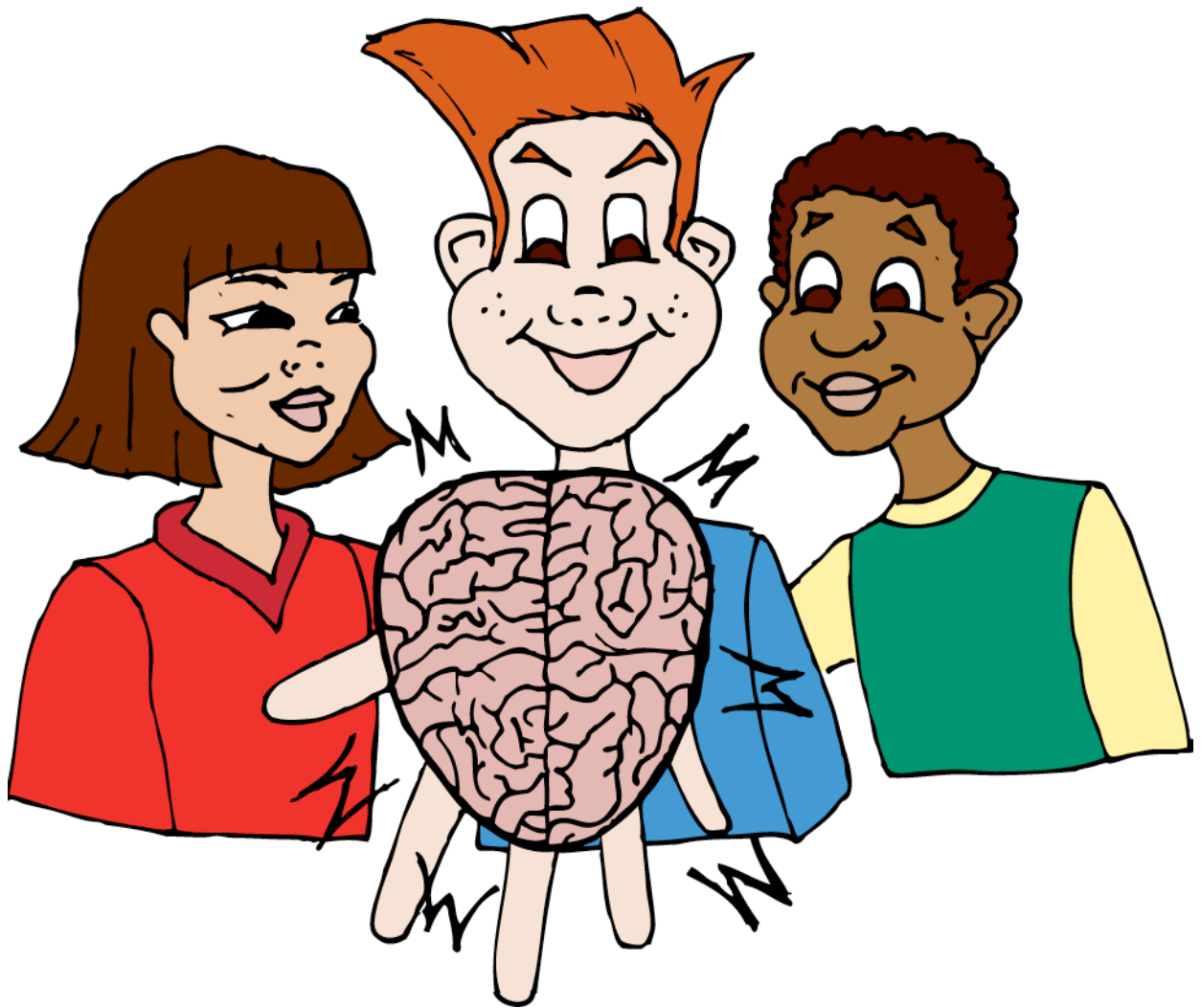


My Amazing Brain



STUDENT Activity Log Book
Centre for Studies on Human Stress
Douglas Hospital – McGill University
www.douglas.qc.ca/stress/

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Build Your Own Brain, pg. 1

Your brain has a lot of different parts that work together to make you happy, to help you learn, and to let you dream. Find out more about the parts of the brain by building one of your own!

1. Color in the brain parts using crayons, colored pencils, or colored markers.
2. Cut out the parts and use the map on page 2 to Build Your Brain!



Pink



Yellow



Blue



Purple



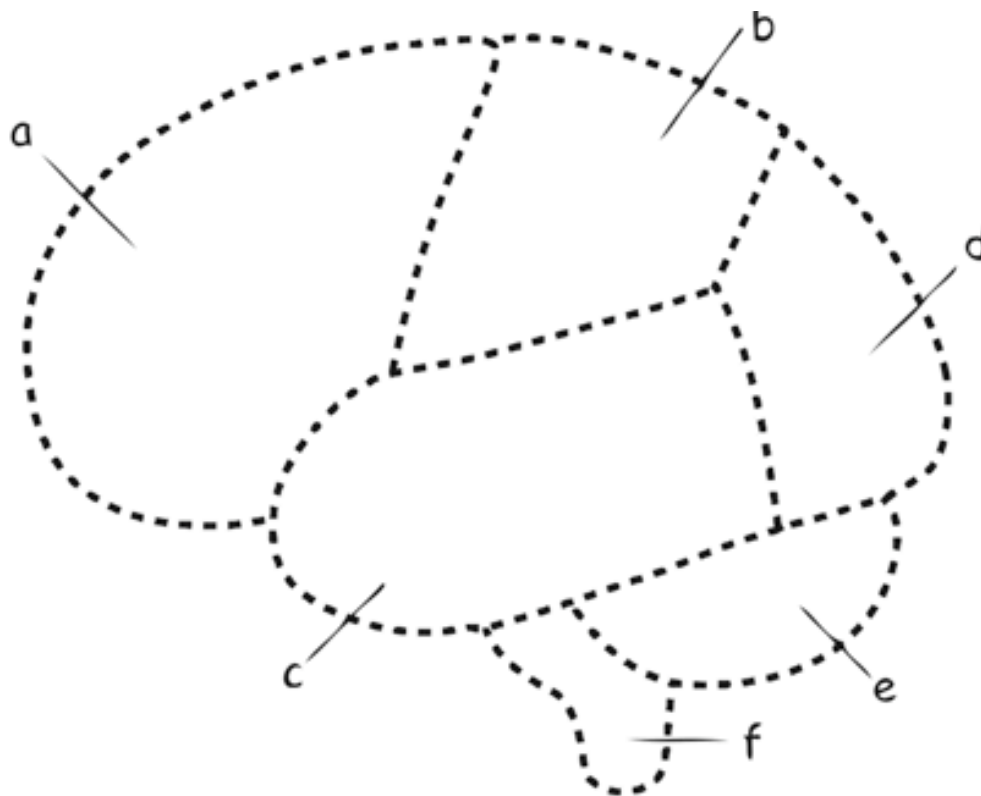
Gray



Green

Build Your Own Brain, pg. 2

Match the brain parts from page 1 with this Brain Map. Glue the pieces onto the map to Build Your Own Brain!



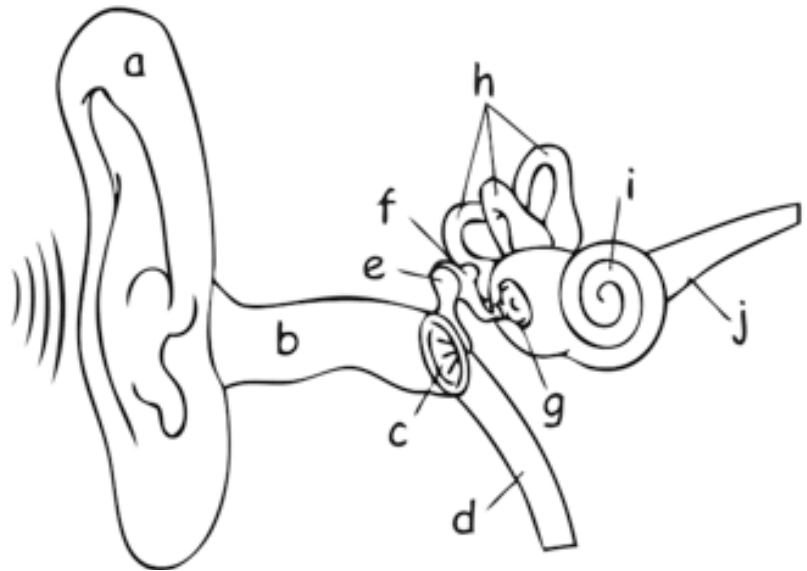
- a. **Frontal lobe** – Setting goals, planning, feeling emotions.
- b. **Parietal lobe** – Feeling softness or hardness, feeling temperature and pressure, and activating your muscles.
- c. **Temporal lobe** – Recognizing faces, objects, and sounds; also important for making memories.
- d. **Occipital lobe** – Interprets everything you see.
- e. **Cerebellum** – Maintains your balance and coordination, helps you walk and move around.
- f. **Brain Stem** – Regulates vital functions like breathing, eating and your heartbeat.



What's In Your Ear?

Listen up! Your ear is an amazing acoustic instrument. It's designed to hear all kinds of sounds, from loud thunderclaps to quiet whispers. Find out how it works by coloring in its parts with crayons, colored pencils, or colored markers.

- a. **Outer ear** (pink)
- b. **Ear canal** (orange)
- c. **Ear drum** (blue)
- d. **Eustachian tube** (gray)
- e. **Malleus** (purple)
- f. **Incus** (red)
- g. **Stapes** (black)
- h. **Semicircular canals** (green)
- i. **Cochlea** (white)
- j. **Auditory nerve** (yellow)



Outer ear – The outside part that you can see and touch. Helps to funnel the sound towards inside.

Ear canal – A tube that filters and focuses sound.

Ear drum – A thin sheet of tissue that vibrates when sound hits it.

Eustachian tube – A tube that connects the ear to the throat, so that pressure doesn't damage the ear.

Malleus – One of three tiny bones that helps to turn sound into electrical signals.

Incus – One of three tiny bones that helps to turn sound into electrical signals.

Stapes – One of three tiny bones that helps to turn sound into electrical signals.

Semicircular canals – Fluid-filled tubes that help you maintain your balance.

Cochlea – the main organ of hearing, a tiny fluid-filled spiral of neurons.

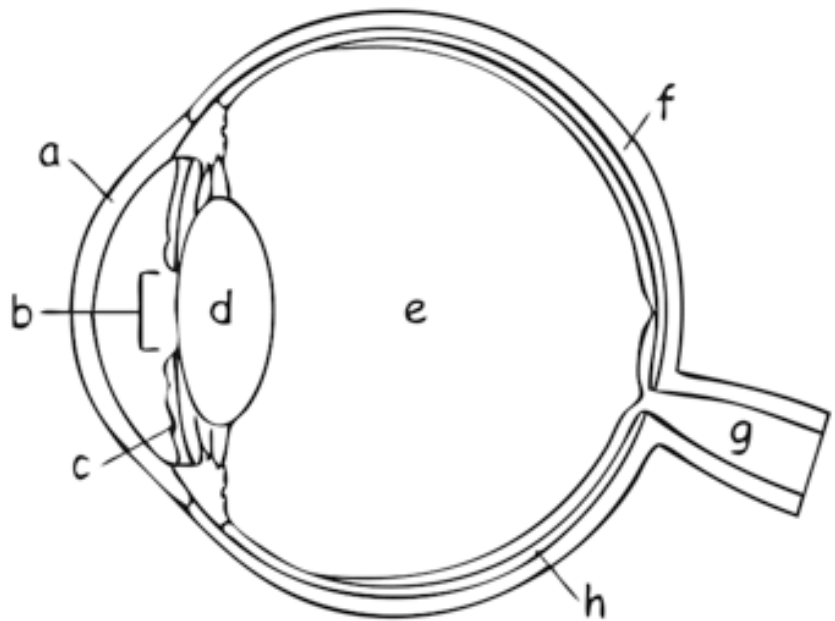
Auditory nerve – relays electrical signals from the ear to the brain.



What's In Your Eye?

Your eye is one of the most sensitive instruments in the world! Learn how it works by coloring in the different parts with crayons, colored pencils, or colored markers.

- a. **Cornea** (gray)
- b. **Pupil**
- c. **Iris** (blue)
- d. **Lens** (pink)
- e. **Vitreous humor** (orange)
- f. **Sclera** (white)
- g. **Optic nerve** (yellow)
- h. **Choroid** (green)



Cornea – A thick, clear covering that protects the eye.

Pupil – A hole in the iris that lets light into the eye.

Iris – A colorful, circular muscle that controls how much light gets into the eye.

Lens – A stiff, clear tissue that focuses light.

Vitreous humor – A dense liquid that fills up the eyeball.

Sclera – The white part of the eyeball.

Optic nerve – Relays electrical signals from the eye into the brain.

Choroid – A dark layer of tissue at the back of the eye that absorbs extra light.

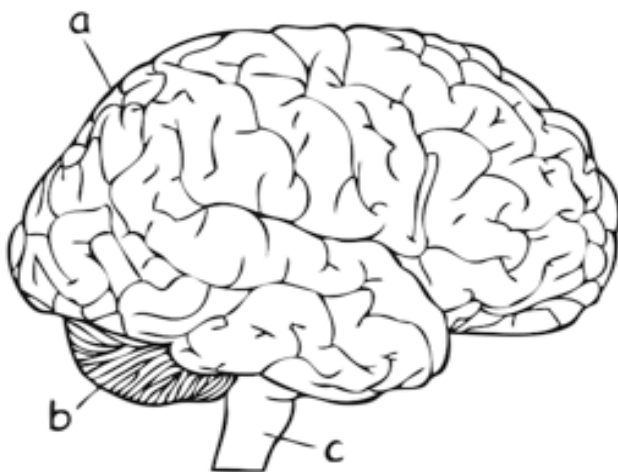


The Inside - Outside Brain

The outside of your brain is covered with wrinkly folds called “gyri”. On the inside, your brain has a lot of parts that help you to walk, talk, breathe, and think. Use this page to build your own brain hemisphere, and find out how the parts of your brain fit together!

1. Color in the parts of the brain using colored pencils, crayons, or markers.
2. Fold this page in half along the dotted line to see how the brain structures line up in your head.

Outside surface of Brain



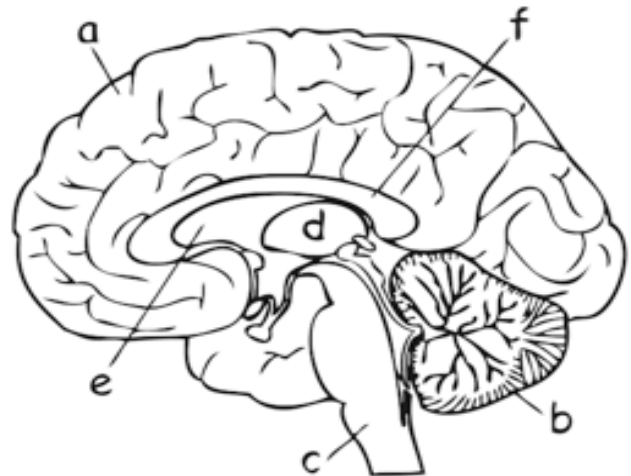
- a. Cerebrum (pink)
- b. Cerebellum (orange)
- c. Brain stem (blue)

Cerebrum - A wrinkled sheet of tissue that helps you talk, think and plan.

Cerebellum - Maintains your balance and coordination, helps you walk and move around.

Brain stem - Regulates vital functions like breathing, eating, and your heartbeat.

Inside surface of Brain



- d. Thalamus (gray)
- e. Hypothalamus (purple)
- f. Corpus Callosum (red)

Thalamus - The brain's post office, the thalamus receives information from the eye and sends it to the correct address in the brain.

Hypothalamus - This part of the brain secretes hormones that control when you wake up and how quickly you digest food.

Corpus callosum - A fiber “highway” that connects the two hemispheres of the brain.



Grocery Store Tricks

Sometimes it's hard to remember everything you'd like to. Want to know a secret way to remember lots of information easily? Play this game to find out how!

Get together in a circle. One person will start the game by saying, "I'm going to the store to buy some bread." The next person will add a grocery item to the list, saying, "I'm going to the store to buy some bread and milk." Then the next person will add an item, and so the list will get longer and longer.

The trick to remembering the list is to make up bizarre visual images. Try picturing the item that each person in the circle names, and imaging them doing something funny with that item. Maybe you'll imagine that your friend who said "bread" is in the middle of a giant sandwich, or that the person who said "milk" is sitting in a big bowl of it. Now when you have to say the list, just look around the circle and remember the images you made up.

Using this technique, how long can your grocery list get?



Left Brain, Right Brain

Your brain has two halves, called “hemispheres” – you have one hemisphere on your right side and one on your left side. Some people tend to rely on the right hemisphere, while others rely on the left. Which side do you use the most?

Pair up with a friend and try this experiment. Ask your friend to do the Task, and then write down which side of their body they used to do it.

TASK	RIGHT or LEFT?
Write your name.	Right or left hand?
Use a scissors to cut out a circle.	Right or left hand?
Kick a ball.	Right or left foot?
Step onto a mat with one foot.	Right or left foot?
Look through a tube.	Right or left eye?
Cup your ear to listen to a whisper.	Right or left ear?
Listen through a wall.	Right or left ear?

Now compare your results with your classmates. Did you find that people used one side of their body for all of the Tasks, or did they use the right side sometimes and the left side other times? Did the boys use one side more than the girls? What side of the brain do you use the most? ***

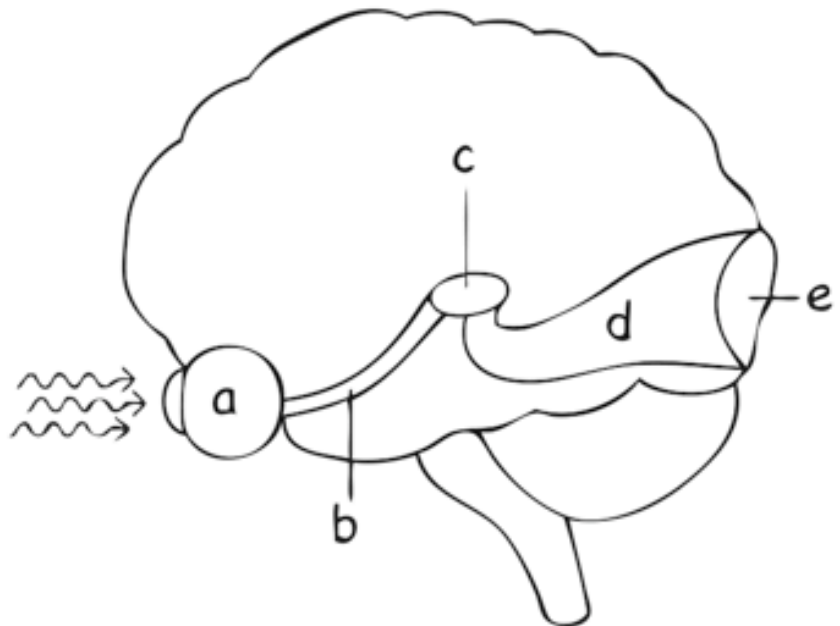
***This is a trick question! Remember that the right side of your body is controlled by the left side of your brain. So what side of your brain do you think you used most?



The Path To The Brain

When you see something, light has to travel all the way from that object into your brain. Learn about the path light takes into the brain by coloring with crayons, colored pencils, or colored markers.

- a. Eye (white)
- b. Optic nerve (yellow)
- c. Thalamus (blue)
- d. Optic radiation (pink)
- e. Visual cortex (orange)



Eye - Changes light into electrical signals.

Optic nerve - Relays electrical signals from the eye into the brain.

Thalamus - Relays electrical signals from the thalamus to the cortex.

Visual cortex - the part of the brain that interprets visual information.



The Invisible Spot

Did you know that there is a spot that you can never see, no matter how hard you look? It's called your "blind spot", and it happens because of the way your eye is built. Try this game to find your blind spot.

Hold this page about two feet away from your face. Close your right eye and look at the + sign with your left eye. Now move the page closer to your face until the dot disappears. That's where your blind spot is!



To find out why you have a blind spot, check out the "What's in Your Eye" Activity Page.



Shifting Backgrounds, Shifting Images

Here's another way to demonstrate how different images are projected on to each eye. Look at an object in the distance (20-30 feet away), such as a clock on the wall. Close one eye, hold up your arm and line up your finger with the object. Now without moving your finger or your head, close the opened eye and open the closed eye. The object in the distance will appear to jump to the side...your finger will no longer be lined up. This shows that different images fall on each eye.

Materials:

- NONE



Where Was That?

How do you know when someone taps you on your shoulder? Your sense of touch, of course! But did you know that your sense of touch is different on different parts of your body? Measure your touch sensitivity in this experiment.

Get two colors of washable markers and a ruler, and then pair up with a friend. Have your friend close their eyes while you mark a spot on their skin. Now ask your friend to use another color marker to mark the same spot (make sure their eyes are still closed!). Using your ruler, measure the distance between the two spots and fill in the table below. The smaller the distance, the more sensitive that body part is to touch.

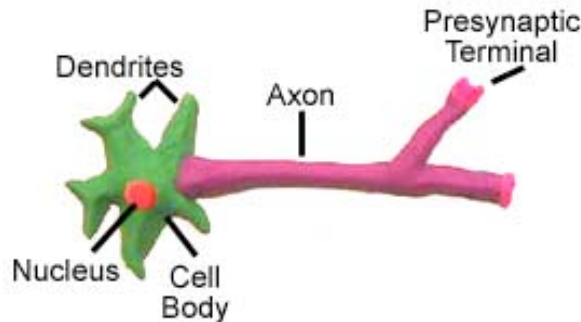
Where?	Distance?
Arm	
Back of Hand	
Palm of Hand	
Neck	

Which areas of the body are the most sensitive? Which are the least sensitive? Why do you think that some parts of the body are more sensitive than others?



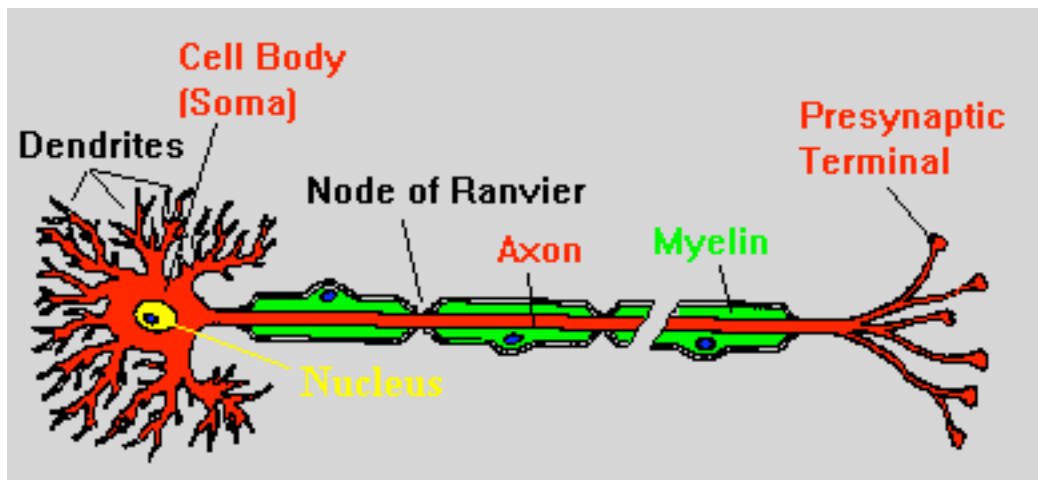
Make a Neuron!

Create a model of a neuron by using clay, playdough, Styrofoam, recyclables, food or anything else you can get your hands on. Use pictures from books to give you an idea of where the components of a neuron should go and what shape they should be. Use different colors to indicate different structures. Make a neural circuit with a few of the neurons. Create sensory or motor systems. Eat your model if you made it out of food!!



Materials:

- Clay or Playdough or Styrofoam or Recyclables (bottle caps, cups, buttons, etc) OR Food (fruit, jelly beans)
- A picture or diagram of a neuron (see the picture below).



Thanks for Dr. Chudler for his website describing this experiment.



Fine Fingers

We have the ability to tell whether objects are cold, hot, smooth or rough. To demonstrate the different types of receptors in the skin, gather a number of objects that are:

- smooth (an apple)
- rough (sand paper; rock)
- cold (ice)
- warm (a sun-warmed piece of metal)

Tell someone to close their eyes (or use a blindfold) and touch the items to the person's hands or fingers. Ask them what they feel.



Brain Box (Bag) of Science

What could it be? Only the Brain Boxes and Bags of Science know for sure. The boxes and bags are used to isolate the sense of touch from sight and hearing. The object is to put something into the box and then have other people try to guess what it is just by feeling it with their hands. For the Brain BOX, use a "medium-sized" cardboard box (bigger than a shoe box). On the side of the box, cut a hole large enough to put your hand through. Cut off the closed end of an old sock to make a tube. Tape (duct tape works well) the sock to the inside of the box so that the sock makes a "tunnel" from the outside to the inside of the box. You can make 1 or 2 more tunnels and holes in the box so that more than 1 person can use the box at the same time. Decorate the box with pictures and drawings. For the Brain BAG of Science, use a pillow case. Have people put their hand into the bag while you hold it or sew a length of elastic around the top to close it up.

Questions and Comparisons:

Things to try:

- Familiar objects: cup, spoon, ball, block, sponge, fruit, sponge, rock, cotton ball, leaf, pinecone, feather
- Difficult objects: wood letters, wood numbers, foil, peanuts, bar of soap
- Put several things in the box at the same time. Ask how many items are in the box.
- Discuss the texture of objects: smooth, rough, bumpy, soft, hard, etc.
- Sponges cut up in similar and different shapes.
- Plastic cut-out bath letters and animals (you know, the kind that you can throw into the bathtub)
- Get pairs of objects; one object is outside of the box, the other object is inside the box. Show an object to a person, then have this person find the same object in the box.
- GLOVE TREATMENT: put on a pair of gloves (dishwashing gloves, latex gloves, work gloves) and try to guess what is in the box. This will show you what happens when you reduce the amount of tactile (touch) information getting to your brain.

Materials:

- A cardboard box or pillow case
- Socks
- Scissors (to cut socks)
- Tape (duct tape is best)
- Decorations for the box: drawings, pictures
- Objects to put in the box or bag
- Gloves (for the GLOVE TREATMENT portion of the experiment)

Thanks for Dr. Chudler for his website describing this experiment.



Sock It To Me!

Here is a simple variation of the Brain Bag/Box of Science project. Get 5 to 7 different socks. Put different small objects into each sock. Have other people try to guess what is inside of each sock by touching and feeling the object on the outside of the sock. If they can't guess what the object is, have them put their hand into the sock and feel it. By actually touching the object, you can get more information about the characteristics of the object. For example, its roughness and texture. Try numbering each sock. Then prepare a worksheet identifying the object in each numbered sock.

Materials:

- 5-7 socks
- Small objects to put into the socks (pencil eraser; coin; golf ball; rock, etc.)



Tactile Double Trouble

How about a little comparison-shopping? Collect some small object "pairs" such as two identical bottle caps, two paper clips, two marbles, etc. Put one item from each pair into two separate bags. So now you have one set of objects in one bag and the matching objects in another bag. Reach into the bags and pull out the pairs. To make things harder, use object pairs that are only slightly different from each other, such as grades of sand paper or different sizes of marbles.

Another way to play Double Trouble is to put one set of objects in a bag and have a friend hold up the objects. To play, the friend will hold up the item he or she wants you to find in the bag. See how long it takes to find it.

Materials:

- Object Pairs - marbles, paper clips, sand paper squares, balls, etc.
- Bags- paper bags, pillow cases, brain bags of science



Mystery Noises

Jiggling coins, clinking glasses, clapping hands...think you know what these sound like? Test the ability of people to identify several sounds with this game. People should close their eyes or turn away from the "sound maker." Make each sound and see if everyone knows what it is. Example sounds:

1. Shake pennies or other coins
2. Clap hands
3. Clap chalkboard erasers
4. Tap a pencil or pen on a desk
5. Close a book
6. Crumple up paper or foil
7. Stomp on the floor
8. Tear some paper
9. Close a stapler
10. Bounce a ball

I am sure that you can think of more sounds to make. You could also have people take turns making sounds and asking the others to guess the noise.

Materials:

- Sound effects



In the Middle

Blindfold one person and have him sit in the middle of the class. Have the other people form a large circle around the blindfolded person. Point to one of the people in the circle and have him say the seated person's name. The seated person must then try point in the direction of the voice and identify the name of the person who said his name. Try this experiment with the seated person using both ears and then again with one ear closed. How accurate can the center person identify the caller and where the call came from? Are two ears better than one?

Materials:

- Chair for center subject



Sound Shakers/Noise Makers

Let's make some NOISE! Explore the sense of sound with these easy-to-make sound shakers (noise makers). Find some plastic film containers, plastic yogurt or cottage cheese cups, or other plastic juice bottles. Make sure that the containers have covers for the tops. Fill the containers 1/2 or 1/4 full with dry seeds, uncooked beans or rice, pebbles or sand. Seal the top of the container with glue or tape (you don't want the seeds, beans, rice, etc. all over the floor). Decorate the container with glue and magazine cutouts, stickers or colored paper, then shake, shake, shake. Compare the sounds made by the different materials.

You could also play a guessing game with your sound shakers: have people guess what is inside of your sound shaker just by listening to the noise your shaker makes.

Materials:

- Plastic containers: film canisters, yogurt cups, plastic bottles
- Glue or tape to seal the top of the containers and to attach decorations.
- Fillings: dry seeds, uncooked beans or rice, sand, pebbles, coins, marbles, rocks
- Decorations: stickers, colored papers, cutouts from magazines



Model Eardrum

It's easy to make a model of the eardrum (also called the "tympanic membrane") and see how sound travels through the air. Just stretch a piece of plastic wrap over a large bowl or pot (any container with a wide opening will work). Make sure the plastic wrap is stretched tightly over the container. The plastic represents the eardrum. Place about 20-30 grains of uncooked rice on the top of the plastic wrap. Now you need a noisemaker. A tin cookie sheet or baking tray works well. Hold the cookie sheet close to the plastic wrap. Hit the cookie sheet to create a "big bang" noise and watch the rice grains jump.

The "big bang" produces sound waves (changes in air pressure) that cause the plastic sheet to vibrate which causes the rice grains to move. Sound waves vibrate the eardrum in much the same way.

Materials:

- Plastic wrap
- Container with wide opening
- Uncooked rice (any other small grain will work)
- Tin cookie sheet (or other noise maker)



Smell Match

Collect pairs of items that smell and place them in containers that you cannot see through. Poke holes into the top of the containers. Mix up the containers and try to match the containers that have the same item. When you have made your decisions, open up the containers and see how you did.

Suggested smells:

lemon	orange peel	cedar wood	perfume soaked cotton
banana	pine needles	chocolate	coffee
dirt	vanilla	garlic	onion
mint	vinegar	moth balls	rose flowers



The Nose Knows

The nose is responsible for part of the flavor of food. To demonstrate this, blindfold a person and have that person hold their nose. Give them something to taste such as a pear or apple slice. Can they tell the difference between the pear and the apple? Try to distinguish the pear slice from the apple slice. Other good comparison items are baby foods: they come in a variety of fruit and vegetable flavors. A test food most kids like is the jelly bean. Buy several flavors of jelly beans and have everyone try to guess the flavor (with and without the use of their nose). The advantage of using the baby foods and jelly beans is that they all have the same texture. Therefore, the blindfolded person will not be able to use touch information to distinguish the different items.

Materials:

- Foods to taste: fruit or vegetable slices, baby food, jelly beans
- Blindfold



The Sense Chart

This is a good project to start young children toward learning about their senses. Draw or make a chart with a picture of an eye, ear, nose, tongue and hand. Write down words or hold up pictures that "go" with each of the senses that are represented by the eye (vision), ear (audition), nose (olfaction), tongue (gustation) and hand (tactile sense). For example under the:

- 1 Eye: light bulb, sun, flashlight
- 2 Ear: piano, music
- 3 Nose: garbage, skunk
- 4 Tongue: ice cream, apple, hamburger
- 5 Hand: glove, pencil, book

Of course, most of these items could go under a few of the categories, but that is part of the project. Our senses work together to tell us about the outside world.

Materials:

- Blackboard and chalk OR a poster chart
- A list of words or pictures to be placed under the appropriate categories.



Sensory Stations

Explore the 5 senses in different "stations" around the classroom. Set up tables with hands-on materials for kids to touch, smell, taste, hear and see. Some possible station items:

- Hearing: bells, drums, whistles, rice-filled containers, spoons to tap.
- Touch: sandpaper, playdough, clay, ice, finger paint
- Vision: microscope, magnifying glass, colored water, prism
- Olfaction: vanilla, perfume, chocolate, spices
- Taste: jellybeans, cookies, crackers, fruit slices, salty chips, dill pickles