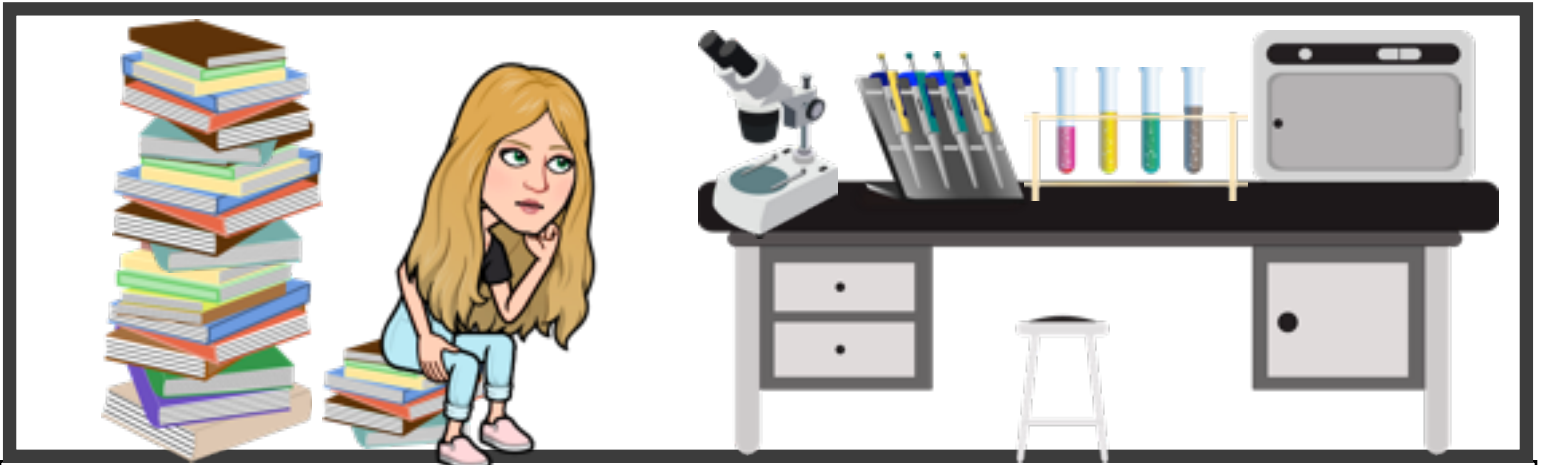


# AVOID PAIN, PROTECT YOUR BRAIN

Hi!

she / her

THIS IS ME, ROXY. MY PRONOUNS ARE SHE/HER/HERS. I'M A STUDENT AT THE GREATEST UNIVERSITY IN THE WORLD.



AT THE UNIVERSITY, I'M A BIT OF A SCIENTIST. I AM A RESEARCH ASSISTANT TO REAL RESEARCHERS AT A NEUROSCIENCE LAB. NEUROSCIENCE IS JUST A BIG WORD FOR "STUDIES OF THE BRAIN." IN NEUROSCIENCE, SCIENTISTS ASK QUESTIONS ABOUT THE BRAIN, SUCH AS...

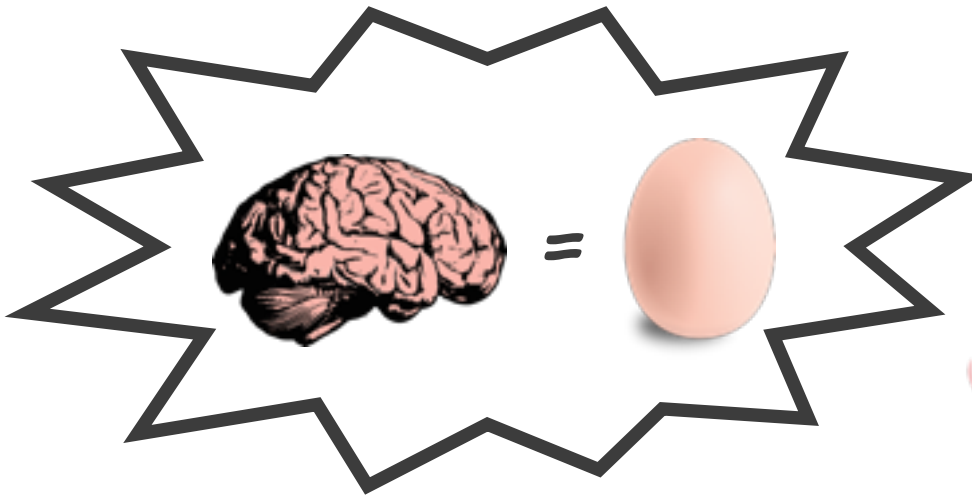
HOW MANY DIFFERENT PARTS OF THE BRAIN ARE THERE?

HOW DO THE DIFFERENT PARTS OF THE BRAIN INTERACT?

IS THERE A MODEL FOR THE BRAIN, TO BETTER UNDERSTAND IT?

THE MOST IMPORTANT THING A SCIENTIST CAN DO IS ASK QUESTIONS.  
THE SECOND MOST IMPORTANT - ANSWER THOSE QUESTIONS!

FOR EXAMPLE, AN EGG MAY SERVE AS A MODEL FOR A BRAIN, IN ORDER TO BETTER UNDERSTAND THE PARTS, AND INTERACTIONS OF THE PARTS, OF THE BRAIN.



FIRST, LET'S TALK ABOUT THE BRAIN...

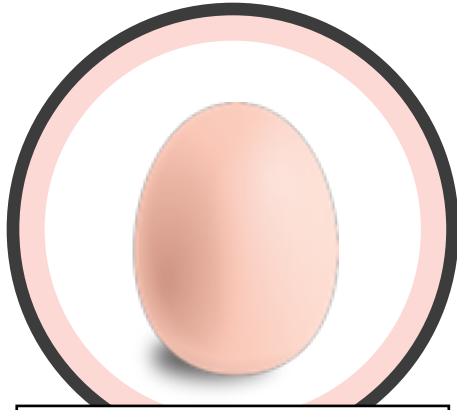
THE **BRAIN** IS RESPONSIBLE FOR YOUR FEELINGS, THOUGHTS, AND EVEN ACTIONS!  
CONNECTED TO THE BRAIN ARE THE **MENINGES**. THE MENINGES COVER THE BRAIN IN ORDER TO PROTECT IT. FLOWING THROUGH THE MENINGES IS **CEREBRAL SPINAL FLUID**. CEREBRAL SPINAL FLUID CREATES A CUSHION IN ORDER TO PROTECT THE BRAIN EVEN MORE!

NOW LET'S CRACK OPEN THE EGG...

THE **YOLK** REPRESENTS THE BRAIN, WHICH IS CONNECTED TO THE WHITES, THE MENINGES. THE WHITES ENCLOSE THE YOLK, IN THE SAME WAY THAT THE MENINGES ENCLOSE THE BRAIN, PROTECTING IT. SO, WHERE IS THE CEREBRAL SPINAL FLUID, AND HOW MUCH MORE PROTECTION MAY THE CEREBRAL SPINAL FLUID PROVIDE?

**THIS CALLS FOR AN EXPERIMENT**

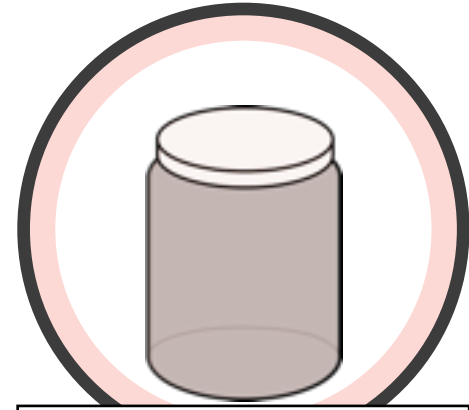
FIRST, WE NEED TO ALTER OUR MODEL. WE UNDERSTAND THAT THE YOLK OF THE EGG REPRESENTS THE BRAIN AND THE WHITES OF THE EGG REPRESENT THE MENINGES, BUT WHAT COULD REPRESENT THE CEREBRAL SPINAL FLUID? AND WHAT COULD REPRESENT THE SKULL?



AN EGG REPRESENTS THE BRAIN & MENINGES.



WATER REPRESENTS THE CEREBRAL SPINAL FLUID.



A PLASTIC CONTAINER REPRESENTS THE SKULL.

IN ORDER TO UNDERSTAND THE ROLE OF THE CEREBRAL SPINAL FLUID IN PROTECTING THE BRAIN, WE WILL CREATE TWO EXPERIMENTS. ONE EXPERIMENT WILL EXAMINE THE BRAIN AFTER TRAUMA IN THE ABSENCE OF CEREBRAL SPINAL FLUID, AND THE OTHER EXPERIMENT WILL EXAMINE THE BRAIN AFTER TRAUMA IN THE PRESENCE OF CEREBRAL SPINAL FLUID.



HOW WOULD YOU DESIGN THE EXPERIMENT?

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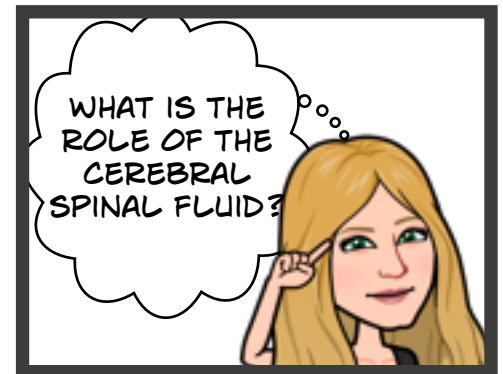
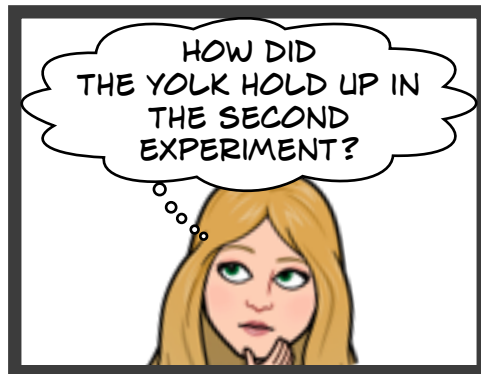
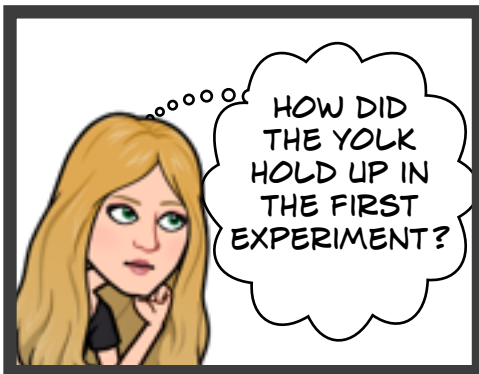
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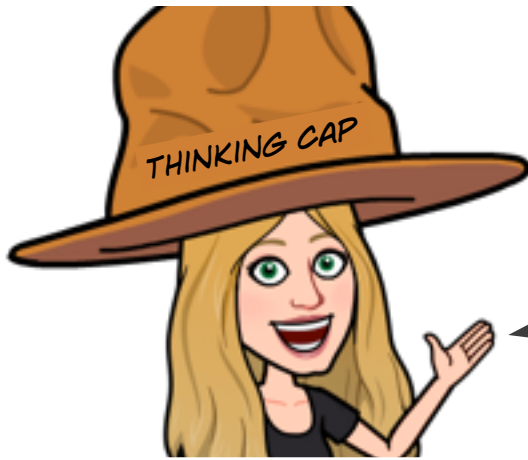
FOR THE FIRST EXPERIMENT, GATHER ONE PLASTIC CONTAINER (WITH A LID) AND ONE EGG. BREAK THE EGG INTO THE PLASTIC CONTAINER, CLOSE THE PLASTIC CONTAINER WITH THE LID. SHAKE THE PLASTIC CONTAINER VIGOROUSLY.



FOR THE SECOND EXPERIMENT, GATHER ONE PLASTIC CONTAINER (WITH A LID), ONE CUP OF WATER, AND ONE EGG. BREAK THE EGG INTO THE PLASTIC CONTAINER, POUR THE WATER INTO THE PLASTIC CONTAINER, AND CLOSE THE PLASTIC CONTAINER WITH THE LID. SHAKE THE PLASTIC CONTAINER VIGOROUSLY.



# THIS CALLS FOR OUR THINKING CAPS



WERE YOU SURPRISED THAT THE YOLK SPLIT AFTER THE FIRST EXPERIMENT?  
WERE YOU SURPRISED THAT THE YOLK WAS WHOLE AFTER THE SECOND EXPERIMENT?  
HOW DID THE ADDITION OF WATER AFFECT THE YOLK?  
HOW DOES CEREBRAL SPINAL FLUID AFFECT THE BRAIN?

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CEREBRAL SPINAL FLUID ACTS AS A BUFFER BETWEEN THE BRAIN AND THE SKULL. IN THE CASE OF TRAUMA, THE CEREBRAL SPINAL FLUID ABSORBS THE SHOCK OF THE TRAUMA, AND PROTECTS THE BRAIN FROM THE SHOCK OF THE TRAUMA. IN OTHER WORDS, CEREBRAL SPINAL FLUID ACTS AS A CUSHION FOR THE BRAIN.

ALTHOUGH CEREBRAL SPINAL FLUID IS A STRONG DEFENSE AGAINST TRAUMA, IT IS IMPORTANT TO WEAR A HELMET WHENEVER YOUR BRAIN MAY BE AT RISK. ALWAYS REMEMBER THAT YOUR BRAIN IS YOUR MOST PRECIOUS POSSESSION.



**BIG AND SMALL, HELMETS ARE FOR ALL**