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An Investigative Approach to the Brain: The 5 Senses, the 5W's and an H

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by Vivienne Bartman

I keep six honest serving-men (They taught me all I knew); Their names are What and Why and When And How and Where and Who.

Introduction

Close your eyes and imagine this picture: It is 9:00 am the morning of July 7, 2009. There is a group of about 100 teachers sitting in a conference room at the Yale National Initiative, a two week intense professional development with outstanding professors from Yale. Our task is to develop a curriculum unit, designed to benefit students in urban schools. Looking at the faces of the new fellows I could see the fear in their eyes. At this session the topic of discussion was focused on the creation of our units, mine being the one you are currently reading. The main point was how to get started and overcoming the fear of the blank page. Throughout the lecture I kept hearing familiar words: "What do you want to share with other teachers?" "How are you going to get your point across?" Why do you think your topic is of interest for teachers and students?" etc.

I was so proud of myself. I realized in the middle of this wonderful discussion that I had found the best topic to develop. If, as educators, we are still struggling with the process of research and writing, what is going through the heads of our students when they are given an assignment as momentous as a research project? If the accepted practice at a university is to use who, what, when, where, how and why; then we as teachers need to have our students do the same. It is my objective in this lesson to give the basic understanding of the 5W's and an H to my second graders so that they can take that tool and use it in every facet of their lives until it becomes the norm in their research practice.

Rationale

In the past ten years of teaching I have seen a gamut of both educational settings and student understanding. I started teaching math in a high-achieving performing arts magnet middle school. I spent the last 5 years in neighborhood K-8 schools, first teaching middle school math and now just finishing my first year as a third grade self-contained classroom teacher. Next year, I will teach second grade. Within this wide range of ages and skill level I have found one important part of education missing. All of these students do not have a foundation in the process of research. They struggle with making sense of their research and knowing which are important facts and which are unnecessary. In too many of their minds, the idea of research is to copy the first paragraph of a book about their topic or cut and paste someone else's work. It is my opinion that the earlier a child is taught a process of research the better they will be at the skill in later years.

My school is located in one of the highest crime and poverty areas in Pittsburgh. There is a lot of instability in the neighborhood and most of the families are non-traditional. Many of the children come to school for stability, hot meals, and social interactions. Beginning in the fall of 2009 my school will be returning to a K-5 school with enrollment of under 200 students with 99.2% African American. Discipline within the building is very strict; each child is required to wear a uniform, walk the halls in quiet straight lines and obey strict school rules. Each grade level will have one self-contained classroom. Class size ranges from twenty to thirty-five children. There will be a possibility of having class reduction teachers come into the building if the class size is too large.

My classroom is based on positive self-image and mutual respect for anyone that steps through the door. Many of the children come into school with negativism and issues that affect not only their education but all of their peers' education as well. The school environment must be such that the children can focus these energies into their education. My classroom is a beehive of activities. I am the queen bee and the children are the worker bees. The worker bees know the expectations of the classroom and they know that if one bee does not do the work expected the whole hive suffers. Yes, my classroom theme is a beehive with bee name tags, Bee Rules, filling the honey jar and of course I have my crown to wear to signify that I am the queen.

This unit will be taught in the Science class during the National Brain Awareness week. For the school year 2009-2010 it is the week of March 15; all subsequent years can be identified through the website of the Dana Foundation at www.dana.org . Because of the length of the unit, it may need to be extended into the following week or started early. The lessons will be designed to build pride in the school community, as well as pride in themselves.

Young children need to develop and understand techniques to do a thorough research assignment. They need to be given a tool that they can use to research any topic. The tool that will be used in this unit is the journalist's approach to writing a complete story. This technique is to answer all of these six questions: Who, What, When, Where, Why and How. By asking these questions and finding the answers the children will be able to research a subject and get a complete understanding of it. The subject the children will be researching is the brain and the five senses.

Background

In journalism, the five Ws and an H is a concept in news style, research, and police investigations that is regarded as basic information-gathering. It is a formula for getting the "full" story. A newspaper story, research paper, or police report must answer a check list of six questions, each of which comprises an interrogative word: Who? What? Where? When? Why? How? Each question should elicit a factual answer—facts that are necessary to include for an investigation to be considered complete. Notice that none of these questions can be answered with a simple 'yes' or 'no'.

The 5Ws and an H technique builds upon questioning skills that must be learned in grade school. Its simplicity helps ensure the right questions are asked and the right information is recorded. The 5Ws and an H technique provides several benefits. The first benefit is that it's simple and easy to learn. Even a child of seven can remember what words the 5Ws represent, and if not they can learn the rhyme from Rudyard Kipling's: The Elephant's Child or the rap that is part of this lesson. It develops questioning skills that avoid yes or no answers. One of our 'catch phrases' in Pittsburgh is 'accountable talk'. When using 'accountable talk' in the classroom, both teacher and student are expected to ask and answer questions that do not have a response of 'yes' and 'no'. The children are already used to using it so to extend it into a research based activity will be easy. Next, the technique encourages collection of complete information. The children must understand that if they can answer each of the six questions, the result will be at a suitable grade level. And finally, it keeps researchers from forgetting or overlooking key pieces of information. This is an organizational technique that benefits students of all ages.

What is the brain?

The brain is the most complicated object in the world, but an adult brain is only about 3 pounds. It is made up of brain cells packed tightly together so that the non-cellular fraction of brain is only 20%. The brain cells are arranged both in columns that go deep into the brain and in sheets that stack up like the layers of a cake. A closer look would show that each of these brain cell branches, like a tree and each branch is connected to many other cells and their branches. The functional cells are called neurons and the branches are called dendrites. Each neuron has one long special branch called an axon. These axons can grow several inches to several feet long. They link to other neurons at their dendrites through a space called the synapse.

How can the brain be used as a teaching tool?

If you are like me you probably have no idea the true impact the brain has on the education of the children in our classes. If we really thought about it and read all the research we would find some very interesting facts as to why the children of today are having such a problem with learning. My seminar "The Brain in Health and Disease" provided me with information that will ultimately change the way I teach. I am about to share this insight with you because the better we understand the students the better teachers we will be. By understanding how the brain learns, we can better use our educational resources.

You might think the brain works like a computer with all the complex organization of cells. But the brain is not a computer and in fact no computer can do what the brain can do: 'think and imagine itself in space and time'. The brain has no central processing unit (CPU), but instead processing functions are spread throughout the brain. A computer doesn't reorganize itself the way a brain does as it creates new information. What the human brain does best is learn. The learning is done by neurons. We are born with pretty much all the

neurons we will ever have, but we develop connections through sensory stimulus and learning. The neuron receives a stimulus, or signal, from one of its dendrites; it tries to make sense of the signal then sends a response through its axon. The axon delivers the message to the sensory receptors and the action is completed. Sometimes in order to receive or send a signal it must travel through several neurons to arrive at its destination. To reach the next neuron the signal must travel through a gap called the synapse. All of this action takes a fraction of a second to complete and the brain has now forged a pathway of a learned response.

Learning changes the brain because it can rewire itself with each new stimulation, experience and behavior. The brain's capacity to change is called plasticity. Our brains are all unique because everyone has different experiences at different times. Each time we have an experience a connection is made between neurons through the synapse. The connections between cells strengthen with each repeated experience. To our brain, we are either doing something we already know how to do or we are doing something new. If we are repeating an earlier learning, there's a good chance the neural pathways will become more and more efficient. When a new task is initiated the brain works very hard to understand it at first, but as the task is repeated the neurological pathway gets stronger and makes the task easier to do. In the classroom if you look very carefully you see this happening everyday. The struggling child is working hard to build the neurological pathway. The know-it-all child up front has already built the pathway and needs more stimulation. The quiet child in back might need more encouragement to begin the process.

When we do something we already know how to do it is called an exercise: when we learn something new it is called stimulation. This stimulation is sent to the brain by nerve impulses. The brain processes the input, decides what to do with it and then sends an electrical discharge outward to the axon, it stimulates the release of stored chemicals into the synaptic gap, the space between the end of an axon and the tip of a dendrite. Believe it or not the learning takes place in the synaptic gap. The key to getting smarter is growing more synaptic connection between brain cells and not losing existing connections. It is the connections that allow us to solve problems and figure things out.

If learning is what we value, then we ought to value the process of learning as much as the result of learning. What ensures our survival is adapting and creating options. A typical classroom of the past narrowed our thinking strategies and answer options. Educators who insisted on singular approaches and the "right answer" are ignoring what has kept our species around for centuries. We are still around because we are trying new things and not always getting the right and true answers. We as humans try to find different approaches to problems, sometimes succeeding and sometimes not. If we as teachers expect children to respond in a certain manner we are stifling the chances that they will create thoughtful, in depth answers independently. Good quality education encourages the exploration of alternative thinking, and multiple answers. Learners want school to be worthwhile and meaningful. With so many different personalities, cultures and types of students, how can school be meaningful for everyone? That is our awesome responsibility.

Neurobiologists tell us that much of our sensory learning develops in our first year. During the first year of life the developing brain grows rapidly and sensory stimulation needs to be constantly activated in order for the child to be prepared for school. Imagine if one of your students was denied this stimulus as a baby. They would begin school already behind. They already have to play catch up with the students that have been stimulated from birth. Our huge task, as teachers, is to fill this gap. For example, a teacher can not expect children to be able to discuss a story about a rafting trip when they have no idea what a raft is: this happened in our fourth grade class. To fill the gap the teacher had to first build a foundation, a miniature raft, then show the possible dangers by attempting to float it in a tub of water and then to go one step further she made waves in the tub. The foundation was set and now it was easier to encourage the children to read with more

rigor and expectations.

Here is where I had one of those 'wow' moments. I have always been told that once a child is behind he/she really can never catch up and is always behind. That the brain does not change. I also thought that if a child suffered from a devastating injury or was socially deprived he/she would always be that way. Well my 'wow' came when I learned more about the plasticity of the brain. With a lot of patients, practice, and stimulus and a positive environment the brain can actually change physically. I was so excited. I delved into books and documents that proved and showed, for example, that epileptics could get half of their brains removed and could still live productive, normal lives. Well I know that my students have more than half a brain. If it works for an epileptic child it could work for my children. So I need to be patient and make sure I teach each and every lesson with sensory stimuli. Each new stimulus that is given to a child will create a new neurological pathway that will give them a lifelong foundation.

As educators, we can most influence the "nurture" aspect of students. The brain reacts adversely to negative inputs so we must appreciate how the brain reacts to these influences. We must remove the threats from the learning environment. This includes embarrassments, finger-pointing, making kids miss recess, and humiliations. Once they are removed the learning environment can be developed into a nurturing positive place for the brains to be developed.

The brain learns fastest and easiest during the early school years: every movement, every thought and every feeling a child experiences is controlled by the brain. The brain nearly explodes with spectacular growth as it adapts with stunning precision to the world around it. During school is when the foundation is set for later learning. The children come expecting to be stimulated in ways they are not at home. It is our awesome responsibility to give our students the best foundation.

What do the senses do for us?

Our senses are amazing. The purpose of the major senses is to detect and discriminate among signals coming from our environment. These signals carry information necessary for us to support our vital functions. Without the information we receive through our five senses, we could not function as individuals. Each sense works both independently and in collaboration with other senses, depending on the task at hand. Each sense is important in its own right, but has limitations and the capacity to compensate for another damaged sense. The most effective way to receive information, of course, is to use all our senses in harmony.

Our senses are the physical means by which all living things see, hear, smell, taste, and touch. Each sense collects information about the world and detects changes within the body and this information is then quickly transported to the brain for a reaction. So how does that happen?

All senses depend on the working nervous system. Our sense organs start to work when something stimulates special nerve cells called receptors in a sense organ: eyes, nose, ears, tongue, and skin. Once stimulated, the receptors send nerve impulses along sensory nerves to the brain. Your brain then interprets the stimulus and helps you to decide what you should do about it. Your brain can do all this in a fraction of a second. In many situations reaction time must be quick for safety and survival. An example of this would be if your hand is burning on a hot stove you would need a fast reaction to alleviate further pain.

Why do we need to see?

Seeing or vision is the ability to detect light by the eye and the brain to interpret the detected light as an

image as "sight". There is disagreement as to whether or not this constitutes one, two or even three distinct senses. From the moment you wake up in the morning to the time you go to sleep at night, your eyes are acting like a video camera. Everything you look at is then sent to your brain for processing and storage much like a video cassette. This is a very simplified explanation, but as you read on, you will discover why the sense of sight is actually considered the most complex of the five senses.

How do your eyes work?

Take a moment to locate an object around you. Do you know how you are able to see it? Would you believe that what you are actually seeing are beams of light bouncing off of the object and into your eyes? It is hard to believe, but it is true. The light rays enter the eye through the cornea, which is a thick, transparent protective layer on the surface of your eye. Then the light rays pass through the pupil and into the lens. When light rays pass through your pupil, the muscle called the iris makes the size of the pupil change depending on the amount of light that's available. You may have noticed this with your own eye, if you have looked at it closely in a mirror. If there is too much light, your pupil will shrink to limit the number of light rays that enter. Likewise, if there is very little light available, the pupil will enlarge to let in as many light rays as it can. Just behind the pupil is the lens and it focuses the image through a jelly-like substance called the vitreous humor onto the back surface of the eyeball, called the retina.

The retina, which is the size of your thumbnail, is filled with approximately 150 million light-sensitive cells called rods and cones. Rods identify shapes and work best in dim light. Cones on the other hand, identify color and work best in bright light. Both of these types of receptor cells send information to the brain by way of the optic nerve. The amazing thing is, when they send the image to the brain, the image is upside down! It is the brain's job to turn the image right side up and to help you interpret you what you are looking at. The brain does this in a specific place called the visual cortex.

Because the eye is such an important and complex part of our body, we have many features which protect the eye. The eyebrows are the strips of hair above your eyes which prevent sweat from running into them. Eyelashes help keep the eye clean by collecting small dirt and dust particles floating through the air. The eyelashes also protect the eye from the sun's and other light's glare. The eyelids sweep dirt from the surface of the eye. The eyelid also protects the eye from injury. Tears are sterile drops of clean water which constantly bathe the front of the eye, keeping it clean and moist.

What did you say? How hearing works.

Hearing is the sense of sound. Hearing happens when tiny hair fibers in the inner ear detect the motion of atmospheric particles within (at best) a range of 20 to 20000 Hz. Sound can also be detected as vibration. Lower and higher frequencies than can be heard are detected this way only. When an object makes a noise, it sends vibrations (better known as sound waves) speeding through the air. These vibrations are then funneled into your ear canal by your outer ear. As the vibrations move into your middle ear, they hit your eardrum and cause it to vibrate as well. This sets off a chain reaction of vibrations. Your eardrum, which is smaller and thinner than the nail on your pinky finger, vibrates the three smallest bones in your body: first, the hammer, then the anvil, and finally, the stirrup. The stirrup passes the vibrations into a coiled tube in the inner ear called the cochlea.

The fluid-filled cochlea contains thousands of hair-like nerve endings called cilia. When the stirrup causes the fluid in the cochlea to vibrate, the cilia move. The cilia convert the vibrations into messages that are sent to the brain via the auditory nerve. The auditory nerve carries messages from 25,000 receptors in your ear to

your brain. Your brain then makes sense of the messages and tells you what sounds you are hearing and then sends a message, or multiple messages to create your reaction to the sound.

Your ears serve two very important purposes. Ears help you to hear sounds and your ears also help you to keep your balance.

How does that taste?

Taste is one of the two "chemical" senses, but without the sense of smell you are unable to pick up all the flavors in food. Your smell sensors are much more sensitive than your taste sensors: before you have even taken a bite you sense of smell is sending a message to the brain. It is well-known that there are at least four types of taste "buds" (receptors) on the tongue. Have you ever thought about why foods taste different? It's really quite amazing. Your tongue and the roof of your mouth are covered with thousands of tiny taste buds. When you eat something, the saliva in your mouth helps break down and dissolve your food. This causes the receptor cells located in your taste buds to send messages through sensory nerves to your brain. Your brain then tells you what flavors you are tasting.

Taste buds play the most important part in helping you enjoy the many flavors of food. Your taste buds can recognize four basic kinds of tastes: sweet, salty, sour, and bitter. The salty/sweet taste buds are located near the front of your tongue; the sour taste buds line the sides of your tongue; and the bitter taste buds are found at the very back of your tongue. Until this seminar I thought, like most of you are thinking, that indeed we have only the four types of taste buds. Well, low and behold I had another 'wow' moment when we learned that there was a fifth taste sensor on the tongue. This fifth receptor, called "umami", was first theorized in 1980 and its existence confirmed in 2000. The umami receptor detects the amino acid glutamate, a flavor commonly found in meat, and in artificial flavorings such as monosodium glutamate.

Everyone's tastes are different. In fact, your tastes will change as you get older. A baby has taste buds, not only on their tongue, but on the sides and roof of their mouth. This means they are very sensitive to different foods. As a baby grows, the taste buds begin to disappear from the sides and roof of their mouth, leaving taste buds mostly on their tongue. As a child gets older, their taste buds will become even less sensitive, so they will be more likely to eat foods that they thought were too strong when they were younger.

Why does that stink?

Smell, or olfactory sense, is the other "chemical" sense. Unlike taste, there are hundreds of olfactory receptors, each binding to a particular molecular feature. The combination of features of the odor molecule makes up what we perceive as the molecule's smell. In the brain, olfaction is processed by the olfactory system. Olfactory receptor neurons in the nose differ from most other neurons in that they die and regenerate on a regular basis. Have you ever wondered what you smell when you "smell the roses" in the spring time or when you smell stinky cheese? What makes a smell is something that is too small to see with your eyeball alone. It is even too small to be seen with a microscope! What you smell are tiny things called odor particles. Millions of them are floating around waiting to be sniffed by the nose! You smell these odors through the nose, which is almost like a huge cave built to smell, moisten, and filter the air you breathe. As you breathe in, the air enters through the nostrils, which contain tiny little hairs that filter all kinds of things trying to enter the nose, even bugs! These little hairs are called cilia. The cilia are not the hair that you can see in your nose. You cannot actually see the cilia. After being cleaned by the cilia the air passes through the nasal cavity. After passing through the nasal cavity, the air passes through a thick layer of mucous to the olfactory bulb. There the smells are recognized because each smell molecule fits into a nerve cell like a lock and key. Then the cells

send signals along the olfactory nerve to the brain. At the brain, they are interpreted as those sweet smelling flowers or that stinky cheese. The brain will then send a response telling the muscles what to do: either hold your nose or sniff again.

Why did that hurt? The sense of touch

Touch is the sense of pressure perception, generally in the skin. While the other four senses (sight, hearing, smell, and taste) are located in specific parts of the body, the sense of touch is found all over. Some parts of the body are more sensitive to touch than others. The skins of the fingers, for example, contain many more sensors than the skin on the back. The sense of touch originates in the bottom layer of the skin called the dermis. The dermis is filled with many tiny nerve endings which give you information about the things with which the body comes in contact. They do this by carrying the information to the spinal cord, which sends messages to the brain, letting you know where the feeling is registered.

The nerve endings in the skin can tell you if something is hot or cold. They can also feel if something is hurting you, sending a signal called pain. The body has about twenty different types of nerve endings that all send messages to the brain. However, the most common receptors are heat, cold, pain, and pressure or touch receptors. Pain receptors are probably the most important for your safety because they can protect you by warning your brain that your body is hurt!

Some areas of the body are more sensitive than others because they have more nerve endings. Have you ever bitten your tongue and wondered why it hurt so much? It is because the sides of your tongue have a lot of nerve endings that are very sensitive to pain. However, your tongue is not as good at sensing hot or cold. That is why it is easy to burn your mouth when you eat something really hot. Your fingertips are also very sensitive. For example, people who are blind use their fingertips to read Braille by feeling the patterns of raised dots on their paper.

Objectives

At the beginning of the unit a lesson on the 5W's and an H will be provided and the concept will be practiced. The first discussion of the 5W's and an H will be through literature. I will read "Beautiful Princess Without a Face" a wonderful fictional story about the five senses. After the story I will ask them questions using the technique and while we are talking I will ask them to listen for any words that ask a question. They will hear the question words: who, what, when, where, why and how. A discussion about a newspaper, the job of a reporter and the use of the journalistic research technique will follow. If time permits there are wonderful books in the library that describes jobs. One about journalism would be a great visual tool.

The next lesson will be titled "Brain-storming the Brain". It will be a prior knowledge discussion about the brain. I would like the discussion to bring out the fact that the 5 senses are part of the brain; this may take some leading questions, since the senses are found in different areas of our body, but they are also part of the brain. To make the connection to the brain more clear, the students will be given an anatomy coloring sheet to identify the location of the 5 senses. A brain Jell-O mold and Plaster of Paris will be used to make brains for each of the children to paint or color to identify each critical region of the brain in which the five senses are processed.

The students will then be divided into 5 groups of newspaper reporters and will be given one of the five senses to research using the journalistic research tool. They will begin by choosing 5 questions they want to answer about their sense. Then using books and internet resources they will find the answers to their questions. Each group will present their information to the class and a question and answer period will follow. The unit will end with a creation of our "Brain Almanac" our classroom newspaper. The newspaper will make the connection between the process and the knowledge.

Strategies

5W's and an H

The research strategy described and explained above. This is the journalistic approach to research. Who, what, when, why, where and how. This is the practicing strategy that is the basis for the entire unit.

Read Aloud/Think Aloud

This strategy involves: modeling for students the internal thought processes of an effective reader; defining for student's skills/terms to be targeted in the selection; and helping students internalize and transfer the reading skills to their own independent analysis. This strategy will be used during the lesson that we read the book "Beautiful Princess Without A Face".

Concept Cards

Using note cards, students can identify major issues, characters, and events and may determine the significance and impact of these events. This method allows student practice in gathering, summarizing, comparing, contrasting, and analyzing information regarding a person, time period, or issue. This can be used during the research time. Each question will be written on a color-coded card and then the response written underneath the question.

Think Pair Share

This discussion strategy ensures that each student is an active participant in a learning situation. The teacher provides something for the students to think about, often asking students to write down their ideas as evidence of their thinking. Students then pair to share their ideas. As much as possible, students should only work in pairs. The larger the group, the greater the chance that students will once again become passive learners. The share aspect can also include having partners share their observations or conclusions with another set of partners or the larger group. Sharing can involve posting writing work or making an informal or formal presentation. This strategy will be used during the research and presentation of the senses.

Think it, Draw it, Make it, Talk it, Write it

This strategy is designed to touch upon all types of learners. They must think about the problem, draw using tables, pictures or organizers, make a physical example, talk about it with others and then write about it. The children will use this strategy during their preparation of their presentation.

Classroom Activities

Day One:

The first lesson can begin the week prior to the National Brain Awareness Week to make sure there is enough time to get everything done. The first lesson is an introduction to the research strategy and the 5 senses. Begin the lesson by reading "Beautiful Princess Without a Face:" as you are reading aloud to the student make sure you 'think aloud' too. This means you need to make sure you have read the story prior to class and be prepared to tell the children what you think as you read the story. Following the story begin a 'rich text discussion' by asking the children the following questions. Ask the children to write down question words that they hear during the discussion. (you may change the questions according to the needs of your students and ask more if you feel it is needed)

1. Who is the main character?
2. What happened to her?
3. When did she realize she had a problem?
4. Where did the princess lose her face?
5. Why do you think losing her face was important to the story?
6. How did losing her face help the princess?

Following the discussion write the words the children heard on the board and then ask: Does anyone know anything about a newspaper? Gather prior knowledge and if a connection is not made that a journalist writes the stories ask: Who writes the stories or articles for the newspaper? A discussion should follow about the technique 5Ws and an H used by journalists to get the whole story. The final announcement should be that next week the children will become journalists and find the scoop about the Five Senses.

Day 2: Brain-storming the Brain

Materials:

1. Internet access to the FOSS site
2. brain coloring sheet
3. 3-D brains prepared in advance
4. T organizational form
5. computer with a projector

1. Where is the brain?
2. Why do we need our brains?
3. What is the brain made out of?
4. When do we use our brains?
5. Why is the brain important?
6. How does the brain work?

Procedure:

Brain-storming: Using the T organizational form share information as to what the children think about the brain. Use the 5Ws and an H to pose question that will encourage them to come up with responses.

Get as much information as possible from the children then using a computer and a projector access the interactive FOSS site provided below. Share and show what the brain is and how it works. Make sure the connections with the senses are made. When the discussion is over complete the second half of the T form to find out what new things the children know about the brain. Be aware that if, because of class size, you are going have a group research the brain try not to give away too much information.

Show the picture of the brain and the senses, from the site provided below, on the screen and talk about the location of each sense in the brain. The children can then color a brain worksheet to represent the picture displayed. They need to include a color key. When they are finished coloring give them markers and the 3-D brain to color in the same manner as the worksheet.

Day 3: Become investigative reporters :

Materials:

Books about five senses

Computers

job chart for the investigative team (in appendix)

computer and projector

Divide the class into 5 investigative teams, assign each team a sense. Present each of the research tools that will be provided in class:

Search engine: http://clusty.com/

FOSS: http://www.fossweb.com/modulesMS/kit_multimedia/HumanBrain/index.html The sensory library of books

Review the job list and what each job description is. The children will separate into their teams and decide what job each person will have. Depending on the size of the groups the jobs might have 2 or 3 people or someone might need to do two jobs. Give the teams time to explore and discuss what they find. Do not rush this. For some children this might be the first time they have been given complete control of research and many might not have had access to the computer.

Note: to have less people on each investigative team have more than one team researching each sense and also have another team investigate the brain.

Lesson 4: Research

Materials:

Resources from previous day

colored note cards (6 colors)

Review Prior Knowledge: Discuss through questions and answers what the children did on the previous day. Then ask them to remember the questions that the journalists must ask to get a complete story or article.

Write them on the board again and next to each word tape a colored card on the board. The children should understand that the question and answer should be written on the colored card that is next to the word. This is an organizational step that will help when they are compiling their information. Give each group several cards of each color and make sure that they understand that they can write as much as they feel is necessary (use more than one card).

For differentiated instruction you can either provide them with a list of the 6 questions they need to answer, create the questions together as a group, or have each team make up their own questions. I have listed questions you can use but with research any question can be viable. This is designed for the children to be independent learners.

1. Who first found this sense?
2. What should we do to keep this sense healthy?
3. When we don't have this sense what will happen?
4. Where do you find this sense in your body?
5. Why do we need this sense?
6. How does it work?

Begin the research: The groups should then be given time to explore the resources and write down information about their sense. As the teacher you need to join each group and listen to what is being discussed and to help when problems arise. Encourage the children to find different pictures that would represent their topic. A time line should be given to keep the teams on task; this will depend on how much time you are allowing for the Brain Awareness Week. These are the tasks that will need to be completed before the Presentation Day:

Colored coded cards completed

organizational form completed

article written in paragraph form

pictures or chart to represent sense

Day 5: Presentation Day

Each group will present their findings to the rest of the class. They will share the questions they used, what results they found and share the pictures found. They will submit their research to the Editor, the teacher, to make the final copy of the Newspaper. As the teacher you can decide whether you want to type the news articles or copy the children's work.

Extra Activity if time permits: Memory tool:

Materials

provided poem

video camera

Procedure

Using the poem below to create a rap that the children can record on video, perform for the school or just as a memory tool. If the children have time they can add extra verses.

Rap of the senses:

1, 2, 3, 4, 5

senses keep us all alive,

there are 5 in our brain,

and they all have a name,

hear, see, taste, smell and touch,

now 6 words that help so much

Who, what, when, where, why and how,

that is what we do now,

When we got things to learn,

this is where we must turn.

Answer each one and you'll see

how great learning will be.

Annotated Bibliography

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A Users Guide to the Brain explains in lucid detail and with perfect clarity the basic structure and chemistry of the brain.

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Most young girls, and even boys, find themselves worried about their looks. Join Sarah, a young girl concerned with her appearance, as she daydreams in the world of Doll Land to find answers concerning beauty and the senses. Sarah begins to wonder if she too is beautiful. She drifts off into a dreamlike state and dreams about a folktale about a princess her grandma told her when she was young.

Princess-Loves-the Pond is obsessed with being beautiful. She is so concerned with her own appearance, that she totally ignores the beauty surrounding her in Doll Land. One day Princess-Loves-The-Pond bent over to see her reflection. She slipped on a stone and fell into the pond. A gush of water washed away her delicate face. She no longer had eyes, ears, nose or a mouth. Without a face, the Princess is only left with the ability to feel.

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The only complete, authoritative, family-friendly guide to the brain's development, health and disorders. It contains essential brain information along with practical, health-preserving advice.

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Internet Resources for teachers and students

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"Come To Your Senses." Oracle ThinkQuest Library . http://library.thinkquest.org/3750/index.html (accessed July 8, 2009).

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Additional Reading List

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Appendix

Day 2 T-chart for the Brain Discussion: Enlarge for actual classroom use

Brainstorming the Brain

What I think I know. What I know now.

Day 3 Job Chart: For easier use for a second grader you may want to change the font. Depending on class size a child may need to share a job or have two jobs.

Group Leader _____

Lead Writer _____

Who Reporter _____

What Reporter _____

When Reporter _____

Where Reporter _____

Why Reporter _____

How Reporter _____

Day 4: Organization Form: For easier use for a second grader you may want to change the font and make it fit one page. This form is used to compile all the information from the cards into one location. The Lead Writer will be the one to complete this task. Once the form is complete the students can then write their newspaper article.

Resource cited page: For easier use for a second grader you may want to change the font and make it fit one page. You may want to add more rows of boxes to encourage more research. The children should be aware that they need to say where they found all of their information. This is a simple chart that they can fill out as they progress through the research.

Topic _____

Books we used

Internet sites we used

How to's for this unit

How to access FOSS: using the URL above enter the site. Register your name, school etc. I suggest you put your grade level as 6 even if you are not a sixth grade teacher this will allow you to access the investigation about the brain and senses. You can now enter the Lab. It is suggested to explore the site ahead of time so that you know what part of it you want to use. The children should be given your login information to use during their research so don't use a username and password that is private.

How to find the picture of the Brain and its senses: use the URL here to access a picture on the web site Bing: http://www.bing.com/images/search?q=brain&FORM=IGRE1&p1=OneRow#focal=8d3812431121bee6095973e167d4b418&furl=http%3A%2F%2Fwww.emc.maricopa.edu%2Ffaculty%2Ffarabee%2FBIOBK%2Fbrain.gif

This link will bring you directly to a colored picture of the brain and the location of the senses. The easiest way to display it would be to use the computer and projector.

How to find a coloring sheet of the brain: Rather than just coloring brain on a worksheet a very unique way of showing the senses in the brain would be to used the desk model found at this URL: http://faculty.washington.edu/chudler/wwwdesk.html The children can color each side of the brain then cut and fold it to stand on their desk while they color the 3-dimensional brain.

How to make 3-dimensional brains: This needs to be done several weeks in advanced. You may need more than mold if you have a lot to make. You can buy brain jell-o molds at http://www.prankplace.com/brainmold.htm. Remember to spray the mold with cooking spray and use Plaster of Paris or other hardening material when making the brains.