCADI)

—[store.samhsa.gov](http://store.samhsa.gov)

1-800-729-6686

EINCAI es el recurso mundial más grande para información y materiales relacionados con el abuso de sustancias. Aquí se pueden obtener muchas publicaciones gratuitas.

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

Este sitio Web contiene información sobre el cerebro, actividades, experimentos, imágenes y otros recursos para estudiantes y educadores.

Rowan, P. *Big Head! A Book about Your Brain and Your Head*. New York, NY: Alfred A. Knopf, 1998. Este libro ofrece un compendio de las diferentes partes del cerebro y contiene transparencias y dibujos a color en detalle.

Treays, R. *Understanding Your Brain (Science for Beginners Series)*. Newton, MA: EDC Publications, 1996. Este libro describe las partes del cerebro y sus funciones.

[Parent Newsletter \(Español, 190KB\)](#)

# Keeping Your Brain Healthy (Module 4)

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You can also download this entire module in PDF format by clicking the following link: [Module 4 \(PDF, 1.8MB\)](#)

## Introduction

Students learned about the brain and all the amazing things it can do during the previous mission. In this lesson, students focus on what they can do to keep their brains healthy. Through brainstorming and discussion, students discover what habits they can put into practice to protect their brains.

## Learning Objectives

- Students learn how they can keep their brain healthy.
- Students work on establishing healthy habits.

## Relationship to the National Science Education Standards

This mission aligns with two standards identified in the NSES: unifying concepts and processes and science in personal and social perspectives.

### Unifying Concepts and Processes

Levels K–4	How Mission Is Aligned
Systems, order, and organization	This mission introduces students to the idea that the brain is one system that is part of a larger system—the human body—and that both systems work together to enable people to function.

Levels K–4	How Mission Is Aligned
Personal health	This mission reinforces the concept that following good health practices, such as eating properly, exercising, and getting enough sleep, are ways to keep your brain as well as your body healthy.

## Background

The primary grades are an excellent time to introduce students to ways of keeping their bodies strong and healthy. At this age, children are almost ready to take responsibility for their health and can understand the importance of eating three meals a day, eating nutritious foods, getting exercise each day, getting enough sleep each night, and wearing helmets and other protective gear when biking, riding a scooter, and roller-blading. What students may not yet be aware of is how these practices work to protect their brain as well as their body. For example, eating healthy foods provides fuel so children can concentrate at school and think more clearly. Exercising gives people a fit body, as well as releases brain chemicals that make people feel good. Finally, wearing a helmet while biking and doing other sports protects our precious brain.

During today’s mission, students will compile a class list of healthy habits and then keep track of what they actually do during the course of a week. By the end of the mission, students will have an understanding of what they need to do to improve their habits to keep both their bodies and brains healthy and fit.

The American Academy of Pediatrics has established guidelines for how much sleep growing children need each night, what is considered a healthy diet, and how much exercise children should get each day. Recommendations for children 5 to 7 years of age are:

- 9 to 10 hours of sleep each night.

- At least 30 minutes of physical activity each day.
- About 1,500 calories (this varies with the age and weight of the child) each day of foods from each of the food groups:
  - 25 percent of total calories from proteins;
  - 30 percent from fat, primarily mono- and poly-unsaturated fats; and
  - 45 percent from carbohydrates, with emphasis on whole-grain foods, fruits, and vegetables.

## Materials/Preparation

### Materials

- Newsprint
- Markers
- Videotape and VCR, or [online video](#)
- [Class Chart \(PDF, 72KB\)](#)

### Preparation

1. Preview the videotape and lesson before doing this activity. Make any necessary adjustments according to the needs and interests of your students.
2. Develop a [class chart \(PDF, 72KB\)](#) to use throughout the activity.
3. Make copies of the [black-and-white trading cards \(PDF, 385KB\)](#) found at the back of the Module 4 Teacher's Guide so that each student has a copy of each card.

## Procedures/Discussion Questions

## Procedures

1. Begin the mission by asking students what practices people should adopt to stay healthy. Suggest that students focus on activities they think have something to do with the brain. Look for ideas like the following:
  - a. Eat 3 meals a day. Make sure you eat food from each of the food groups at every meal.
  - b. Exercise at least 30 minutes each day.
  - c. Get 9-10 hours of sleep each night.
  - d. Always wear a helmet when you ride your bike or scooter. When you go roller-blading, wear knee pads and wrist pads, along with a helmet.
  - e. Never smoke cigarettes.
2. Make sure the class list includes the items above. Other items students may mention that are important but have less to do with the brain include the following:
  - a. Brush your teeth at least twice a day.
  - b. Take a shower or bath at least 3 days a week.
3. Show the students the Module 4 video. Have them watch while Corty explains the ways to keep your brain healthy.
4. Make a class chart of healthy habits like the sample shown at the back of this Teacher's Guide. The sheet includes such items as eating three meals a day, eating healthy foods, getting enough sleep each night, and getting some exercise each day. Each day over the course of a week, ask students how many engaged in healthy activities. Make tally marks in each category. Encourage students to notice trends in behavior. For example, did more students get enough sleep at the end of the week than at the beginning? Were more students eating healthy foods?
5. At the end of the week, make graphs in the following categories: Diet, Sleep, Exercise, and Safety. On the vertical axis, list the number of students. On the horizontal axis, list Day 1, Day 2, through to Day 7. Make a graph in each

category of the number of students who engaged in healthy activities. What conclusions can students draw from the results shown on the graph?

6. Congratulate the students. They have completed the fourth mission of the NIDA Brain Power! Program.

## Discussion Questions

1. What trends did students observe by the end of the week? Were students engaging in more healthy activities in every category? Almost every category? In what areas did students improve the most? In what areas do students still need to work to develop more healthy habits?
2. Discuss how engaging in healthy habits specifically helps the brain. For example, how does good nutrition help the brain? What about sleep and exercise?

## Extensions

The activities listed below provide links to other areas in the curriculum.

1. Draw pictures of different foods in each category and try to think of interesting foods. For example, for the fruit group, draw mango and kiwi. For the bread, cereal, rice, and pasta group, consider putting in barley, couscous, and bagels.
2. Encourage each student to work with an adult at home to develop a health log for 1 week. The log should include specific information about what the student eats each day, what he or she does for exercise, and what time he or she goes to sleep at night and wakes up each morning. At the end of the week, have each student bring his/her health log in and share it with the class. How are the logs different? How are they similar? What can students learn from reading the logs?
3. Bring in food labels from several common foods, such as cereal, crackers, cookies, and juice. As a class, discuss what information they include. What can students learn about the ingredients in the food? What can they learn

about the nutrients the food contains?

4. Bring in a map and have each student point out where the food is from and why it is commonly eaten in that part of the world. If possible, have an international food festival, with students and their parents bringing in foods that students researched and discussed.
5. Have each child learn about a particular dance or exercise he or she can share with the class. Each of the students can teach the rest of the class one move from the dance or exercise. They can do this at home for more exercise.

## Assessment

As students work on the activities in the module, look for the following:

- Do students understand why it is important to engage in healthy habits?
- Do students understand how the habits help the brain stay healthy?
- Were students able to work with their classmates to develop the class graphs?
- Were students able to interpret the graphs?
- Did students participate in class discussions?

## 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 and a section designed specifically for parents, teachers, and students.

- NIDA DrugPubs Research Dissemination Center  
[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov) , 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228)  
Order our materials free of charge in English or Spanish.
- National Clearinghouse for Alcohol and Drug Information (NCADI)  
[store.samhsa.gov/home](http://store.samhsa.gov/home), 1-800-729-6686  
NCADI is operated by the Substance Abuse and Mental Health Services Administration (SAMHSA). Many free publications are available here.
- Eisenhower National Clearinghouse (ENC)  
[www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education](http://www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education)  
This Web site provides useful information and products to improve mathematics and science teaching and learning.

## Resources for Students

- Maas, J. *Remmy and the Brain Train: Traveling Through the Land of Good Sleep*. Blue Ridge Summit, PA: Maas Presentations, LLC, 2001.  
This is a story for young children that explains the importance of getting a good night's sleep each night.
- McGinty, A. *Staying Healthy: Sleep and Rest (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999.  
This book, written for young children, is a comprehensive overview of the importance of sleep.
- McGinty, A. *Staying Healthy: Eating Right (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999.  
This book, written for young children, is a comprehensive overview of the importance of eating right.
- Albee, S. *Watch Out for Banana Peels and Other Sesame Street Safety Tips*. New York, NY: Random House Children's Books, 2000.  
In this fun book, Officer Grover and Safety Deputy Elmo share important safety tips.

## Introductory Story for Module 4

The kids are getting ready to go bike riding. They are strapping on their helmets and other safety gear.

Beth asks, "Max, where's your helmet and safety gear?"

"I'm a good bike rider. I'm not going to fall," Max explains.

Juan responds, "Well, we're all good riders, but sometimes things happen that you don't expect. And you don't want to hit the pavement without protective gear. You could really get hurt."

Corty appears. "No one is going bike riding without safety gear. And anyway, I've got a mission for you. I want you to find five ways to keep your brain healthy. And I'll give you a hint: Wearing a helmet is number one."

Juan says, "Great, now we can go bike riding!"

"Better think about that, Juan! Bike riding is a clue to one of the other ways to keep your brain healthy," says Beth.

"Could another one be exercise? Does exercise help your brain?" asks Beth.

"We already learned that our brains are part of our bodies—right in our heads—so maybe it does," replies Julia.

"Okay. So protecting our heads is one way to keep our brains healthy. And the second way is exercise," says Beth.

"All this thinking is making me tired," sighs Max.

Beth says, "Maybe you didn't get enough sleep last night."

Juan jumps in, "That's it! The third way to keep your brain healthy is to make sure you get enough sleep! Okay, so two more."

"Let's figure this out later. I'm hungry," complains Max.

"My mom says that eating right is a good way to stay healthy," says Julia.

Beth says, "That's it, Julia! That's the fourth way to keep your brain healthy."

Julia confirms, "Protect your head, exercise, get enough sleep, and eat right."

"But what's number five?" asks Juan.

"What about brushing your teeth or taking baths? My mom says that's good for me," says Julia.

"You're right, Julia. They're both good things for you, but they don't help your brain.

What is the fifth way?" asks Beth.

Corty suddenly appears. "The fifth way to keep your brain healthy is something you may not know much about yet: Don't do things like smoking or drinking alcohol. Has anyone told you about that?"

Beth says, "My mom says smoking is bad."

"And my dad says kids shouldn't drink alcohol. But I didn't know it could hurt your brain," says Juan.

Corty replies, "Well, it sure can. And we're going to find out more about that next time!"

# Brain Power News

*Parent Newsletter*  
*Volume 1, Number 4*

## Taking Care of Your Brain

In Module 4, your child learned about basic health practices. He or she learned that:

- Children should get 9 to 10 hours of sleep each night.
- Children should participate in at least 30 minutes of physical activity each day.
- Children should eat about 1,500 calories each day of foods from each of the food groups.

What your child may not have realized, however, is that following these basic rules is also a good way to keep the brain healthy. An important addition to this list is always wearing helmets while bike riding or roller-blading.

Try to reinforce these healthy habits at home. Discuss with your child why they are so important, and encourage your child to take responsibility for his or her body and brain.

This activity aligns with the standards “unifying concepts and processes” and “science in personal and social perspectives” from the National Science Education Standards, which reinforce the importance of following common health practices.

### Science at Home

With your child, go over his or her routine, including diet, exercise, and sleep. Discuss what you can do to make improvements, and then try to implement at

least one of those suggestions. Some suggestions for healthy changes are:

- Having fruit for a snack instead of chips;
- Going outside and riding a bike or playing with friends, instead of sitting in front of the television; and
- Going to bed at a specific time each night.

After your child improves one habit, try to help him or her improve another one.

## What Does Your Child Think?

Suggest that your child draw a picture of two healthy things he or she does each day. The picture could show your child riding a bike with a helmet and eating a healthy snack.

## Additional Resources

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. Publications and other materials are available free of charge.

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McGinty, A. *Staying Healthy: Sleep and Rest (The Library of Healthy Living)*.

New York, NY: Franklin Watts, Incorporated, 1999. This book, written for young children, is a comprehensive overview of the importance of sleep.

McGinty, A. *Staying Healthy: Eating Right (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999. This book, written for young children, is a comprehensive overview of the importance of eating right.

[Parent Newsletter \(PDF, 218KB\)](#)

## Brain Power News (Español)

### Noticias Sobre El Poder Del Cerebro

*Boletín Informativo Para Padres  
Volumen 1, Número 4*

#### El cuidado del cerebro

En el módulo 4, su hijo aprendió sobre prácticas de salud básicas. Aprendió que:

- Los niños deben dormir entre 9 y 10 horas por noche.
- Los niños deben realizar por lo menos 30 minutos de actividad física por día.
- Los niños deben ingerir aproximadamente 1.500 calorías por día de alimentos provenientes de cada uno de los grupos alimenticios.

Sin embargo, es posible que su hijo no se haya dado cuenta de que cumplir con estas reglas básicas también es una buena manera de mantener saludable al cerebro. Una adición importante a esta lista es usar siempre un casco al andar en bicicleta o patinar.

Trate de reforzar estos hábitos saludables en el hogar. Platique con su hijo

acerca de la razón por la cual son tan importantes y aliéntelo a ser responsable de su cuerpo y su cerebro.

Esta actividad se ajusta a los estándares de “la unificación de conceptos y procedimientos” y de “la ciencia desde la perspectiva personal y social” de los Estándares Nacionales de Educación Científica (National Science Education Standards), que refuerzan la importancia de seguir las prácticas de salud comunes.

## **La ciencia en el hogar**

Repase con su hijo su rutina diaria incluyendo, la dieta, los ejercicios y el sueño. Comente lo que se puede hacer para mejorarla, y luego trate de poner en práctica por lo menos una de esas sugerencias. Algunas sugerencias para cambios saludables son:

- Comer frutas en vez de papas fritas como refrigerio;
- Salir a andar en bicicleta o jugar con los amigos, en lugar de sentarse frente al televisor; y
- Recostarse a dormir a la misma hora todas las noches.

Una vez que su hijo haya mejorado un hábito, trate de ayudarlo a mejorar otro.

## **¿Qué piensa su hijo?**

Sugíerale a su hijo que dibuje dos cosas saludables que haga todos los días. Un dibujo podría mostrar a su hijo andando en bicicleta con un casco y otro comiendo un refrigerio saludable.

## **Recursos adicionales**

National Institute on Drug Abuse (NIDA) — [www.drugabuse.gov](http://www.drugabuse.gov)

301-443-1124

Este sitio Web contiene información acerca del abuso de drogas y una sección

destinada específicamente a padres, maestros y estudiantes.

National Clearinghouse for Alcohol and Drug Information (NCADI) —  
[store.samhsa.gov](http://store.samhsa.gov)  
1-800-729-6686

El NCADI es el recurso mundial más grande para información y materiales relacionados con el abuso de sustancias. Aquí se pueden obtener muchas publicaciones gratuitas.

Albee, S. *Watch Out for Banana Peels and Other Sesame Street Safety Tips*. New York, NY: Random House Children's Books, 2000. En este libro divertido, el Oficial Grover y el Jefe de Seguridad Elmo comparten consejos importantes de seguridad.

McGinty, A. *Staying Healthy: Sleep and Rest (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999. Este libro, escrito para niños pequeños, es un compendio integral sobre la importancia del sueño.

McGinty, A. *Staying Healthy: Eating Right (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999. Este libro, escrito para niños pequeños, es un compendio integral sobre la importancia de comer bien.

[Parent Newsletter \(Español, PDF, 229KB\)](#)

# Protecting Your Brain (Module 5)

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You can also download this entire module in PDF format by clicking the following link: [Module 5 \(PDF, 1.5MB\)](#)

## Introduction

During the previous mission, students discussed specific things they can do to keep their body and brain healthy. This final mission in the program continues with that theme but with a slightly different focus. This mission discusses the differences between helpful medicines, such as Tylenol, aspirin, and antibiotics, and harmful drugs, such as alcohol and nicotine. Many adults consume alcohol daily, and, while this is not a problem, it can pose negative effects if not used in moderation. Children should never drink alcohol. Nicotine is found in tobacco and is very addictive. Tobacco products are also illegal for children. Students will learn about the effects these substances have on the body and the brain.

They will also learn important information about the use of helpful medicines, such as who should administer the medications, when they should be taken, and how much should be given. By the end of the module, students will have some understanding of the potency of medications and the importance of taking them properly.

Also included in this module is information about cocaine and marijuana. If you think your students are ready, you can introduce the topic of illegal drugs to them and discuss their effects on the brain and why they are harmful.

## Learning Objectives

- Students learn about the differences between helpful medicines and harmful drugs.

- Students learn about the effects that both medicines and drugs have on the brain and the body.
- Students learn about the importance of taking helpful medicines carefully, under the right circumstances, and with adult supervision.

## Relationship to the National Science Education Standards

The activities in this lesson align with two standards identified in the NSES: unifying concepts and processes and science in personal and social perspectives.

### Unifying Concepts and Processes

Levels K–4	How Mission Is Aligned
Systems, order, and organization	This mission reinforces the idea that the brain is one system that is part of a larger system—the human body—and that both systems work together to enable people to function.

### Science in Personal and Social Perspectives

Levels K–4	How Mission Is Aligned
Personal health	This mission introduces students to the differences between helpful medicines and harmful substances. The lesson stresses the importance of taking helpful medicines with care.

## Background

This module serves as an introduction to the concept of helpful medicines and harmful drugs. In this module, the helpful medicines discussed are acetylsalicylic acid (aspirin), acetaminophen (Tylenol), fluoride, immunizations,

and antibiotics. These substances either cure illnesses or prevent problems from occurring. Nonetheless, even these substances must be used with care. In this module, students will learn that they 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. They will also learn that it is important to follow the dosage prescribed by the healthcare provider. Taking too much medicine or not enough can be dangerous.

The harmful drugs discussed in this module are nicotine and alcohol. Students will learn that, when used in excess, these substances can cause such problems as impaired concentration, slow reflexes, impaired reaction time, poor coordination, and drowsiness (alcohol), as well as a reduction of appetite, nausea, and vomiting (nicotine).

The following list gives information about the substances studied in the module. Students will learn more about alcohol and illegal drugs in the Brain Power! Program for second- and third-grade students. If you feel that students are ready to learn about these other substances now, feel free to do so. Information about these illegal substances is included on the next page.

## **Aspirin or Tylenol**

### **Other Terms:**

Aspirin is also known as acetylsalicylic acid; Tylenol is made from acetaminophen

### **How It Is Used:**

Taken orally in a liquid, pill, or gum form

### **Effects on the Body:**

Both aspirin and Tylenol reduce fever and ease aches and pains; aspirin can decrease the risk of heart attacks

### **How It Works:**

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 chemicals in the body

## **Fluoride**

Other Terms:

Sodium fluoride

How It Is Used:

Available as tablets, drops, rinses, gels, and paste

Effects on the Body:

Prevents cavities and can also treat osteoporosis

How it works:

Hardens the enamel on teeth and reduces the harmful effects of plaque; causes an increase in bone mineral density

## **Immunizations**

Other Terms:

Vaccinations, inoculations

How It Is Used:

Injected or taken orally

Effects on the Body:

Boosts the body's resistance to specific diseases

How it works:

Causes the body to produce antibodies to fight diseases

## **Antibiotics**

Other Terms:

Penicillin, cephalosporins, tetracycline

How It Is Used:

Taken orally as a pill or liquid, or injected

Effects on the Body:

Fights diseases caused by bacteria

How it works:

Antibiotics kill bacteria by preventing them from constructing cell walls; the bacteria can't reproduce, and they die out

## **Alcohol**

### Other Terms:

Ethyl alcohol or ethanol, beer, wine, and liquor

### How It Is Used:

Consumed by drinking

### Effects on the Body:

Impairs concentration, slows reflexes, impairs reaction time, reduces coordination, and causes drowsiness when used in excess

### How it works:

Depresses the central nervous system and can kill brain cells when used in excess

## **Nicotine**

### Other Terms:

Nicotine is found in cigarettes, cigars, and smokeless tobacco

### How It Is Used:

Smoked or chewed

### Effects on the Body:

Reduces appetite and can cause nausea and vomiting; increases alertness

### How it works:

Acts as a stimulant, speeding up the heart and raising blood pressure

## **Illegal Drugs (Marijuana, Cocaine, and Crack)**

### Other Terms:

Marijuana is referred to as grass, pot, reefer, and weed; cocaine is also called coke, snow, or blow; crack is a form of cocaine also called rock, rox, or base

### How It Is Used:

Marijuana is usually smoked but can be baked into brownies or cookies or brewed like tea; cocaine can be snorted; crack can be smoked

### Effects on the Body:

Marijuana impairs memory, concentration, perception, and movement; cocaine stimulates the brain and spinal cord causing dizziness,

headache, anxiety, insomnia, and depression when the person stops using the drug

How it works:

Marijuana acts on parts of the brain that control thinking, pain, and memory; cocaine effects the reward center of the brain disrupting the normal action of dopamine which is associated with feelings of pleasure

## Facts About Cocaine

Cocaine affects the brain and the body in many ways. It makes a person's heart beat faster and blood pressure rise. It can change the way someone feels and acts, making it harder to make wise decisions. Cocaine is a very addictive drug; when people use it, they find it really hard to stop.

## Facts About Marijuana

Marijuana can make it harder for the brain to function properly. For example, marijuana can cause people to forget important information and lose the ability to think clearly and solve problems. Marijuana also can have negative effects on people's health. Inhaling marijuana may increase the risk of harming the lungs and developing lung cancer. Finally, marijuana is an addictive drug that changes the way the brain functions.

# Materials/Preparation

## Materials

- Videotape and VCR, or [online video](#)
- Newsprint and markers
- [Trading Cards \(PDF, 370KB\)](#)
- Large piece of paper

## Preparation

1. Preview the videotape and lesson. Divide the class into small groups.
2. Make copies of the [black-and-white trading cards \(PDF, 370KB\)](#) found at the back of the Module 5 Teacher's Guide so that each student, or group, has a copy of each card.

## Procedures/Discussion Questions

### Procedures

1. Split the children into groups. Hand out one copy of each trading card to each group. Without discussing the cards first, ask students to group the cards as described below. You may want to write the different groupings on a large piece of paper and hang it in the room. Tell students to record their groupings by writing down the names of the medicines or drugs.
  - a. Have the students put the cards into two piles. One pile will be helpful medicines, and the other will be harmful drugs.
  - b. Have the students group substances by how they are taken. Have one group be "Substance Taken by the Child Alone," and the other group be "Substance Given by an Adult." If a card doesn't fit into either category, put it aside.
  - c. Have the students group substances by amount taken. Have one group be "Must Take Only a Certain Amount of the Substance," and the second group be "Never Take." If a card doesn't fit into either category, put it aside.
  - d. Have the students group substances by when they are taken. Have one group be "Only Take at Certain Times," and the second group be "Never Take." If a card doesn't fit into either category, put it aside.
2. Give students about 10 minutes to group the cards in the categories requested, and then discuss the groupings. Did most students group the cards correctly? If so, can they explain how they made their decisions? If they were not able to group the cards correctly, discuss what problems they had.

3. Talk with students about the relationship between the substances grouped in each category. Do students notice any patterns emerging about which substances fit into each group? For example, point out to students that all the helpful medicines must be administered by an adult, given at the right time, and taken in the right dosage. Helping students understand this tells them that the healthy medicines are very powerful and must be taken carefully.
4. Ask students whether there are rules about alcohol and nicotine, and if they are put in place for children. Point out that these substances are very powerful. Alcohol can be very harmful if too much is consumed. Over time, alcohol can cause severe problems in the body and brain. Children should never drink alcohol because their brains are still growing. Tobacco is the primary way people receive nicotine. Tobacco is harmful to the brain and body, and nicotine's addictive effects are the reason people continue using tobacco. Tobacco is illegal for children because it is dangerous.
5. As a class, have students draw some final conclusions based on this activity. What is the most important thing they learned about helpful medicines? What is the most important thing they learned about harmful drugs? How will they apply this information to their own lives?
6. If you think your students are ready to discuss alcohol and illegal drugs, information you can use to start such a dialogue can be found at the end of the Background section.
7. After learning about illegal drugs, what conclusions can students draw? They will discover that the illegal drugs—cocaine and marijuana—have negative effects on the body and the brain and should not be taken at all. Alcohol also must be taken with great care; too much alcohol has a detrimental effect on just about every system in the body and is illegal for kids.
8. Congratulate the students. They have just completed the final mission in the NIDA Brain Power!Program and are now members of the Brain Power!Club.

## Discussion Questions

1. If you did not discuss illegal drugs and alcohol, ask students if they are

familiar with any other substances that could be considered healthy or harmful. Make a list of their ideas. If the students come up with illegal drugs or alcohol, tell them that they will learn more about these substances in the next Brain Power! curriculum. If you did discuss these substances, ask students if they have any additional questions about them. Give students an opportunity to express their ideas about what they have just learned.

2. Ask students to think back on what they learned in Module 4 about keeping the brain healthy. How do those ideas and what they learned today work together? If students put into practice what they learned in both modules, would they be living a healthy lifestyle?

## Extensions

The activities listed below provide links to other areas in the curriculum.

1. Take out the large body outlines students used in Module 3 and hang them around the room. Using index cards, have students write how each of the substances they learned about today is taken and what part of the body it affects. Then, have students paste the cards next to the appropriate body part. For example, the fluoride card would be pasted next to the mouth, and acetylsalicylic acid would be pasted near the mouth (where it is taken) and the head (one of the body parts it affects).
2. Write a class story about what life would be like if we did not have the helpful medicines available. How would our health be affected? How would the unavailability of these medicines affect our overall quality of life?
3. Do a class research project about when tobacco and alcohol were introduced to North America. Where did these drugs come from? How were they grown in the New World? What effect did they have on life in America? With the teacher's help, students can use books from the library or the Internet to do the research.

## Assessment

As students work on the activity, look for the following:

- Did students understand the differences between helpful medicines and harmful drugs?
- Did students understand the proper way to take helpful medicines? Do students know why following these instructions is so important?
- Did students understand why alcohol and nicotine are considered harmful drugs for children?
- If you discussed illegal drugs, did students understand why these substances are considered harmful?
- Were students engaged by the activity? Did they participate in class discussions?
- Were students able to work with their classmates to complete the groupings?

## 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 and a section designed specifically for parents, teachers, and students.
- NIDA DrugPubs Research Dissemination Center  
[drugpubs.drugabuse.gov](http://drugpubs.drugabuse.gov), 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228)  
Order our materials free of charge in English or Spanish.
- National Clearinghouse for Alcohol and Drug Information (NCADI)  
[store.samhsa.gov/home](http://store.samhsa.gov/home), 1-800-729-6686  
NCADI is operated by the Substance Abuse and Mental Health Services Administration (SAMHSA). Many free publications are available here.
- Eisenhower National Clearinghouse (ENC)

[www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education](http://www.sciencepioneers.org/resource/eisenhower-national-clearinghouse-math-science-education)

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

## Resources for Students

- Neuroscience for Kids  
[faculty.washington.edu/chudler/nic.html](http://faculty.washington.edu/chudler/nic.html)  
Presents the history of tobacco and cigarette smoking, nicotine addiction, and the effect of nicotine on the brain.
- Friedman, D. *Focus on Drugs and the Brain*. Frederick, MD: Twenty-First Century Books, 1990.  
Part of the “Drug-Alert” series, this book gives a good overview of the brain, neurotransmission, the effects of drugs on the brain, and addiction.
- DeStefano, S. and Neuhaus, D. *Focus on Medicines*. Frederick, MD: Twenty-First Century Books, 1990.  
Part of the “Drug-Alert” series, this book gives a good overview of medicines and how various medicines work with the body and brain to help heal.
- McGinty, A. *Staying Healthy: Personal Safety (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999.  
Written for young children, this book is a comprehensive overview of the importance of personal safety.
- Cosgrove, S. *Crickle-Crack (Serendipity Books)*. New York, NY: Price Stern Sloan Publishing, 2001.  
Crickle-Crack is the story of Squeakers, a young squirrel who is curious about a certain tree in the forest, even though he knows it is very dangerous.

## Introductory Story for Module 5

Juan and Julia are sitting in the club house reading magazines. "Juan, I have a headache," groans Julia. "Can you give me something to make it go away?"

"I can't give you anything, Julia. You should only take medicine from adults you trust, like your mom, or the school nurse," says Juan. "You should have gotten something before you came here."

Just then, Beth and Max come walking in, and Corty appears on the screen. "Sorry to hear about Julia's brain pain, but I'm going to take your mind off it. I've got a mission for you!

Remember how you learned some ways to keep your brain healthy—and the last one was not to smoke cigarettes or drink alcohol?"

They all nod their heads in agreement.

Corty continues, "Well, that leads us to some things you can do to keep your brain safe. This mission requires learning about some harmful drugs and helpful medicines. Your first assignment is to answer this question: What are two helpful substances, and how should they be used?"

Beth guesses, "Let's see, Juan. Helpful substances would stop pain, like Julia's headache. So aspirin is probably one of them."

"That reminds me of another helpful medicine. Antibiotics are used to fight infections. But you should only take these medicines from a trusted adult," adds Juan.

Corty replies, "Good work, Junior Scientists. Now, what are two harmful substances, and why can they hurt you?"

"I know that cigarettes are harmful. There is a chemical in cigarettes called nicotine. Nicotine can change a part of the brain and cause a person to keep smoking. If a person continues to smoke they can badly damage the lungs," says Beth.

"Oh, and remember that kids aren't supposed to drink alcohol. It can hurt your

brain," reminds Max.

Corty appears with a party hat on, and confetti falls around him. "Bingo! You're excellent Junior Scientists! But I still have one more question: Which of the substances we talked about can be both a harmful drug and a helpful medicine?"

Juan responds, "Well, we know cigarettes are always bad."

"Well, my dad drinks beer sometimes, and I don't think it hurts him," Max says.

Beth explains, "Alcohol can be okay for adults in small amounts. So it may not always be a harmful drug, but it isn't helpful either. What else?"

Juan exclaims, "I've got it! Maybe helpful medicines like aspirin and antibiotics can be harmful if you take too much of them, and that's why we have to be sure we get them from a responsible adult, like a parent."

Corty congratulates them again. "Good thinking, Junior Scientists. Taking too much of almost anything can be harmful to your body and your brain."

Beth concludes, "So now we know that we have to keep our brains healthy, and we also have to keep them safe by protecting them from harmful substances."

Juan agrees, "Right, because we know how important the brain is. It lets us think, play, sleep, and even breathe."

"It's a really cool thing, the brain," says Max.

"You're right, Max! We can't live without it!" says Julia.

Corty chimes in, "Now you're using your heads! And as a brain, I take that as a personal compliment!"

# Brain Power News

*Parent Newsletter*  
*Volume 1, Number 5*

## Keeping Your Brain Safe

During the last module of *Brain Power! The NIDA Junior Scientists Program*, children are introduced to the concept of helpful medicines and what characteristics they have. Students learn that only a trusted adult should give medicines, and children can take only a small amount of the medicine. In some cases, physicians must prescribe the medicines. Finally, students learn that medicines are taken for a specific purpose, such as when they have a headache or sore throat, but can be harmful if taken incorrectly.

Then, students discuss two other substances: alcohol and nicotine. They discover that these substances are not medicines, and there are laws about consuming them, especially for kids. They are very powerful. Students learn that alcohol and nicotine are examples of drugs and are illegal for children. [Although nicotine is not considered a medicine, it can be used to aid in smoking cessation.]

Introducing the subject of harmful drugs at the end of the program is meant to pave the way for the second part of the curriculum, which is geared to students in second and third grades. The six modules in Part 2 discuss drugs in greater detail, as well as the effects they have on the brain. Through these modules, students learn even more about what they can do to keep their precious brains safe. This module aligns with the National Science Education Standards: “unifying concepts and processes” and “science in personal and social perspectives” and stresses the importance of protecting your brain and body by doing what you can to keep them safe and healthy.

## Science at Home

Ask your child what his or her impressions were of the module. Ask if there are

any questions you can answer. Now is a good time to correct any misconceptions your child may have about the differences between helpful medicines and harmful drugs.

## **What Does Your Child Think?**

Ask your child to write or draw one question or concern he or she may have about medicines and drugs.

## **Additional Resources**

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. Publications and other materials are available free of charge.

National Clearinghouse for Alcohol and Drug Information (NCADI) —  
[store.samhsa.gov](http://store.samhsa.gov)

1-800-729-6686

NCADI is the world's largest resource for information and materials concerning substance abuse. Many free publications are available here.

National Clearinghouse for Alcohol and Drug Information (NCADI): For Kids Only — [store.samhsa.gov](http://store.samhsa.gov)

NCADI is the world's largest resource for current information and materials concerning substance abuse. This section of the site is designed specifically for kids.

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

This Web site contains information on the brain, activities, experiments, pictures, and other resources for students and educators.

Friedman, D. *Focus on Drugs and the Brain*. Frederick, MD: Twenty-First Century Books, 1990. Part of the "Drug-Alert" series, this book gives a good

overview of the brain, neurotransmission, the effects of drugs on the brain, and addiction.

DeStefano, S. and Neuhaus, D. *Focus on Medicines*. Frederick, MD: Twenty-First Century Books, 1990. Part of the “Drug-Alert” series, this book gives a good overview of medicines and how various medicines work with the body and brain to help heal.

McGinty, A. *Staying Healthy: Personal Safety (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999. Written for young children, this book is a comprehensive overview of the importance of personal safety.

Cosgrove, S. *Crickle-Crack (Serendipity Books)*. New York, NY: Price Stern Sloan Publishing, 2001. Crickle-Crack is the story of Squeakers, a young squirrel who is curious about a certain tree in the forest, even though he knows it is very dangerous.

## Brain Power News (Español)

### Noticias Sobre El Poder Del Cerebro

*Boletín Informativo Para Padres*  
*Volumen 1, Número 5*

### Cómo proteger a su cerebro

Durante el último módulo de ¡El poder del cerebro! el Programa Pequeños Científicos (*Brain Power! Junior Scientists Program*) del Instituto Nacional Sobre el Abuso de Drogas (*National Institute on Drug Abuse o NIDA*) se presenta a los niños el concepto de las medicinas útiles y sus características. Los estudiantes aprenden que solamente un adulto de confianza les debe suministrar medicinas y que los niños deben tomar solamente una cantidad pequeña de la misma. En algunos casos, los médicos deben recetar las medicinas. Finalmente, los estudiantes aprenden que las medicinas se toman para un propósito específico (como cuando tienen dolor de cabeza o de

garganta) pero que pueden ser dañinas si se toman de manera incorrecta.

Luego, los estudiantes platican acerca de otras dos sustancias: el alcohol y la nicotina. Descubren que estas sustancias no son medicinas y que hay leyes sobre su consumo, especialmente para niños. Estas sustancias son muy potentes. Los estudiantes aprenden que el alcohol y la nicotina son ejemplos de drogas y que son ilegales para los niños. [Aunque la nicotina no se considera una medicina, se puede utilizar para ayudar a dejar de fumar].

La introducción del tema de las drogas dañinas al final del programa tiene como meta preparar el terreno para la segunda parte del currículo, que está dirigida a los estudiantes de segundo y tercer grado. Los seis módulos de la Parte 2 analizan las drogas en más detalle, así como los efectos que tienen en el cerebro. A través de estos módulos, los estudiantes aprenden aún más acerca de lo que pueden hacer para proteger a sus preciados cerebros.

Este módulo se ajusta a los Estándares Nacionales de Educación Científica (*National Science Education Standards*) de “la unificación de conceptos y procedimientos” y “la ciencia desde la perspectiva personal y social” y recalca la importancia de proteger a su cerebro y a su cuerpo, haciendo todo lo posible para mantenerlos seguros y saludables.

## **La ciencia en el hogar**

Pregúntele a su hijo cuáles fueron sus impresiones sobre el módulo. Pregúntele si tiene alguna pregunta que usted pueda contestar. Este es un buen momento para corregir cualquier concepto erróneo que su hijo pueda tener sobre las diferencias entre las medicinas útiles y las drogas dañinas.

### **¿Qué piensa su hijo?**

Pídale a su hijo que escriba o dibuje una pregunta o inquietud que tenga sobre las medicinas y las drogas.

## **Recursos adicionales**

National Institute on Drug Abuse (NIDA) — [www.drugabuse.gov](http://www.drugabuse.gov)

301-443-1124

Este sitio Web contiene información acerca del abuso de drogas y una sección destinada específicamente a padres, maestros y estudiantes.

National Clearinghouse for Alcohol and Drug Information (NCADI) —

[store.samhsa.gov](http://store.samhsa.gov)

1-800-729-6686

El NCADI es el recurso mundial más grande para información y materiales relacionados con el abuso de sustancias. Aquí se pueden obtener muchas publicaciones gratuitas.

National Clearinghouse for Alcohol and Drug Information (NCADI): For Kids Only — [store.samhsa.gov](http://store.samhsa.gov)

El NCADI es el recurso mundial más grande para información y materiales relacionados con el abuso de sustancias. Esta sección del sitio está destinada específicamente a niños.

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

Este sitio Web contiene información sobre el cerebro, actividades, experimentos, dibujos y otros recursos para estudiantes y educadores.

Friedman, D. *Focus on Drugs and the Brain*. Frederick, MD: Twenty-First Century Books, 1990. Parte de la serie “Drug-Alert”, este libro proporciona un buen compendio del cerebro, la neurotransmisión, los efectos de las drogas en el cerebro y la adicción.

DeStefano, S. y Neuhaus, D. *Focus on Medicines*. Frederick, MD: Twenty-First Century Books, 1990. Parte de la serie “Drug-Alert”, este libro proporciona un buen compendio de los medicamentos y el modo en que muchos de ellos trabajan con el cuerpo y el cerebro para ayudar a curar.

McGinty, A. *Staying Healthy: Personal Safety (The Library of Healthy Living)*. New York, NY: Franklin Watts, Incorporated, 1999. Escrito para niños pequeños, este libro es un compendio integral de la importancia de la seguridad personal.

Cosgrove, S. *Crickle-Crack (Serendipity Books)*. New York, NY: Price Stern Sloan Publishing, 2001. Crickle-Crack es la historia de Squeakers, una ardilla joven que siente curiosidad sobre determinado árbol del bosque, aunque sabe que es muy peligroso.

[Parent Newsletter \(Español, PDF, 233KB\)](#)

# Materials/Contact

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## Contact Information

For questions regarding *NIDA's Science Education Program and Materials*, contact Cathrine Sasek, Ph.D., e-mail: [csasek@nih.gov](mailto:csasek@nih.gov).

Posters are available to order from

<https://drugpubs.drugabuse.gov/publications/brain-power-nida-junior-scientist-program-posters-grades-k-1>

## Handouts

### Module 1: You Could Be A Scientist

- [Parent Newsletter \(PDF, 147KB\)](#)
- [Parent Newsletter \(Español, PDF, 230KB\)](#)
- [Trading Cards: Color \(PDF, 422KB\)](#)
- [Trading Cards: B&W \(PDF, 449KB\)](#)

### Module 2: Meet the Scientists

- [Resume Form \(PDF, 48KB\)](#)
- [Parent Newsletter \(PDF, 228KB\)](#)
- [Parent Newsletter \(Español, PDF, 243KB\)](#)
- [Trading Cards: Color \(PDF, 313KB\)](#)
- [Trading Cards: B&W \(PDF, 151KB\)](#)

### Module 3: Your Amazing Brain

- [Outline of Brain \(PDF, 66KB\)](#)
- [Parent Newsletter \(PDF, 179KB\)](#)
- [Parent Newsletter \(Español, PDF, 190KB\)](#)
- [Trading Cards: Color \(PDF, 728KB\)](#)
- [Trading Cards: B&W \(PDF, 2.3MB\)](#)

## **Module 4: Keeping Your Brain Healthy**

- [Sample Class Chart \(PDF, 73KB\)](#)
- [Parent Newsletter \(PDF, 218KB\)](#)
- [Parent Newsletter \(Español, PDF, 229KB\)](#)
- [Trading Cards: Color \(PDF, 634KB\)](#)
- [Trading Cards: B&W \(PDF, 385KB\)](#)

## **Module 5: Protecting Your Brain**

- [Parent Newsletter \(PDF, 146KB\)](#)
- [Parent Newsletter \(Español, PDF, 233KB\)](#)
- [Trading Cards: Color \(PDF, 416KB\)](#)
- [Trading Cards: B&W \(PDF, 370KB\)](#)

# **T-shirts, Stickers, and Buttons**

## **How do I make a T-shirt?**

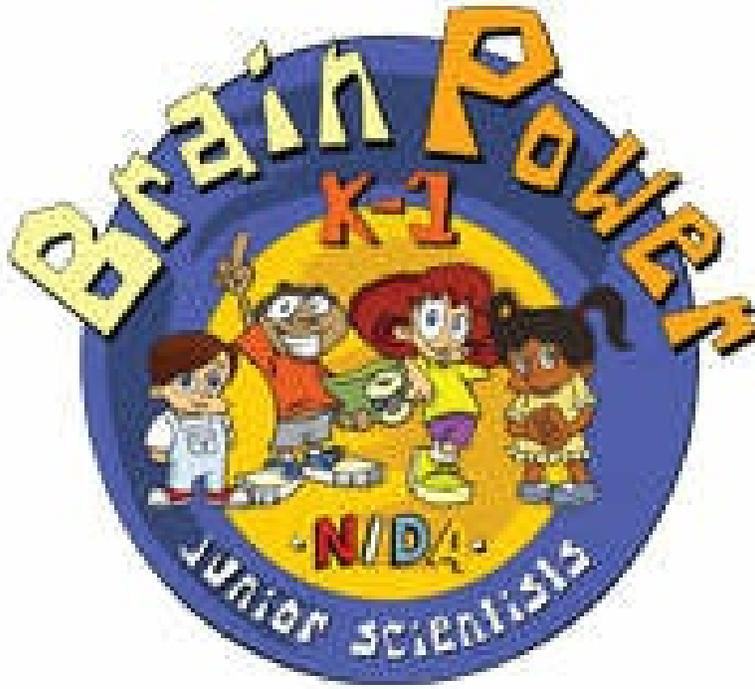


[Download PDF \(2.7MB\)](#)

1. Ask children to have their parents find a plain white t-shirt or other cotton item that they can use for the iron-on.
2. Pick up iron-on ink-jet transfer paper at your local craft or office supply store. Choose opaque transfer paper for dark-colored items and transparent transfer paper for light-colored items. Transparent transfer paper may help avoid white outlines around artwork. Always read the instructions that come with the transfer paper.
3. Download the free artwork.
4. Use an inkjet printer to print the downloaded artwork onto the transfer paper. The artwork comes as a two-page PDF document. Page one is a flipped, mirror image (backwards) of the design. Page two is a regular (straightforward) non-flipped image.

5. Use an ordinary iron to transfer the design onto the item. Use caution, the iron will be very hot.

## How do I print the stickers?



[Download](#)

1. Pick up some blank white labels paper at your local craft or office supply store.
2. Download the free artwork.
3. Place the downloaded artwork onto your labels and resize the art to fit your label.
4. Use an ink-jet printer to print your downloaded design onto the labels. Be sure to read the instructions that come with the labels.