Neuroscience lesson

On Track Volunteers

6th GRADE

Lesson Introduction - 10 minutes

A. Introductions

Introduce yourself and allow any other volunteers share about themselves. Tell the students what you are studying or about your career ambitions. If you have a career or are studying something technical, try to think of a way to explain what you do in a simple way.

Introduction Example: If you are a microbiologist -
Hi! I’m Anna and I am a microbiologist. Raise your hand if you have been sick from a cold? Colds are caused by bacteria, some people call them germs. Bacteria are what I study.

B. PowerPoint Review and lesson introduction

The whole group PowerPoint is typically done by an On Track Staff, but can also be done by trained volunteers. If you are interested in leading the class please email me at ontrack@ohsu.edu.

After a quick introduction students are spit into groups and volunteers teach them about their brains and different parts while building a brain out of clay

Building a brain out of clay - 20 Minutes

Talking points before you start

• You are going to be making a clay brain. You will get to take your clay brain home at the end of the day. It is yours to keep.
• This clay is special. If you keep it in a sealed baggy it will stay moldable. If you leave it out, it will dry out like a statue. But if you try to add water to it, it won’t go back to be soft again.
• Your brain has two sides to it. A right and left side (show on your forehead). It is split down the middle. These sides are symmetrical. Does anyone know what symmetrical means? It’s okay if it is a guess.
• Symmetrical means both sides look the same. Our faces are kind of symmetrical. You have an eye on one side and one on the other, one nostril and ear on each side.
**When handing out the clay try to give each students and their neighbor a different color of clay.**

<table>
<thead>
<tr>
<th>Steps</th>
<th>What it looks like</th>
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| 1. Divide your clay into 2 halves roughly even.  
2. Swap one of your halves of clay with a neighbor                      | ![step 1](image1.png) ![step 2](image2.png) |
| 3. Take one of the halves of clay and make the clay into an oval shape. Then split it into two lumps – one that is 1/3 of the original piece and one that is 2/3. With one large piece and one small piece of clay.  
Talking point: I said the brain is symmetrical so what do you think we do to the other piece of clay? | ![step 3](image3.png) ![step 4](image4.png) |
| 4. Repeat the step with the 2nd color of clay ending with two small pieces of clay and two large                | ![step 5](image5.png) ![step 6](image6.png) |

**Making the cortex**

5. Set aside your two smaller pieces of clay. We are going to start off making the cortex of our brain. The cortex is the lighter pink part of the brain in the picture and makes up most of our brain. Take one of your large pieces of clay and roll it out like a piece of pasta.  
You want your pasta to be the width of a pencil.  
6. Now we are going to roll up your pasta into a ball, but you need to do it randomly turning it every which way as we make the ball. Start at one end and roll it up.  
7. Your brain is symmetrical so what do you think we do to the other large piece of clay? The same thing!  
Repeat steps 5 and 6. Making the two halves to our brains cortex  
8. Now you have the left and right sides of your brain we need to put them together. Our brains have a center line that goes down the middle of our head. We have to gently make a flat spot to put our two sides together without smashing up our random pasta wiggles. The way we are going to do that is we are going to cup one of our pieces of clay in our hands and gently tap it three times on the desk. Tap, Tap, Tap.  
Repeat on the second piece of clay. And place the two flat sides of the halves together to complete your cortex. You can gently shape your brain into an egg shape if needed.  

**Talking points about the cortex.**

- Your cortex contains most of your brain. It is where you take in all 5 senses, hold your memories and make decisions.  
- Your prefrontal cortex is in the front of your brain. Have students say prefrontal cortex a few times to practice.  
  Does anyone remember what we said your prefrontal cortex does?  
This is where your decision making happens. It takes the longest time to finish developing. When you were a toddler you might not have made very many good decisions and you are better at making them now then you did then. You will be even better at it when you are in your 20’s after it has fully developed.
Making the Cerebellum.
1. We are going to make our cerebellum. Have the students say cerebellum a few times. The cerebellum is sometime called the small brain.
2. Repeat steps 5-8 on your small pieces of clay to make your cerebellum and attach it to the cortex.

Talking points about the cerebellum
- Cerebellum is what helps you balance and coordination. Have students stand on one foot and balance, have them rotate their arms in large circles going one way and then the other to test their balance.
- The feeling your feel in your foot is your cerebellum working hard to adjust and keep you upright and balanced. Your cerebellum also helps you with coordination. What does it mean to be coordinated? Discuss with students what coordination is.

Additional parts you can point out if there is time.
- Occipital lobe - Where vision information is taken into the brain. What goes into your left eye is received on the opposite side of your brain in the back. This is also true for things you feel on the left side of your body is received by the right side of your brain.
- Temporal lobe - Mostly for hearing and listening
- Parietal lobe - the place where taste, temperature and touch are sensed.
- Frontal lobe - Higher thinking and learning

Clean up and Review - 15 minutes

Closing is led by On Track Staff

Help students get their clay into the bags and write their names. Be sure to collect all of the markers. Collect their bags and place them where the teacher would like them.

1. Give students about 1 minute to share their answers with their partners, walk around and listen for answers and repeat what you heard to the group.
2. Have students raise their hands or call out their answers.
3 & 4. You can give the students hints if they need it by taping your forehead, making the start sounds of the answers, and balancing on one leg.
C. Introductions

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Introduction Example: If you are a microbiologist- Hi! I'm Anna and I am a microbiologist. Raise your hand if you have been sick from a cold? Colds are caused by bacteria, some people call them germs. Bacteria are what I study.

D. PowerPoint Review and lesson introduction

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After a quick introduction students are spit into groups. Volunteers teach students how to play the brain tower game and participate during the game as a player.

Brain tower game

The towers have to be tall and strong, but it is a 50% chance that students will not gain the straws that are needed to make their towers strong.

It is okay if their tower is not successful at holding all of the weights the first time they test it. They will have a chance to redesign.
Now you are ready to play the game with your students. Remember when they are building their towers to let them take the lead. If you would like you can take turns giving your supplies you earned during the game to other students in your group.

Here are some sample towers:
Testing and improving on their brain towers - 12 minutes

Test your structure!
- Measure your Brain Tower
- Add weights to the tallest point on your tower one at a time
- How many weights can your brain tower hold before it collapses??

Time to measure your brain tower and test to see how many weights it can hold.

Have students measure their tower and record it on their worksheet. Then have the students take turns adding the weights to the tallest point of their structures. Count how many weights their tower can withstand before it collapses and record it to their worksheet.

Write on your worksheet 5 different ways you can help your brain stay healthy and learn new things to get 5 more straws

Redesign your brain tower and test it again!

You have an opportunity to earn 5 more straws to improve your tower and see if it can hold more weight. On your worksheet write down 5 different things you could do to help your brain stay healthy and learn new things and you will earn 5 more straws to make your brain tower stronger or taller. You can use straws or straws and pipe cleaners.

Clean up and review - 5 minutes

Clean up
1. Take apart your brain towers, save the base!
2. Untangle any pipe cleaners and return “Pipe Cleaner supply bag”
3. Rubber straws and deck of cards
4. Return the weights and measuring tape to its bag
5. Return all items to the large bag

Help your students clean up and have them start on the fill in the blank review if they finish clean up before other groups.

Review Led by On Track staff- 5 minutes