Teaching Students about Their Brains - Early Childhood

How our Brains Take in Information

Concepts Taught: The information we take in from the outside world comes through our senses. The information travels from our eyes, nose, mouth, ears, or skin to our brains. Our brains store information about the world. Different kinds of information are sent to and stored in different parts of our brains.

Previous Knowledge: The lesson starts with asking students what they know about their brains. At this age, they are likely to say that it stores information or knows things, helps us learn, is in our heads.

Materials Needed: A piece of sandpaper, a soft scarf or other object
An orange, apple, candle or room freshener
A downloaded recording of an animal your students would recognize
Skittles or M&Ms (enough for two for each student)
Powerpoint slide with brain parts labeled.

Activity: The teacher lets the students experience their senses , one by one. Start with touch. Tell the students to close their eyes and that you're going to let them touch something rough or soft. Give each student a chance to touch something and tell whether it is rough or soft, without looking. Vary which object you provide to students to feel. When each student has had a chance, tell them they did a great job of telling soft from rough with their eyes closed – show them the sandpaper and the scarf. Ask them how they knew what it was without looking. Talk about how the information is stored in their brains. The information travels from their fingers to their brains and their brains compare it to their memories. Point out on the picture and by indicating the top of the head where our sense of touch is in our brains.

Repeat with each of the senses, using the orange (or other fragrant object) for smell. Use the recorded animal sound for hearing. Use the Skittles or M&Ms for taste and sight (the first time for taste). Except for the last sense, the students' eyes will be closed.

Talk about how much information their brains take in every day and how much smarter they are getting every day.

Follow-on: Have students label a copy of the picture of the brain with crayons or markers to show where each sense is processed, or use clay to model the brain and use Mr. Potato Head pieces to mark the areas of the brain.

Bring in different types of head protection and hats and talk about the importance of protecting their brains letting them try on all the helmets and hats and decide which provide the best protection.

Make brain hats and teach them about neurons and dendrites.

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Teaching Students about Their Brains – High School

Attention

Concepts Taught: Brain scans can show us what parts of the brain are active when we're performing different activities. Different parts of the brain specialize in different functions. The brain has a filter that controls what information gets in, called the reticular activating system. It functions involuntarily and lets in information that is new, changed or different. From there, our frontal lobes, the prefrontal cortex, enable us to decide what to focus our attention on. There are several different kinds of attention – sustaining our attention, selective attention, flexible attention, and divided attention. Our brains can't really focus on two things at the same time. Multitasking is a misnomer. It is fastasking and still takes longer than if we focused on a single activity.

Previous Knowledge: The lesson starts with asking students what they know about their brains. At this age, you will get all kinds of answers – from where it is to relating it to learning and intelligence to facts such as your brain doesn't have pain sensors. If a student comments on attention, explain that that is what we are going to be exploring in the lesson today.

Materials Needed: Powerpoint slides.
Ability to access the Internet for a YouTube video or other example of selective attention.
Multitasking handout and a stopwatch (can use online or on a smartphone).

Activity: After finding out what students already know, there is some direct instruction and explanation using the powerpoint slides. Questions to promote discussion and confirm understanding are included in the notes section of each slide.

For the multitasking exercise, each student needs a handout and something to write with. Tell them that when you say, "Go," they are to write the sentence and then write down the numbers from 1 through 23 and then to raise their hand when they've finished. Start the stopwatch and say, "Go." As students raise their hands call out the time. When all are done, ask them to write down their time for the first trial.

On the second trial, the students must write the first letter of the sentence and then the number 1 on the next line, the second letter and the number 2 until they are done. Start the stopwatch and say, "Go." Again, as students raise their hands, call out the time. When all are done, ask them to write down their time for the second trial.

Have the class discuss why the second trial took longer, how they felt (frustrated? Stressed?), whether they made mistakes, etc. What does this imply for multitasking? What should they do if they really want to do something quickly and accurately?

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Since we know that working with information reinforces learning by keeping the neural networks that represent that information, active, pair the students up. Have one student pretend that their partners wasn't in the room during this lesson and explain it. Then have the person who listened to the explanation summarize the key points.

While the students are peer teaching, the teacher walks around the room and listens – this gives the teacher feedback on whether the information has been understood. Have the class discuss how getting an opportunity to teach helped them learn the material better, and how they can use this new understanding to improve their own learning skills (explain new information to their parents, a sibling, the dog, a classmate, etc.).

Follow-on:

Have students research how fMRIs work or compare fMRI to other brain scan technology.

Have students come up with their own activities to demonstrate one of the types of attention.

Have students repeat the multitasking exercise with their families.

Use different techniques to get students' attention and ask them why it worked (or didn't).

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