

THE MINDBOGGLING WORKBOOK



A Fun-filled
Activity Book
About the Brain!

Much of the information in *The Mindboggling Workbook* is excerpted from *It’s Mindboggling!* and *More Mindboggling!*, both publications of the Dana Alliance for Brain Initiatives.

The Dana Alliance for Brain Initiatives is a nonprofit organization committed to advancing public awareness about the progress and benefits of brain research. Supported entirely by the Dana Foundation, the Dana Alliance does not fund research or make grants.

KIDS:
We hope that you enjoy the following pages of fun things to do and learn about your brain. You will need crayons and some time to think about the many different things you will see.

PARENTS and TEACHERS:
The purpose of this workbook is to start your child thinking about his or her brain, what it does, how it works, its importance, and how to take care of it. We welcome your feedback.

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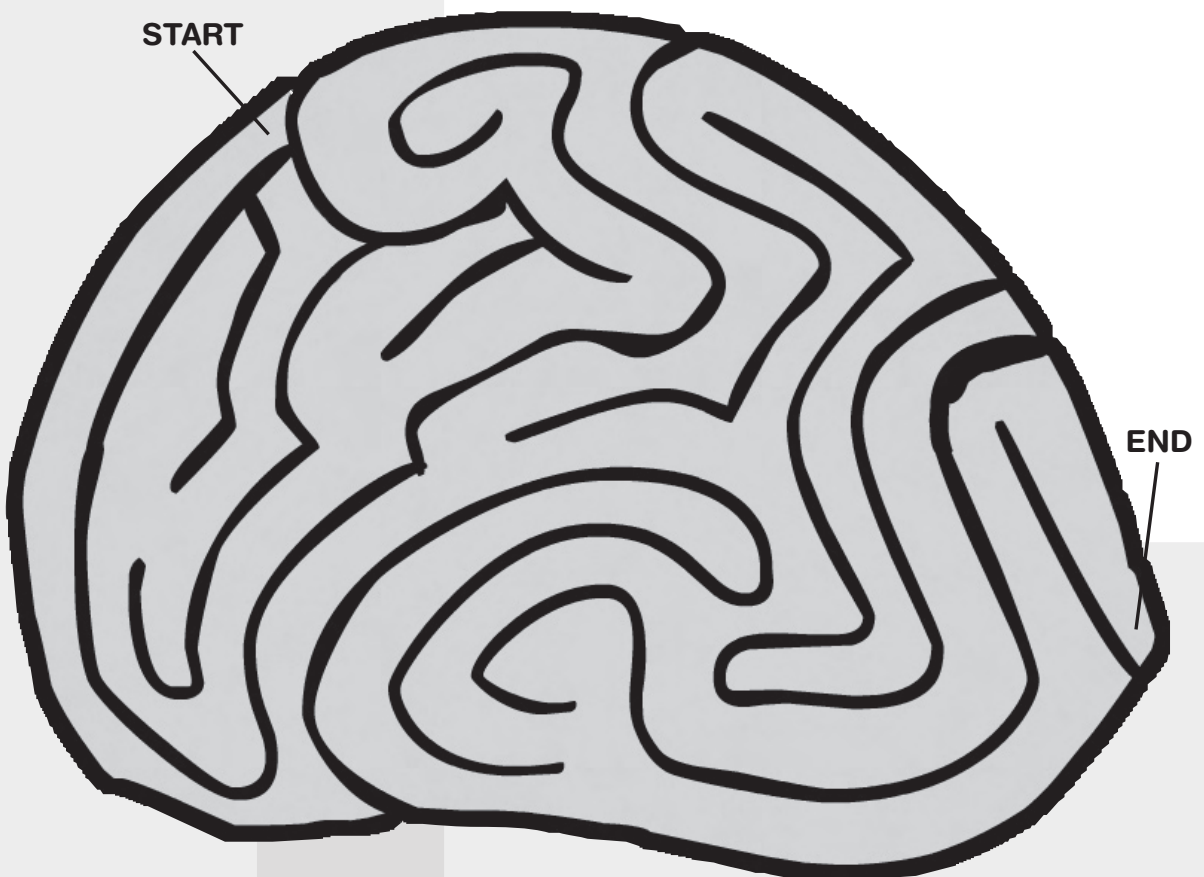
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The Brain

Your brain is a small part of your body but it can do more jobs than the most powerful computer ever made. Your brain helps you to see and hear, to smell and taste, to remember how to count and to recognize the streets on your way home. Your brain is responsible for keeping you breathing and your heart beating. Your brain even decides if you will be happy or sad, nice, bad or well behaved.

Different parts in the brain do different things. Some parts help you to learn and remember, some help you to solve problems and make decisions. Some help you with balance or to move your hands, arms, and legs. Your brain does all of these things for you and many more. It sounds easy, but it is not. Your brain is working very hard all of the time. Your brain is amazing!

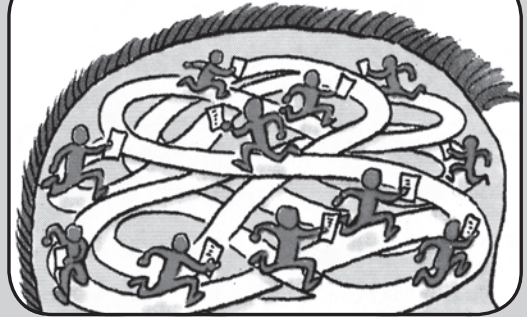
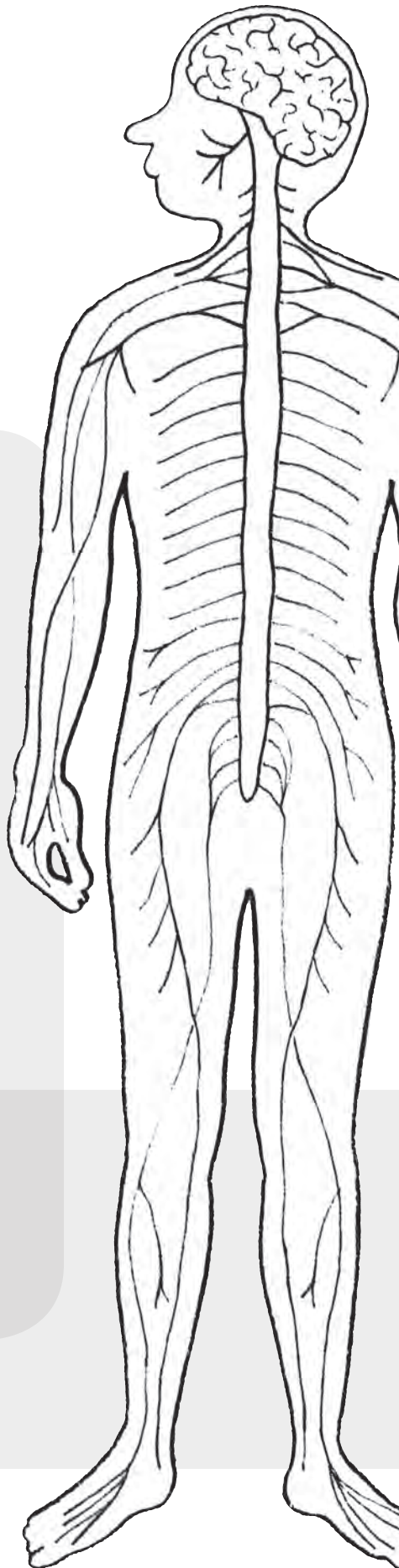
From START below, follow the pathways through the wrinkles of the brain to the END.



The Nervous System

The lines in the boy on the right show his nervous system. The nervous system is like a highway through the body made up of neurons or nerve cells. These neurons pass signals along. If you touch something hot, the neurons send a message from your hand to your brain. Once the signal reaches the brain, it sends the message back to move your hand.

- 1 **COLOR the Spinal Cord yellow. The Spinal Cord is a cable that goes from the brain stem to the lower back and carries messages to and from the brain.**
- 2 **Pretend the boy has touched something hot. With a red crayon TRACE where the message is sent from the hand to the brain along the nerves and through the spinal cord. Now trace the message back from the brain telling the hand to move. Ouch!**
- 3 **Pretend the boy is bitten by a bee on his knee. With a blue crayon TRACE the message sent from the knee to the brain along the nerves. Now trace the message back from the brain telling the hand to swat away the bee.**
- 4 **Pretend the boy has stepped in sand and it is between his toes. With a green crayon TRACE where the message is sent from the toes to the brain along the nerves. Now trace the message back from the brain telling the toes to wiggle. Ah-h-h!**



The fastest brain messages can travel at about 360 miles per hour.

You have more than 100 billion neurons. Each one can be connected to thousands of others. This means there are trillions of different routes a message can take around your brain.

Each nerve cell may receive hundreds and thousands of incoming signals every second.

The Senses

Our senses let us know what is going on inside and outside our bodies. Every moment your brain receives signals from your senses. Draw a line from the part of the body to the correct sense.



A diagram showing five white rectangular cards with black outlines, each containing a sense. The cards are arranged in a circular pattern around a central grey vertical bar. Each card has a black dot on its left side, representing a pin or fastener. The senses listed are TOUCH, TASTE, HEAR, SEE, and SMELL, in clockwise order starting from the top right.

SMELL

TOUCH

TASTE

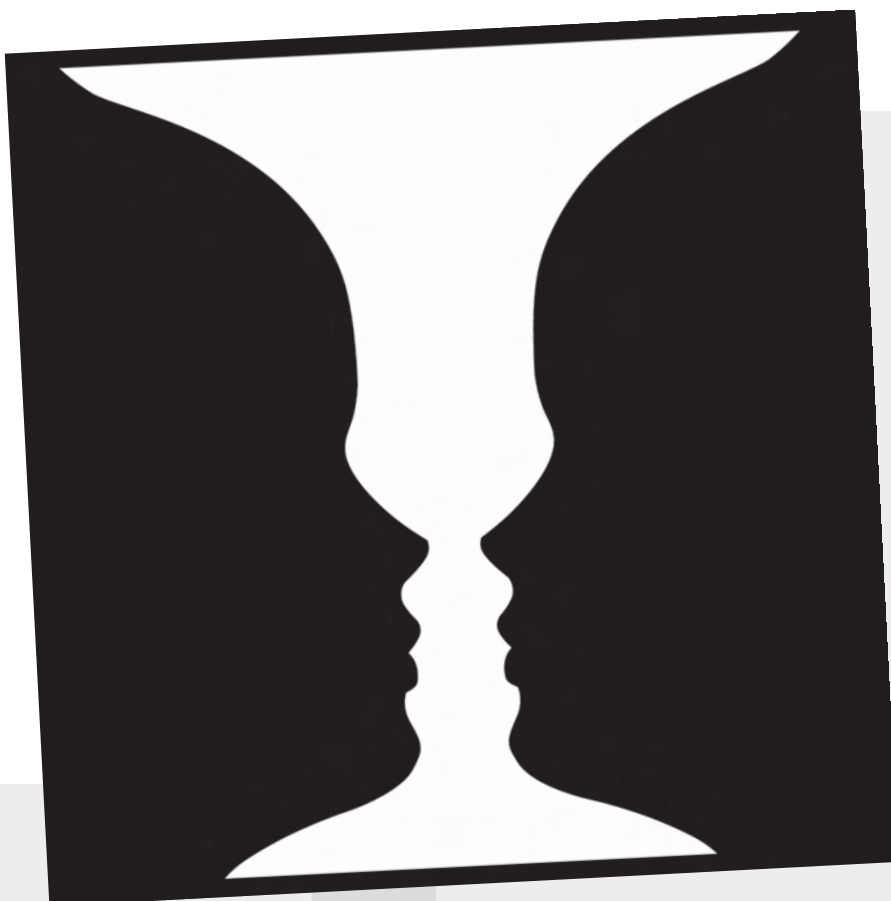
SEE

HEAR

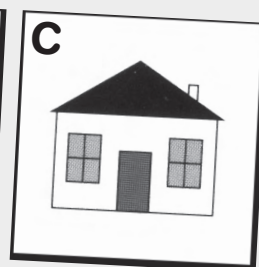
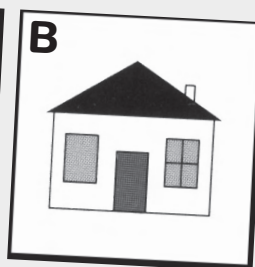
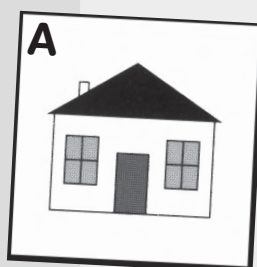
Taste and smell are related. Try this! Hold your nose and taste a jellybean. Can you tell what flavor it is? Try another. Now just eat a jellybean normally. Can you tell the difference? Taste sensors detect four main flavors: salty, bitter, sweet, sour. These work with smell sensors that detect thousands of smells. That is why food seems to have no taste when you have a cold or stuffy nose.

Brain Challenges

Most of the time the eyes and the brain work together to tell us what is around us. Sometimes, though, the brain can be fooled or confused by what the eyes take in. Find the answers on the inside back cover.

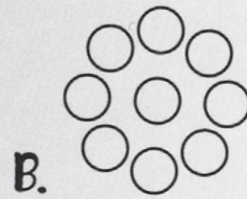
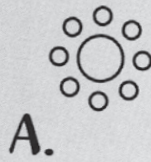


**Do you see
a vase or
two faces?**

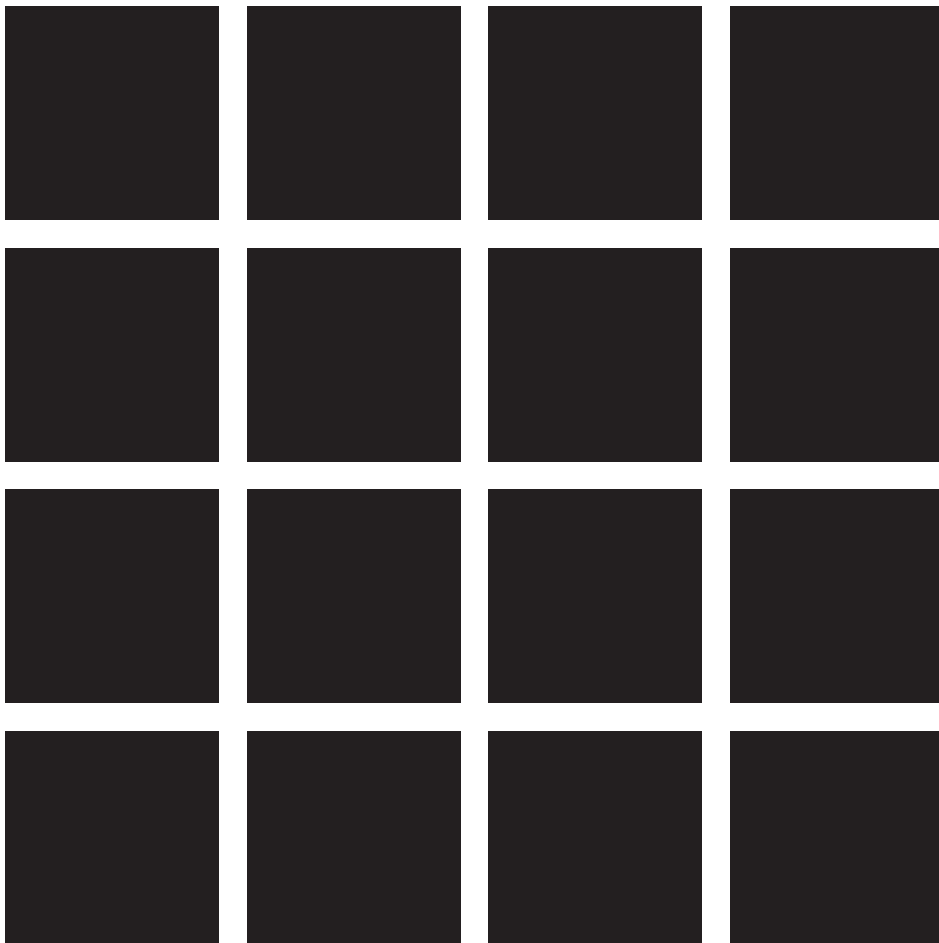


**Find the house that is identical
to the one shown on the left.**

Which center circle
is bigger?

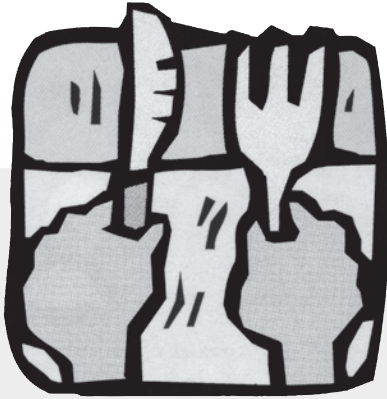


Look at the circles carefully.



Stare at these squares for a few seconds.
Do you see dots appear at the corners of the squares?
Look away and look back. Are the dots still there?

Take Care of Your Brain

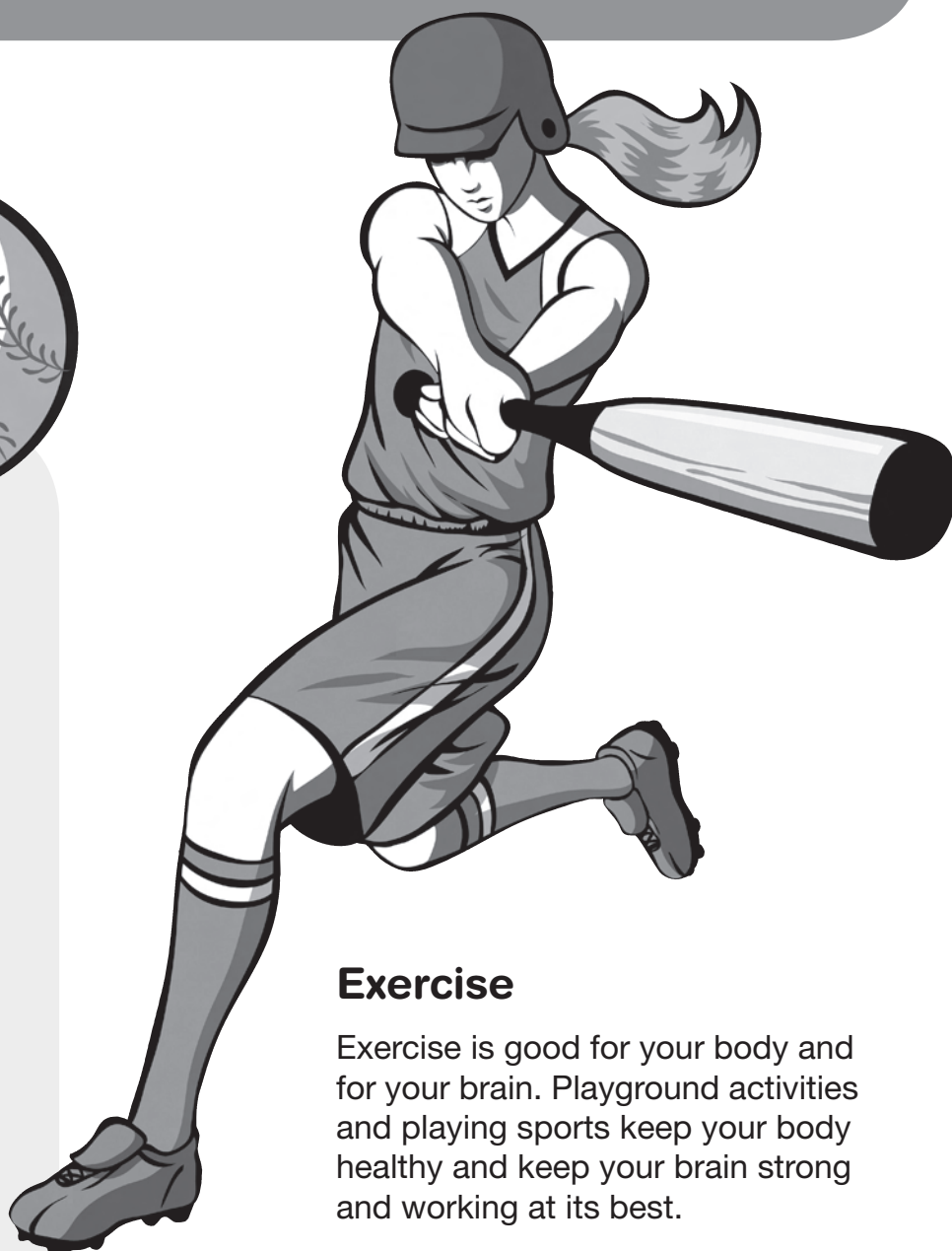


Food for Thought

Your brain works best when you eat well-balanced meals. Without a balance of nutrients, your brain cannot work to its full potential. You could become forgetful, overly emotional, tongue-tied, or light-headed.

**Color the foods that are good for you.
Put an X on foods that are NOT part
of a well-balanced meal.**





Exercise

Exercise is good for your body and for your brain. Playground activities and playing sports keep your body healthy and keep your brain strong and working at its best.



Sleepy Head

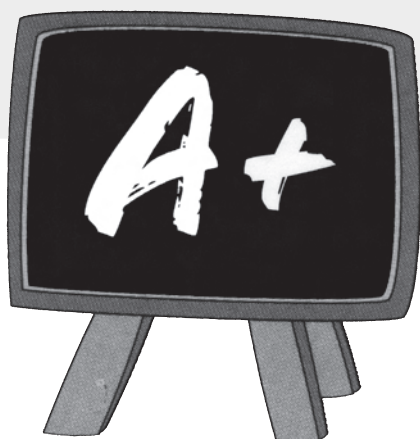
Missing one night's sleep makes you crabby. Two sleepless nights and you have trouble concentrating.

Memory Boosters

Memory Power

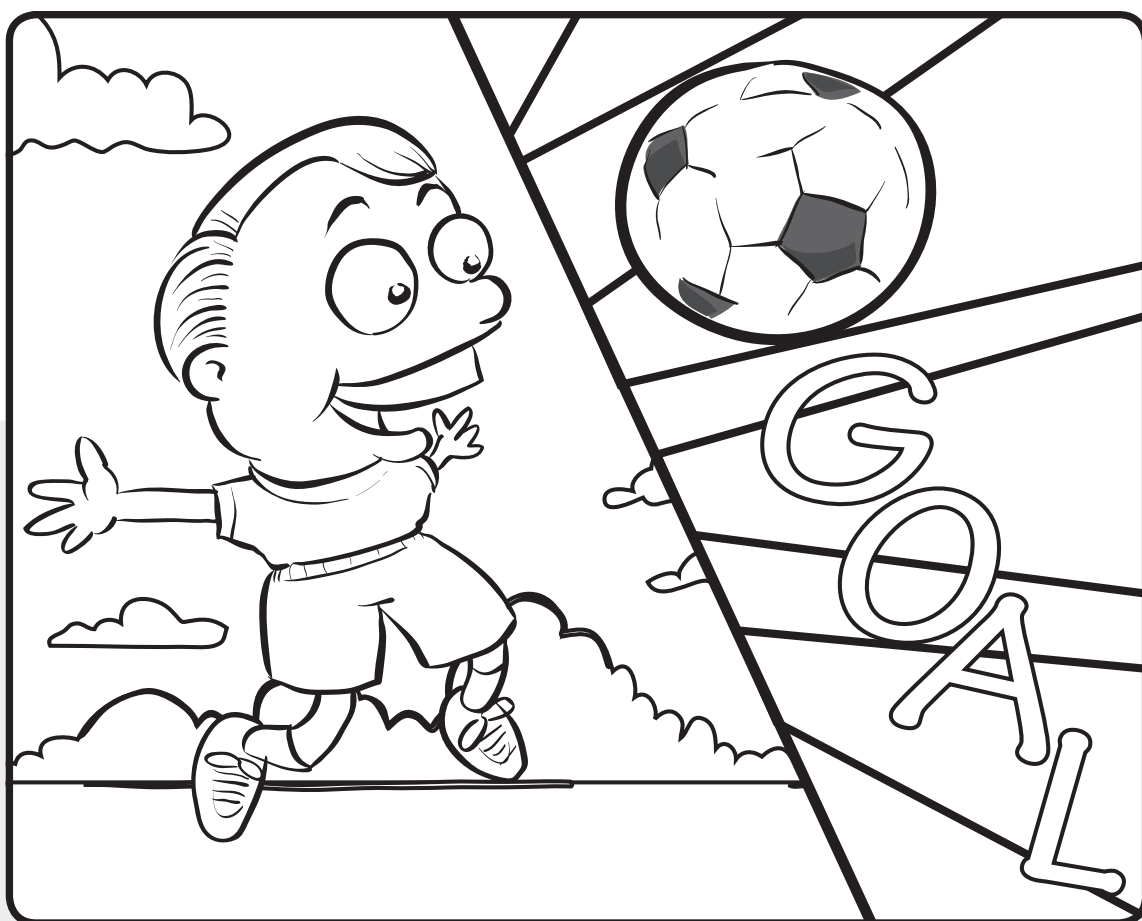
Using rhyme or rhythm to help remember something is one way that you can “boost” your memory power. Most of us learned to say the letters of the alphabet in order by singing the “alphabet song.” Fill in the letters below by beginning at the end and working toward the “A.”

A B C _ E F _
H I J _ L _
N O _ Q R _
_ U _ W _ Y _



Testing! Testing! A+

Scientists have learned that a second look at information can double your ability to remember. It is easier to remember information that you look at again and again.



Color in the picture above with whatever colors you want, then have a friend hold your workbook so you can't see it and ask you these questions:

What color are the boy's shorts?

What color is the boy's shirt?

What color are the boy's shoes?

What color is the soccer ball?

What color are the stripes behind the ball?

How many can you remember?

Protect Your Brain!

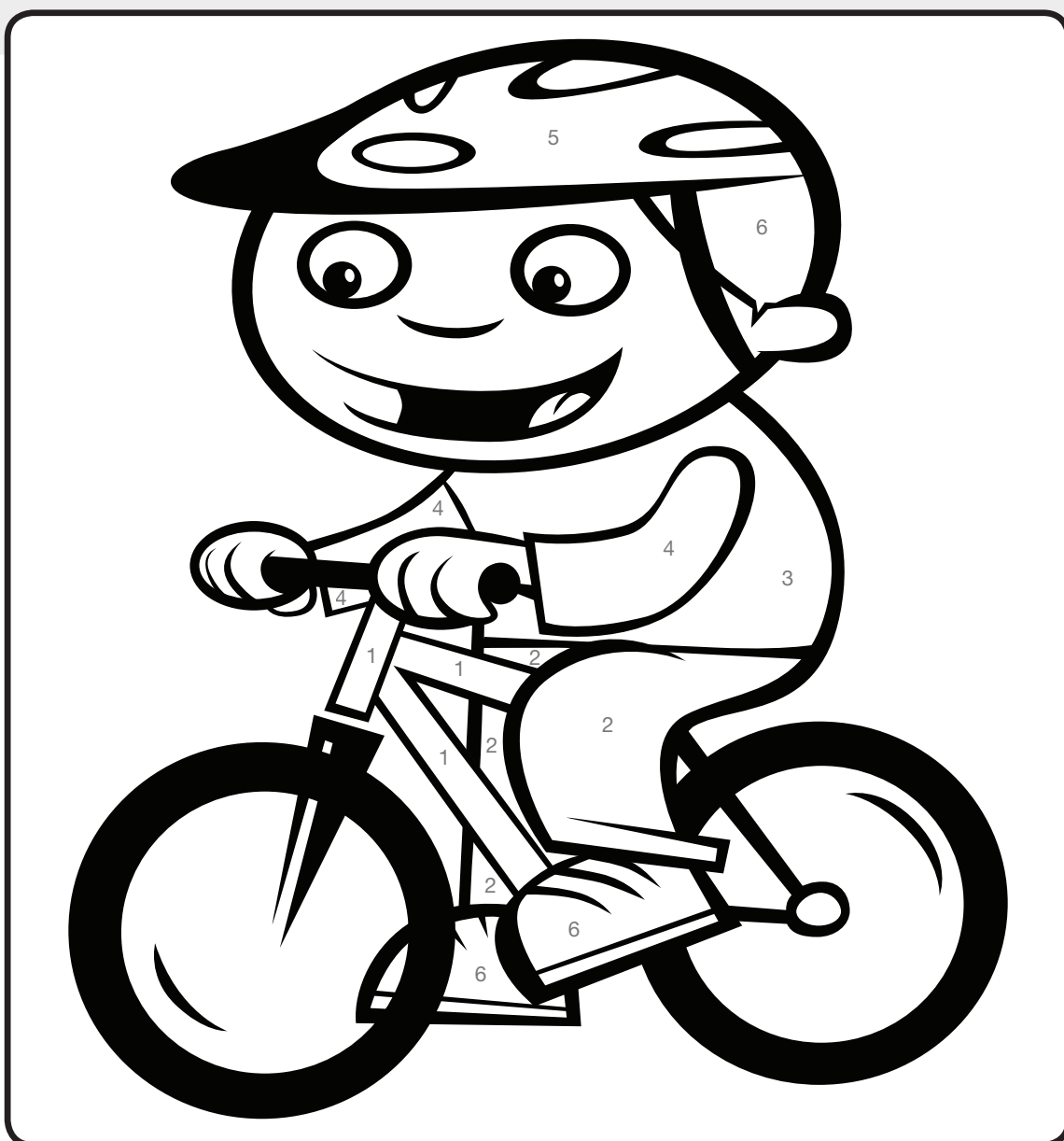
Always Wear a Helmet! Why?

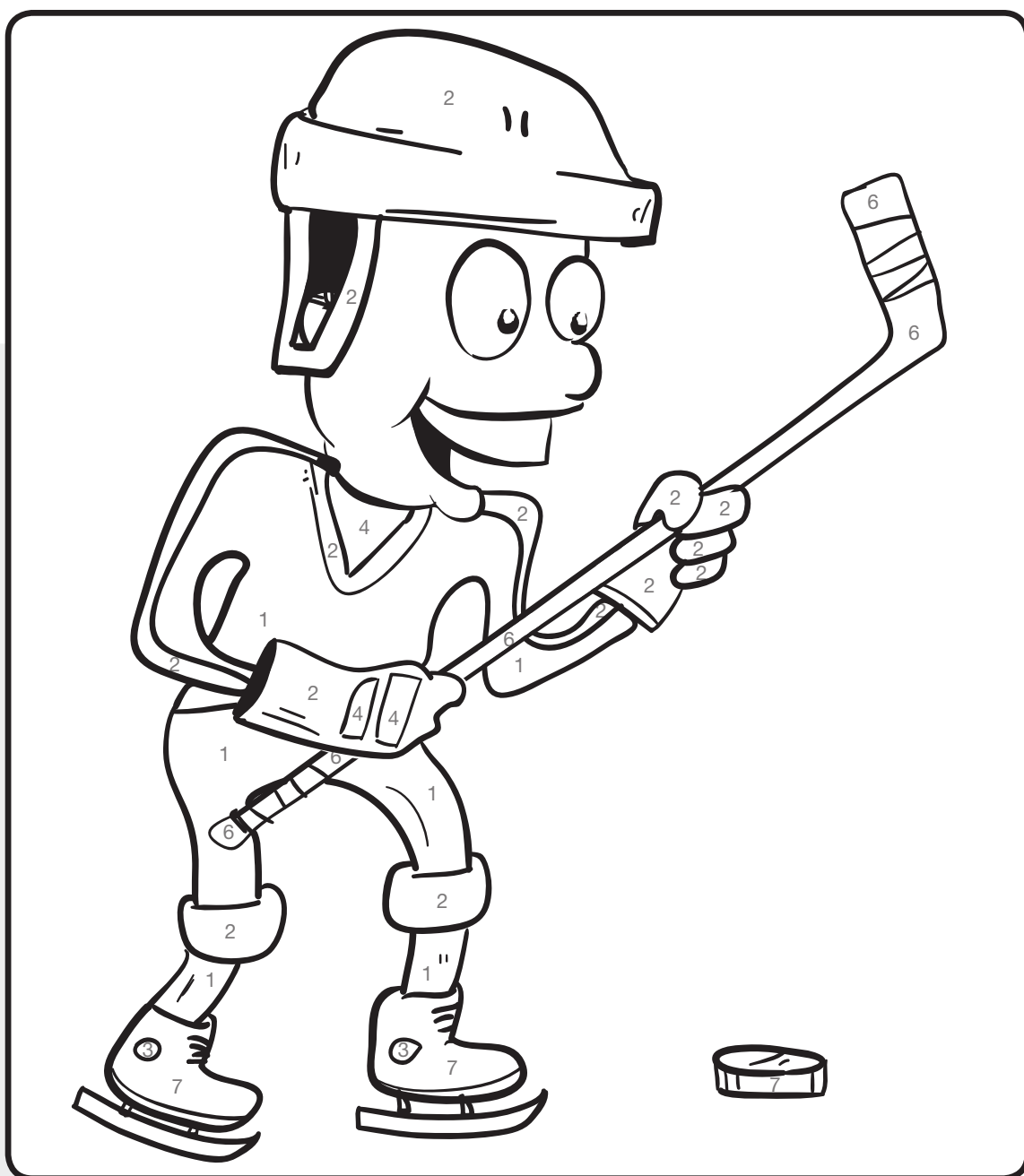
The human brain looks like wrinkled Jell-O. It is a pinkish gray color and sits in a liquid inside your head. The liquid surrounding the brain protects it if you fall and hit your head. If you fall, your brain floats instead of hitting the hard bones of your skull. But if you fall really hard, your brain hits your skull and can be hurt, so always wear a helmet for protection.

Color the pictures of these kids protecting their brains!

1 = red 2 = blue 3 = green 4 = yellow 5 = orange 6 = brown 7 = black

If an area doesn't have a number, color it in with your choice of colors.





Helmets In Action

Try this experiment. You will need a raw egg and a styrofoam cup. Make a helmet for the egg using the cup. Test your helmet by dropping the egg in its helmet. In a bike or skateboarding accident, a helmet protects the brain in much the same way.

Neuroscientists = Brain Doctors

Neuroscience is the study of the brain and nervous system. The human brain is “the most sophisticated machine imaginable or unimaginable.” It is made of more than 100 billion nerve cells and each one forms as many as 10,000 connections with other neurons.

Nearly one in five people have a condition that affects the brain - ranging from learning disabilities to depression to brain injury. Some of these are:

Alcoholism

Alzheimer’s Disease

ADHD (Attention Deficit/Hyperactivity Disorder)

Autism

Blindness

Depression

Drug Abuse

Epilepsy

Learning Disabilities

Multiple Sclerosis

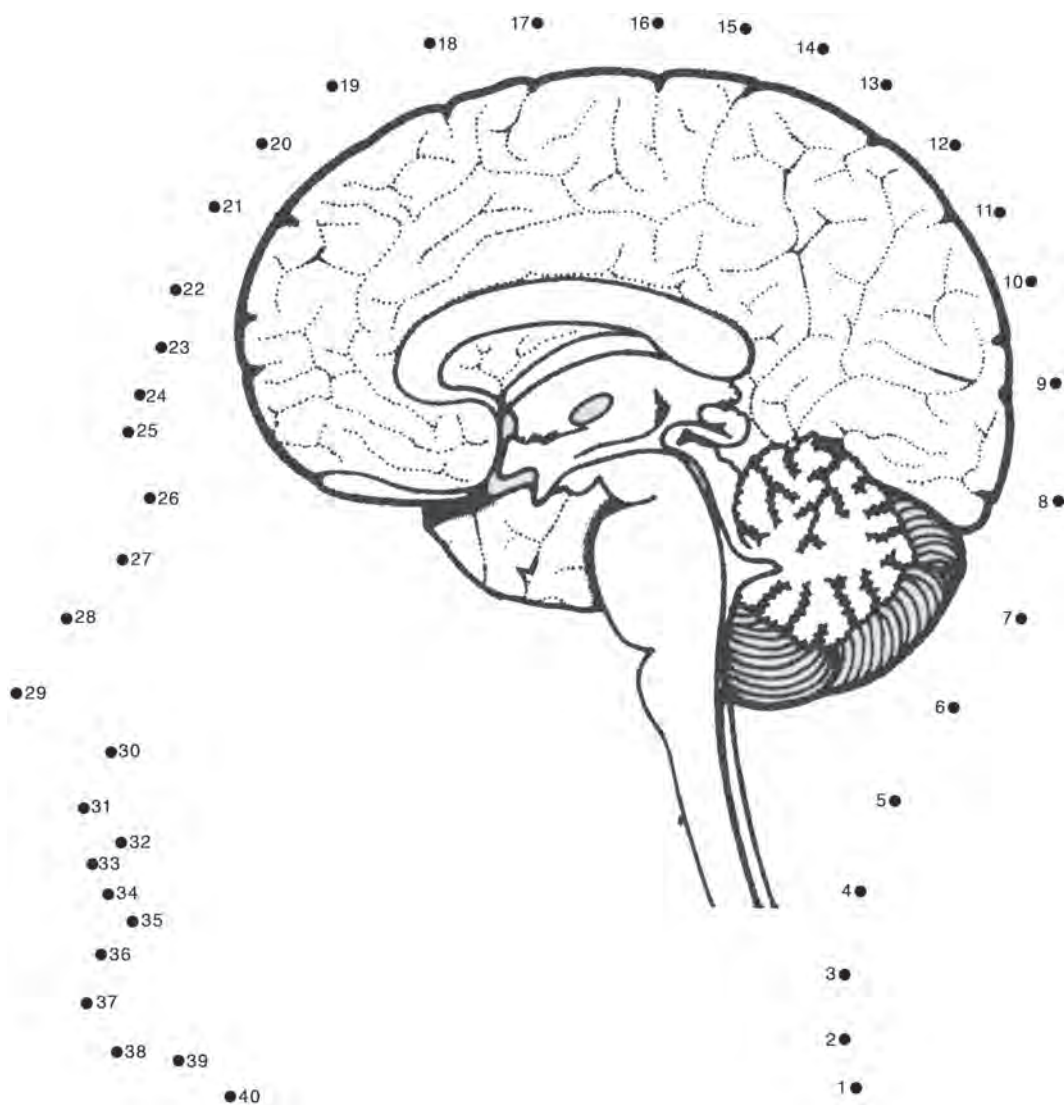
Pain

Parkinson’s Disease

Stroke

Tourette Syndrome





Neuroscientists are doctors who study the brain and nervous system. Neuroscientists are making new discoveries every day to help people who have diseases and disorders of the brain.

Connect the dots on the screen that the neuroscientist is pointing to.

Learn More!

Check out these names for the parts of the brain and see where they are located in the drawing below:

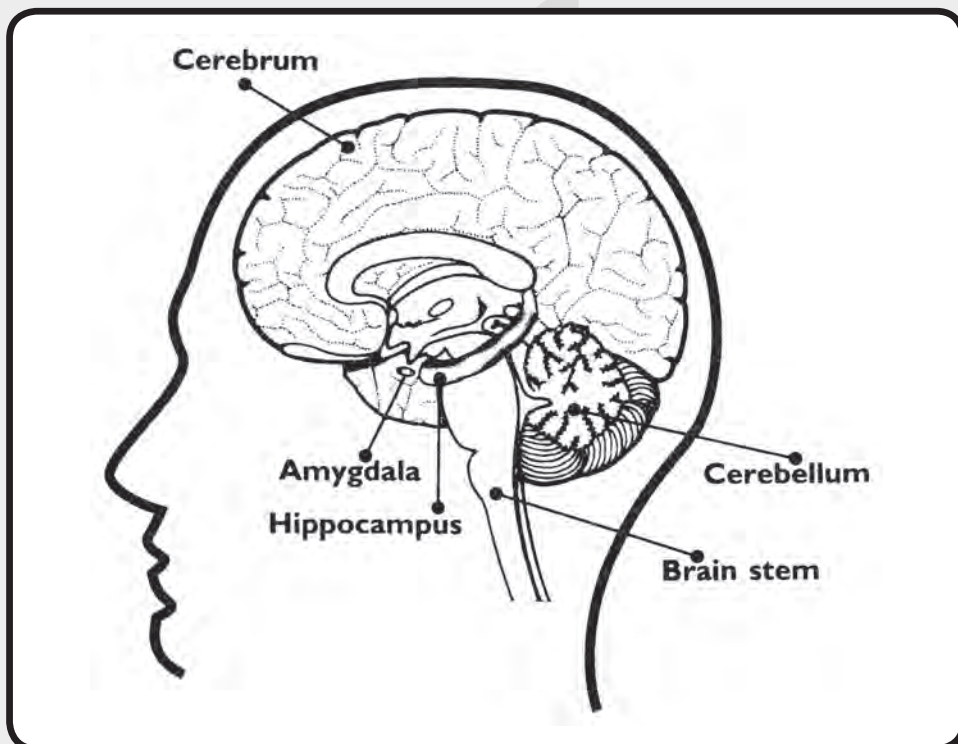
CEREBELLUM: This area helps you with movement and balance. With practice and your cerebellum you won't need training wheels on your bicycle for long.

CEREBRUM: This area helps you solve problems and make decisions. Deciding which game to play can be difficult but your cerebrum will help you to decide which one to play now and which one to play later.

HIPPOCAMPUS: This area helps you remember. Buried deep inside the brain, the hippocampus helps you remember past events – like the smell of your favorite cookies or the turns/directions to get home after school.

AMYGDALA: This area is involved with your emotions, like fear, anger and happiness. Watch out for that spider under the tree!

BRAIN STEM: The brain stem connects the brain to the spinal cord and controls such things as heart rate and breathing.



**To learn more about your brain,
see Sources and Resources on the next page.**

If you want to learn more about the brain, visit these sites on the Internet.

- **Dana Alliance for Brain Initiatives,**
www.dana.org
- **Brainy Kids Online,**
www.dana.org/kids
- **Baylor College of Medicine, Center for Educational Outreach,**
www.ccitonline.org/ceo
- **Howard Hughes Medical Institute,**
www.hhmi.org
- **National Institute on Alcohol Abuse and Alcoholism,**
www.niaaa.nih.gov
- **National Institute on Drug Abuse,**
www.nida.nih.gov
- **National Institutes of Health, Office of Science Education,**
<http://science.education.nih.gov>
- **National Institute of Mental Health,**
www.nimh.nih.gov
- **National Institute of Neurological Disorders and Stroke,**
www.ninds.nih.gov
- **Neuroscience for Kids,**
<http://faculty.washington.edu/chudler/neurok.html>
- **Society for Neuroscience,**
www.sfn.org

ANSWERS

Pages 6-7:

The figure shows a white vase and two faces in black looking at each other.

The circles are both the same size.

House C is the same as the first house.

**YOU HAVE BRAINS IN
YOUR HEAD.**

**YOU HAVE FEET IN
YOUR SHOES.**

**YOU CAN STEER YOURSELF
ANY DIRECTION YOU CHOOSE.**

-DR. SEUSS