



Neuroscience lesson

On Track Volunteers

6th GRADE

Lesson Introduction- - 10 minutes

A. Introductions

<p>Today's lesson is brought to you by:</p> <p>On Track OHSU!</p>	<p>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.</p>
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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.**

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.




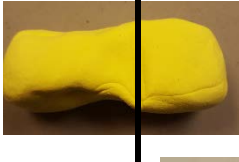



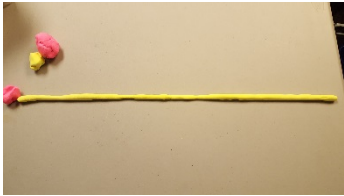






After a quick introduction students are spit into groups and volunteers teach them about their brains and different parts while building a brain out of clay


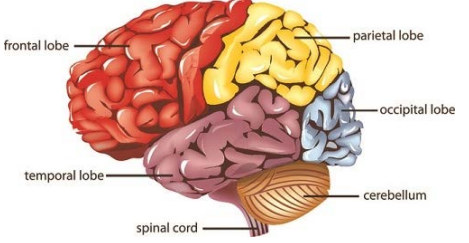
Building a brain out of clay- 20 Minutes

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.


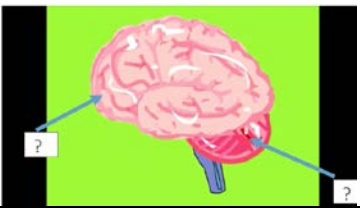
When handing out the clay try to give each students and their neighbor a different color of clay.

Steps	What it looks like
1. Divide your clay into 2 halves roughly even. 2. Swap one of your halves of clay with a neighbor	   <p style="text-align: center;">step 1 step 2</p>
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? 4. Repeat the step with the 2 nd color of clay ending with two small pieces of clay and two large	  
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. <ul style="list-style-type: none"> 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? <p>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 than you did then. You will be even better at it when you are in your 20's after it has fully developed.</p>	

<p>Making the Cerebellum.</p> <ol style="list-style-type: none"> 1. We are going to make our cerebellum. Have the students say cerebellum a few times. The cerebellum is sometimes 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 	
<p>Talking points about the cerebellum</p> <ul style="list-style-type: none"> • Cerebellum is what helps you balance and coordination. <i>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.</i> • The feeling you feel in your foot is your cerebellum working hard to adjust and keep you upright and balanced. <p>Your cerebellum also helps you with coordination. What does it mean to be coordinated? Discuss with students what coordination is.</p>	
<p>Additional parts you can point out if there is time.</p> <p>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.</p> <p>Temporal lobe - Mostly for hearing and listening</p> <p>Parietal lobe - the place where taste, temperature and touch are sensed.</p> <p>Frontal lobe- Higher thinking and learning</p>	

Clean up and Review- 15 minutes

Closing is led by On Track Staff

<p style="text-align: center;">Clean up</p> <ul style="list-style-type: none"> • Put your clay brains in a plastic bag • write your name on the plastic bag <p style="text-align: center;">You can take it home at the end of the day.</p>	<p>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.</p>
<div data-bbox="131 1266 410 1371">  <p>Neuron</p> <p>Pathways</p> </div> <ol style="list-style-type: none"> 1. Share with your neighbor How do we learn new things? 2. What are some things that your brain does for you? 3. What happens in the front of your brain? 4. What happens in the back of your brain? <div data-bbox="370 1392 727 1602">  </div>	<ol style="list-style-type: none"> 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 tapping your forehead, making the start sounds of the answers, and balancing on one leg.



Neuroscience lesson

On Track Volunteers

7th/8th GRADE

Lesson Introduction- - 10 minutes

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

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. Volunteers teach students how to play the brain tower game and participate during the game as a player.

Brain tower game

<p>Today you are going to play a game where you build a Brain Tower</p> <p>Your brain will be built out of pipe cleaners which represent neurons</p> <p>You will play a game to get your neurons to create your Brain Tower</p> <div data-bbox="131 1304 334 1381"> </div> <div data-bbox="431 1287 626 1436"> </div>	<p>Today you are going to play a game where you build a Brain Tower</p> <div data-bbox="1040 1203 1252 1281"> </div> <div data-bbox="906 1289 1179 1354"> <p>Some of the neurons will be strengthened— getting a <u>straw</u> with your pipe cleaner</p> </div> <div data-bbox="1219 1289 1446 1354"> <p>Some of the neurons won't be strengthened— getting a <u>pipe cleaner</u> only</p> </div> <div data-bbox="938 1373 1136 1442"> </div> <div data-bbox="1235 1356 1442 1442"> </div>
<p>Your goal:</p> <p>Play the game following the rules and try to build the tallest Brain Tower you can that can hold 9 -10 gram fishing weights without collapsing.</p> <div data-bbox="167 1619 337 1787"> </div> <div data-bbox="516 1619 686 1787"> </div>	<p>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.</p> <p>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.</p>

How to play the game?- Setup



- Tower base with **Blue tape** on the corners
- Deck of cards
- Dice
- Straw supply pile
- Pipe cleaner supply pile
- Bag with weights and a measuring tape (save for when we test your tower)

Step 1- Choose the top card from the deck and **read** the card aloud to your group



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You love reading funny stories and decide you want to write your own story, but you don't know where to start.

What do you do?

For a Straw + Pipe Cleaner
Roll a 2, 4, 6

OR

For Pipe Cleaner only
Roll a 1, 3, 5

You go online and look for ideas for funny stories.

You feel like if you can't figure out where to start your story, you shouldn't write one.

Step 2: Roll the number dice to see if you get a pipe cleaner with a straw or no straw



Some of the neurons will be **strengthened**—getting a straw with your pipe cleaner

Some of the neurons **won't** be strengthened—getting a pipe cleaner only

For a Straw + Pipe Cleaner
Roll a 2, 4, 6

For Pipe Cleaner only
Roll a 1, 3, 5

OR

You go online and look for ideas for funny stories.

You feel like if you can't figure out where to start your story, you shouldn't write one.



Step 3: Collect your pipe cleaner + straw or pipe cleaner only.

Now it is the next person's turn. After everyone has taken a turn you will add your pieces to your brain tower and start the next round.



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What do you do?

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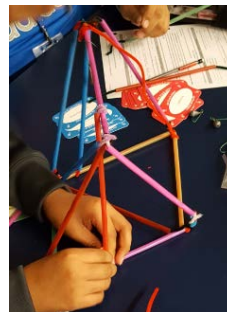
You go online and look for ideas for funny stories.

You feel like if you can't figure out where to start your story, you shouldn't write one.



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:



How to play the game?

Step 1- Choose the top card from the deck and **read** the card aloud to your group

Step 2- Roll the number dice to see if you get a pipe cleaner with a straw or no straw



Step 3- Collect your pipe cleaner with straw or pipe cleaner only.

Next person's turn! **After everyone has taken a turn add your neurons to your brain tower** and start the next round.

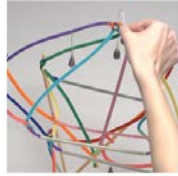


Goal: Play the game and try to build the tallest Brain Tower you can that can hold nine 10 gram fishing weights without collapsing.

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