

What a Brain!

Age/Grade: 9-10 4th Grade

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Science Concept: The brain receives messages from different parts of our body.

Materials:

- 1-Long String
- 2-Signs: Axon, Dendrite, Neurotransmitters, Enzymes, Left Foot, Right Foot, Right Hand, Left Hand, Brain, Spinal Cord, Mouth, Eyes, Ears (etc, depending on questioning)
- 3-Messaging Cards (see below)
- 4-Word Wall Chart
- 5-How the Brain Works flip book
- 6-Where Does it Happen? worksheet
- 7-KWL Chart that was completed at beginning of study- at another lesson
- 8-Silly Glasses
- 9-Study Sheet
- 10- Brain Word Wall
- 11-Research Report Ideas for Children

Process Skills:

- Observation
- Communication
- Prediction
- Classification

Standards:

Alaska Science Standards:A-10, B-1

Alaska State English Language Arts Standards: A-4, A-6

Cultural Standards: Educators: E-2, Students: B-3

Gear Up:

Process Skills: Predicting, communicating, observation

Play Synaptic Tag

Teacher: Today we are going to play Synaptic Tag. This side of the line is an axon. This side of the line is a dendrite. What is the space in the middle? (Synapse)

Everyone, but one person- the enzyme will be on the axon. you are called neurotransmitters. The neurotransmitters job is to get to the dendrite without being caught- or deactivated- by enzymes.

If the neurotransmitters is deactivated by the enzymes, you must return- in other words- be reabsorbed by the axon, and wait until the next turn. When you make it ot the dendrite you are safe!!

Teacher: Over the last few weeks we have been exploring our senses through activities, reading and exploring vocabulary. We've been adding new nervous system words to the word wall the last two weeks and wrote down what we think we know on the KWL chart. How do you think our senses allow us to make sense of our world? Where do messages go once our senses take them in? Feel free to refer to the word wall to help if you like. Today we will be exploring this.

Have string on the ground- somewhat in the shape of the nervous system. Point to it.

Teacher: You have special wires in your bodies that carry messages from all over your body to your brain. Do you know the name? (nerves) How does it work? Put names on word board as children share.

Explore:

Process Skills: Predicting, communicating, observation

Nerve Messaging Game

Four students get a sign Brain, Spinal Cord, Right hand, and Left Hand. They stand on corresponding sign on the string on the ground.

Teacher: These students will be body parts and will act out how the nervous system works.

Left hand gets a card and reads it aloud.

Teacher: How does the brain get the message from the left hand? (Should be passed to the spinal cord, then the brain)

The Brain needs to decide what to do now- what shall it do? Brain, write the message on the card .(in this case, right hand scratch the left hand).

Have the children discuss the pathway of the message. (From brain to spinal cord to right hand to scratch the spot.) Children pass the card to the correct body part.

Continue to do this with the other cards. Add more body parts: eyes, ears, feet, tongue, nose, and corresponding signs. Switch kids so all can participate.

Divide kids up in groups to come up with their own messages that players can act out.

Cards Ideas:

Left hand feels itch.

Right hand touches something hot.

Eyes see a bear.

Tongue tastes rotten meat.

You see a fish and a knife in front of you. You hear your dad say, "fillet the fish".

Student reads directions on board, "Take out a pencil".

Dad puts smoked salmon in front of you to eat.

Generalize

Process Skills: communicating, classifying, predicting

Questioning:

Question: What can you compare the nerves or special wires to in your brain to? (telephone, computer connection etc.) How do messages travel throughout your body? What happens after the brain makes a decision?

Add vocabulary to Word Bank and create quick sketch- seek out information in discussion on neurons, dendrites, axons, motor nerves, sense nerves, sensory and motor areas of brain---- we've been reading about these in book groups)

Brainstorm: How can you keep your nervous system strong and healthy? What foods and activities do you and your family participate in to help with keeping your messaging system in good working order?

Message Check-in

Have kids count by twos. Twos: Turn to a friend and explain the path of this message: You came home from school yesterday and realized you were STARVING.

Friend, do you agree or not with your partner?

Ones: Turn to a friend and explain the path of this message: Your friend is in the other room- you hear a bang in the other room and then your friend starts to scream. Friend, do you agree or not with your partner?

KWL Chart

Review KWL chart we developed. Review "What We Think We Know"- see if it is correct. Add to "What We Learned".

Word Wall

Add new vocabulary words to the word wall

Apply/Assessment

Process Skills: classifying, communicating

How the Brain Works Book

1. Children are given two handouts to make the book, *How the Brain Works* (from the Incredible Body). They cut and staple the book as individuals.
2. They read the book to themselves
3. They read a book to a friend.

(Note: a lot of the content in the book is review for many of the children, although not all. They then relate this review to a new idea: exploring the different function of different parts of the brain- where different senses are processed)

4. Children take the book and fill out the *Where Does It Happen* sheet with the help of the *How the Brain Works* book. Here the children color code the certain parts of the brain related to an activity (such as you smell a flower- color the smelling part of the brain green..... you hear a bird sing- color the hearing part of the brain in red etc.)

Milling to Music

Play up-beat music. have the children wander around the room to music with their book in their hand. Stop the music every minute or so . children need to pair up the person closest to them. Teacher, ask a question related to the book. Ask the children to figure out the answer together or take turns finding the answers to questions. Play the music again and do over (and over, and over, and over :))

Here are some question ideas:

Name the three parts of the brain.

What is the spinal cord used for?

What is the whole system that deals with body messaging?

What is the name of the nerves that carries messages to the brain?

What is the name of the nerves that carries messages from the brain?

How do you keep your brain healthy?

Have a Council Of Brains..... Kids pose questions as the brainiacs in silly glasses and lab coats answer the questions. Switch roles. Have word wall available as a reference if necessary.

Fill in Brainiac Log (see attached)

Fill in Brain Science Journal on another day (see attached)

Give kids a study sheet for upcoming test that will take place after they pose a question and do a research report.

Use the Science Journal Rubric when assessing with the Brainiac Log and Brain Science journal

Use the Inquiry Scoring Guide when assessing the Council of Brains and other activities.

Brainiac Log

Name:

Date:

How do we get information from outside of our bodies?

Name all the senses:

Describe the nervous system.

Describe a neuron?

What is the space between the axon and dendrite that carries chemical information?

Pretend you picked up a hot plate. Describe where the messages travel to and from in your body that allows you to drop the hot plate.

Brain Science Journal

What did you learn from the last week? Include key words and the concept:

What was the most fascinating brain related thing you learned this week:

What questions do you have?

Science Journal Rubric

Student's Name:

Date:

Activity or Journal Response #: _____

Score	Criteria	Comments
3	The writing/drawing shows detail and accuracy in recording observations; the child uses rich science vocabulary and shows a positive attitude toward the subject and science in general	
2	The writing drawing includes mostly accurate details; some may be inaccurate or missing	
1	The writing/drawing shows partial knowledge; lacks detail	
0	There is little or no response, or the writing/drawing is inaccurate or unrelated	

From Rubrics, Checklists, and Other Assessments for the Science you Teach, Scholastic Professional Books

Scientific Inquiry Scoring Guide

Score	<u>Developing Questions</u>	<u>Communicating</u>
5	<ul style="list-style-type: none"> ◇ Uses observations and scientific knowledge to form questions and or hypotheses ◇ Distinguishes testable from nontestable questions 	<ul style="list-style-type: none"> ◇ Communicates in a variety of ways (written, draw, spoken) a clear and complete explanations of their investigation and its results. ◇ Uses data to support conclusions ◇ Makes connections to science content knowledge using observations and results of investigations
4		
3	<ul style="list-style-type: none"> ◇ Forms broad general questions which may or may not reflect scientific knowledge ◇ Distinguishes testable from contestable questions with assistance 	<ul style="list-style-type: none"> ◇ Offers an explanation of investigation using more than one way to communicate information. Explanation may be incomplete or lack clarity. ◇ Evidence is used to support explanation, though may interpret some data incorrectly
2		
1	<ul style="list-style-type: none"> ◇ Is unable to develop questions or questions do not reflect scientific knowledge. ◇ Is unable to distinguish testable from contestable questions 	<ul style="list-style-type: none"> ◇ Is unable to clearly communicate explanation of the investigation and results ◇ ignores evidence