

Your Amazing

BRAIN



Module 3

• NIDA •

MODULE 3: YOUR AMAZING BRAIN

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

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.

Life Science Standards

Levels K-4	How Mission is Aligned
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.

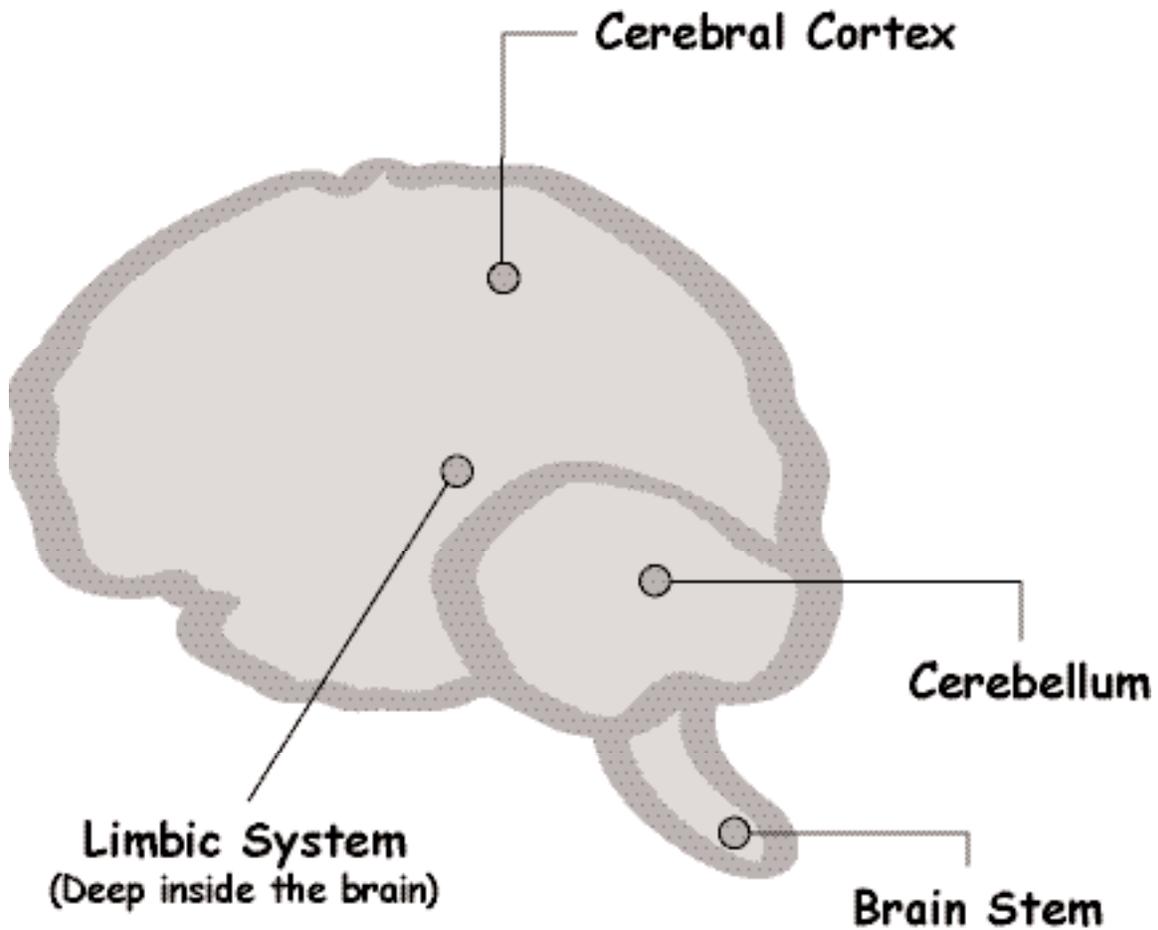
The medulla controls heart rate, respiration, and blood pressure. The medulla also is responsible for temperature control; simple reflexes, such as coughing and sneezing; and digestion.

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

- ✓ Videotape and VCR
- ✓ Large sheets of paper
- ✓ Pencils and markers
- ✓ Crayons
- ✓ Outline of the brain
- ✓ Magazines and other sources of pictures
- ✓ Limbic System Trading Card
- ✓ Scissors
- ✓ Tape
- ✓ Paste

Preparation

- ★ Preview the videotape to familiarize yourself with the activity.
- ★ Make enough copies of the outline of the brain found at the back of the *Teacher's Guide* so that each student has his or her own copy.
- ★ Collect magazines, newspapers, and other sources of pictures showing examples of the different functions of the brain (sleeping, talking, playing ball, and so forth).
- ★ Make copies of the black-and-white trading cards found at the back of the *Module 3 Teacher's Guide* so that each student has a copy of each card.



It may take two or three class periods to complete this lesson.





If possible, it would be helpful to have one or two parent volunteers or instructional assistants in the class to help complete the body outlines of the students.

Procedure

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

- ? 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?
- ? 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?
- ? 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 of the curriculum.



Language arts



Math



Drama



Art



Science



Social Studies



Reading

	<p>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.</p>
	<p>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.</p>
	<p>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.</p>



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?

Notes:



Resources for Teachers

National Institute on Drug Abuse (NIDA)

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)

www.health.org

1-800-729-6686

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

Eisenhower National Clearinghouse (ENC)

www.enc.org

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

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

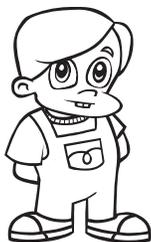
This Web site contains information on the brain and neurotransmission, activities, experiments, pictures, and other resources for students and educators.

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.

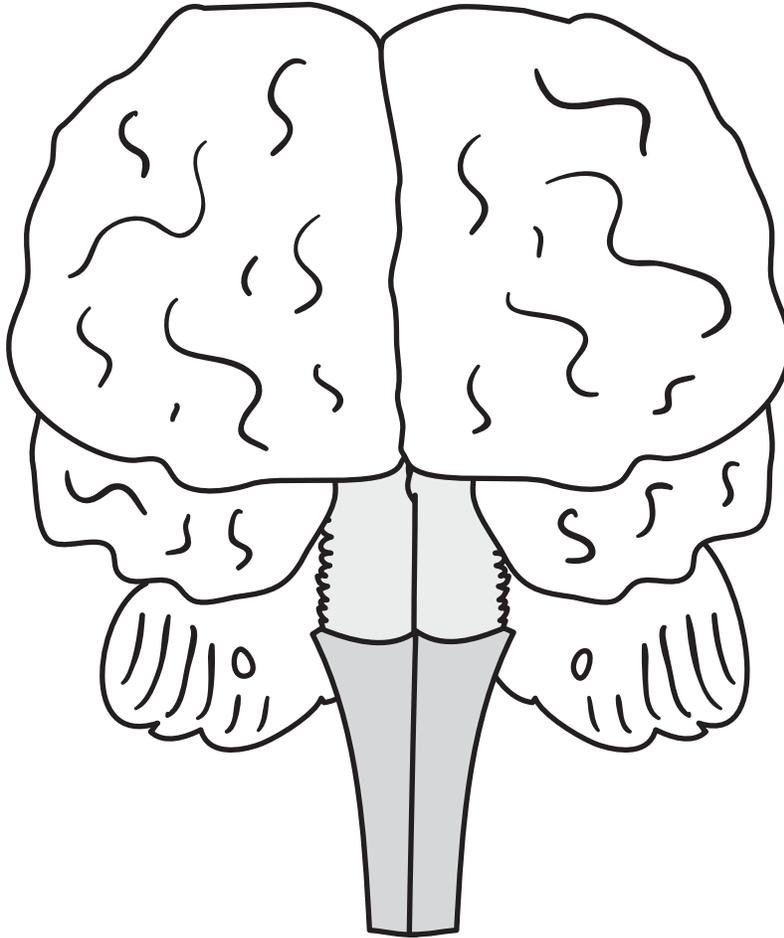
Treays, R. *Understanding Your Brain (Science for Beginners Series)*. Newton, MA: EDC Publications, 1996.

This book describes the parts of the brain and their functions.



Outline of the Brain

Below is a picture of the front of the brain. Cut it out and place it where it belongs on your body outline.



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.

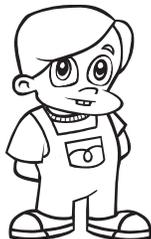
"Now, we need to use our own brains to figure out what kinds of things our brains tell our bodies to do," says Juan.

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

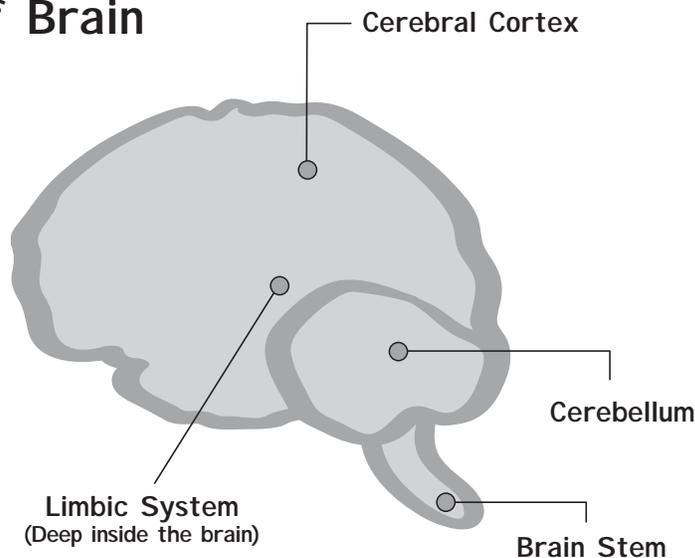
VOLUME 1, NUMBER 3

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



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



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 (NI DA) — www.drugabuse.gov
301-443-1124

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NOTICIAS SOBRE EL PODER DEL CEREBRO

BOLETÍN INFORMATIVO PARA PADRES

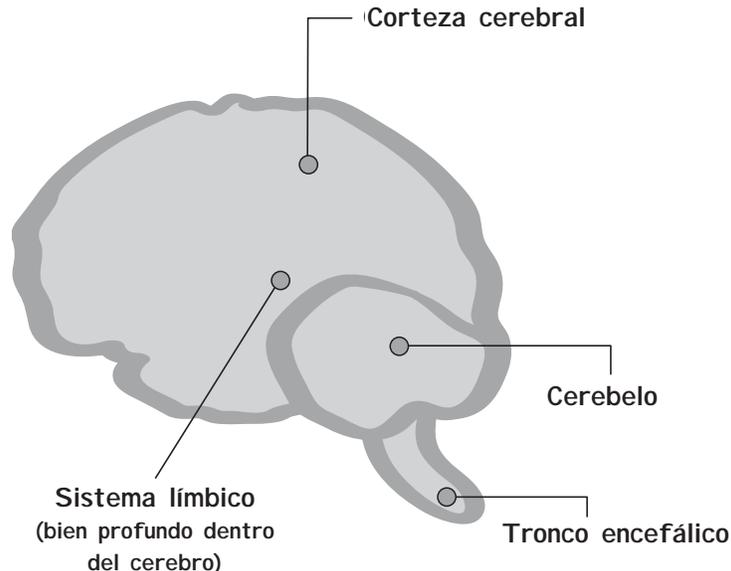
VOLUMEN 1, NÚMERO 3

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



Parte del cerebro	Función
Tronco encefálico	Dormir, soñar, toser, estornudar, respirar, regular la frecuencia cardíaca, 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
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) — www.health.org
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.

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.

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Brain Power



JUNIOR SCIENTISTS

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Brain Power



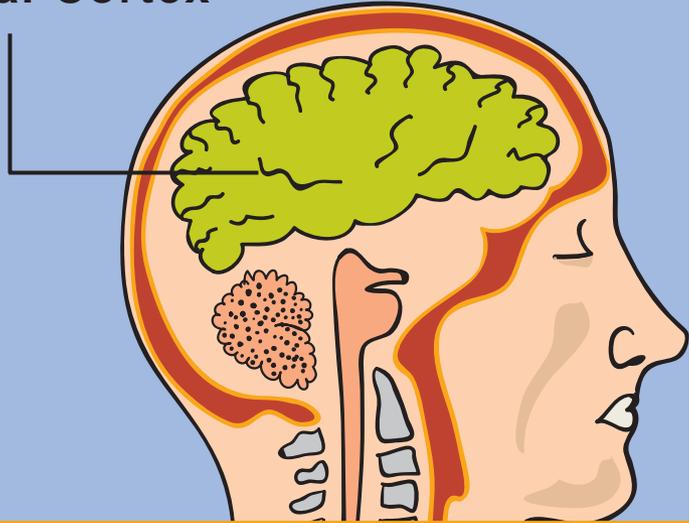
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Cerebral Cortex

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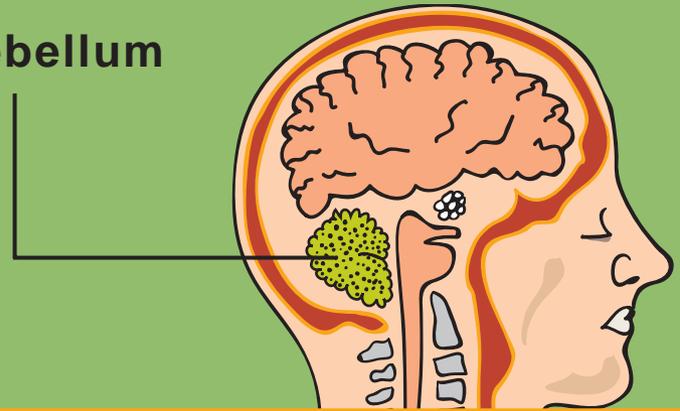
Cerebral Cortex



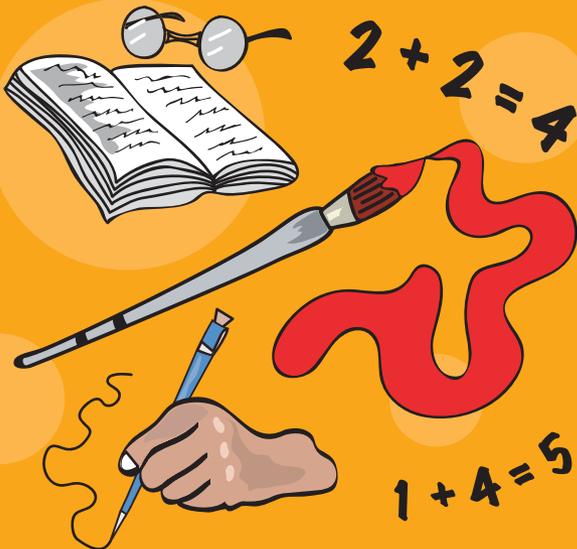
Cerebellum

NIDA

Cerebellum



Your brain helps you think.



Your brain helps you move.

Jumping



Running



Kicking



Balancing

Brain Power



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Brain Power



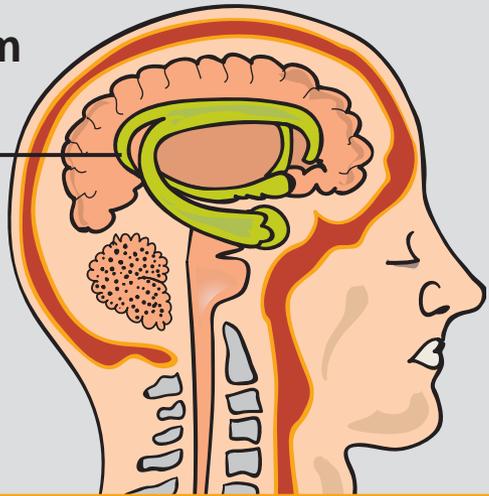
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Limbic System

NIDA

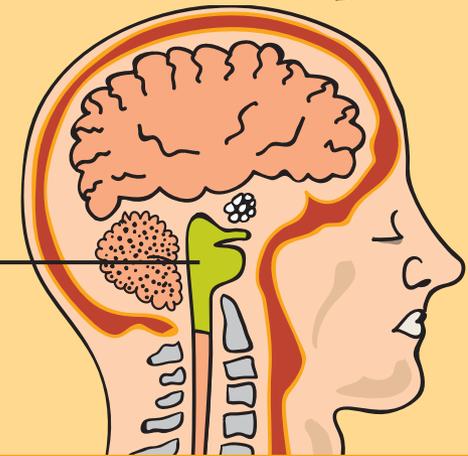
Limbic System



Brain Stem

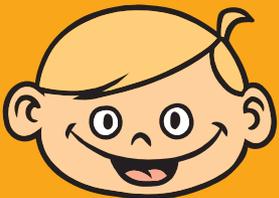
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Brain Stem

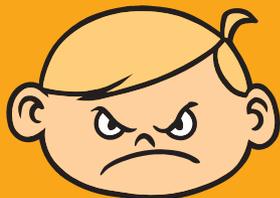


Emotions are how you feel inside. What are some emotions?

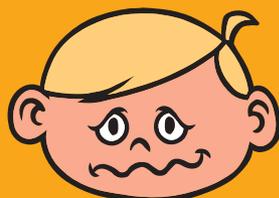
Happy



Mad



Sad

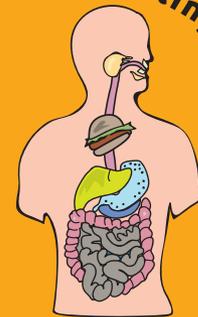


Embarrassed

Heart Beating



Digesting



Breathing



Sleeping

Your brain helps your body work.

Brain Power



Junior Scientists

• NIDA •

Brain Power



Junior Scientists

• NIDA •

Max

NIDA



Max wants to be a Junior Scientist more than anything. Every day, he learns more. Junior Scientists know that science is all around us.

Science is All Around Us

NIDA

Here are some things that scientists study. Use your thinking cap to figure out what they are.



BR _ _ N



P _ AN _ S



_ _ SH



VO _ _ A _ OE _



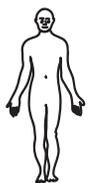
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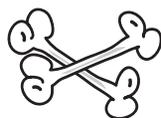
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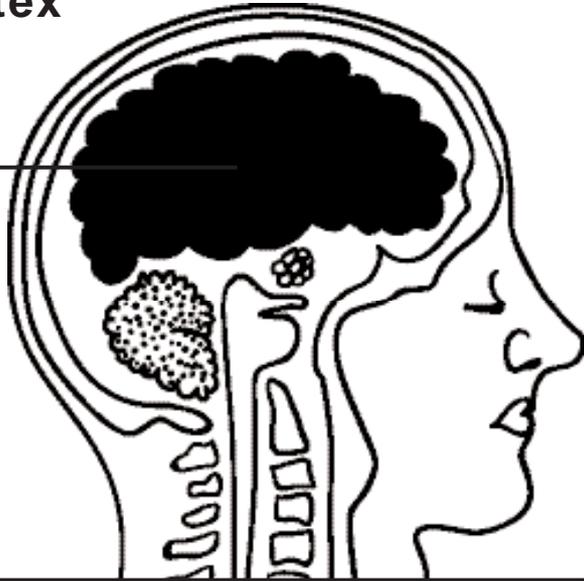


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Cerebral Cortex

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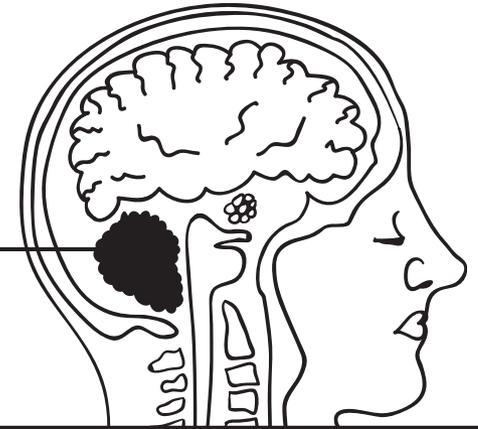
Cerebral Cortex



Cerebellum

N/DA

Cerebellum



Your brain helps you think.



Your brain helps you move.



Limbic System

N/DA

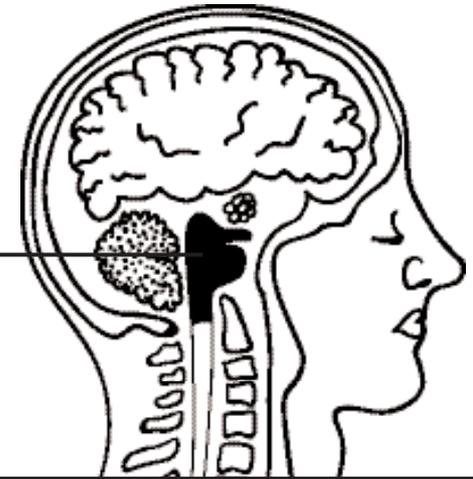
Limbic System



Brain Stem

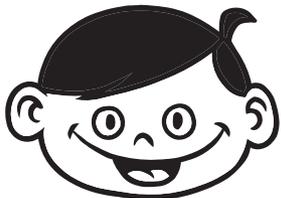
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Brain Stem



Emotions are how you feel inside. What are some emotions?

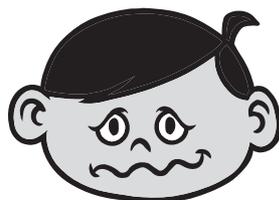
Happy



Mad



Sad

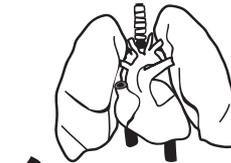


Embarrassed

Heart Beating



Digesting



Breathing

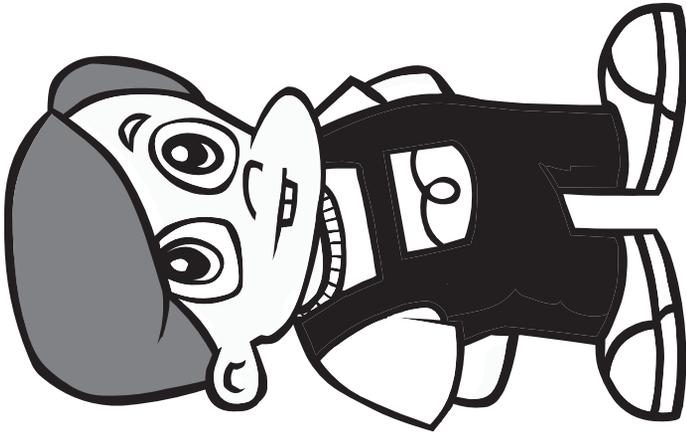


Sleeping

Your brain helps your body work.

Max

NIDA



Max wants to be a Junior Scientist more than anything. Every day, he learns more. Junior Scientists know that science is all around us.

Science is All Around Us

NIDA

Here are some things that scientists study. Use your thinking cap to figure out what they are.



BR _ _ N



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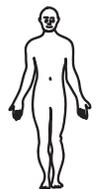
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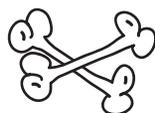
S _ N



B _ D _



H _ AR _



B _ _ E _



_ A _ N



EA _ _ H

Juan

•N/DA•



Juan is a Junior Scientist who is helping Max and Julia learn more about their brains. Juan wants to be a scientist when he grows up.

My Brain

Can't Do Without It!

(Pop Goes the Weasel)

When I hear my favorite song,
And dance to the rhythm,
I couldn't hear without my brain-
Can't do without it!

CHORUS:

My brain helps me do everything,
Every single minute.
It even helps me realize
Can't do without it!

When I hug my teddy bear
And touch his soft, soft fur,
I couldn't touch without my brain-
Can't do without it!

CHORUS

When I watch a video
Or see a funny movie,
I couldn't see without my brain-
Can't do without it!

CHORUS

When I smell delicious smells
Coming from the kitchen,
I couldn't smell without my brain-
Can't do without it!

CHORUS

When I have a special snack
And taste its scrumptious flavor,
I couldn't taste without my brain-
Can't do without it!

• NIDA •

