

Hi

It is so cool to hear that you all are interested in learning about neuroscience! My name is \_\_\_\_\_ and I study psychology, or in other words, how the human mind affects how we feel, what we do, and who we are! Neuroscience is the study of the brain, and it helps me ask big questions about psychology like the great questions you asked in your letter. You all are already thinking like scientists!

1. Why do people feel emotions?



You might ask yourself, what's the use of feeling sad, frustrated, or scared? We don't like feeling this way, so why do we? **Charles Darwin** said that emotions evolved over time because they were ~**adaptive**~, meaning they allowed humans/animals to survive. (A lot of animals feel emotions too - if any of you have pets, it's easy to tell when your dog is happy, sleepy, or sad). Emotions **motivate** us to respond fast to our environment. For example, if you see a giant, angry bear on a hike, you may feel scared, alerting you to take action (**RUN!**) and avoid danger. Your emotions also tell people when you need help. If you are sad and crying, it alerts others to take care of you and make you feel better. On the other hand, if you feel happy, your mind is rewarding you to tell you keep doing what you're doing.

Emotions are a **HUGE** part of being human, from the fun ones (happiness, pride) to the "meh" ones (anger, sadness) because life is full of highs and lows!





2. Why do people feel **pain**?

Much like emotions, pain is our body alerting us that something is wrong. When your body is injured, your nerves (cells that help your body send and receive information) send millions of messages to your brain about what's going on (ex: eek! You just burnt your tongue on that soup!). Your brain then makes you feel pain where the damage is. Pain motivates us to leave bad/dangerous situations, protect your body, and to avoid doing painful things in the future. For that soup example - your tongue hurting is your brain telling you: 1. Stop sipping that soup. It's HOT! 2. Wait for it to cool, 3. Don't do that again! So, pain strangely is a good thing! It's our body warning us about danger!



Helloo amygdala

3. Why are people **scared**?

your Brain

Neuroscientists now know that emotions are created in a place of the brain called the **limbic system** (this is where the characters in Inside Out would work). Inside here, is something called the **amygdala** ("AHMIG'DALAH") which tells you when something is scary. It tells your heart to speed up, your breathing to ↑ and that it is time to get sweaty ← This is called the "**fight or flight**" response which is a nickname for the evolutionary body response to prepare you to either **FIGHT** a scary thing or **RUN** from it ("flight"). So even though we aren't fighting/running away from big bears like maybe our ancestors did, we still feel this way with scary everyday things (like a big test!) Next time you feel scared, remind yourself that your heart racing is a good thing! It means it is actually



Pumping more blood to your brain, helping you focus, think harder & work harder! Cool right?

4. How does **information** get transferred to your brain?

The brain connects to nerves that travel all over your body. Nerves from our senses (like seeing, hearing, touch) send little messages to the brain to let it know what is going on. The brain takes these messages and translates them into things we can understand (like sight, taste). You can thank your nerves for all that you see, feel, hear, taste & touch!

Thank you for your amazing questions! Looking forward to your next letter!

Talk soon,

