

# BRAINSTORM:

What ideas do adults  
have about middle  
schoolers and teenagers?

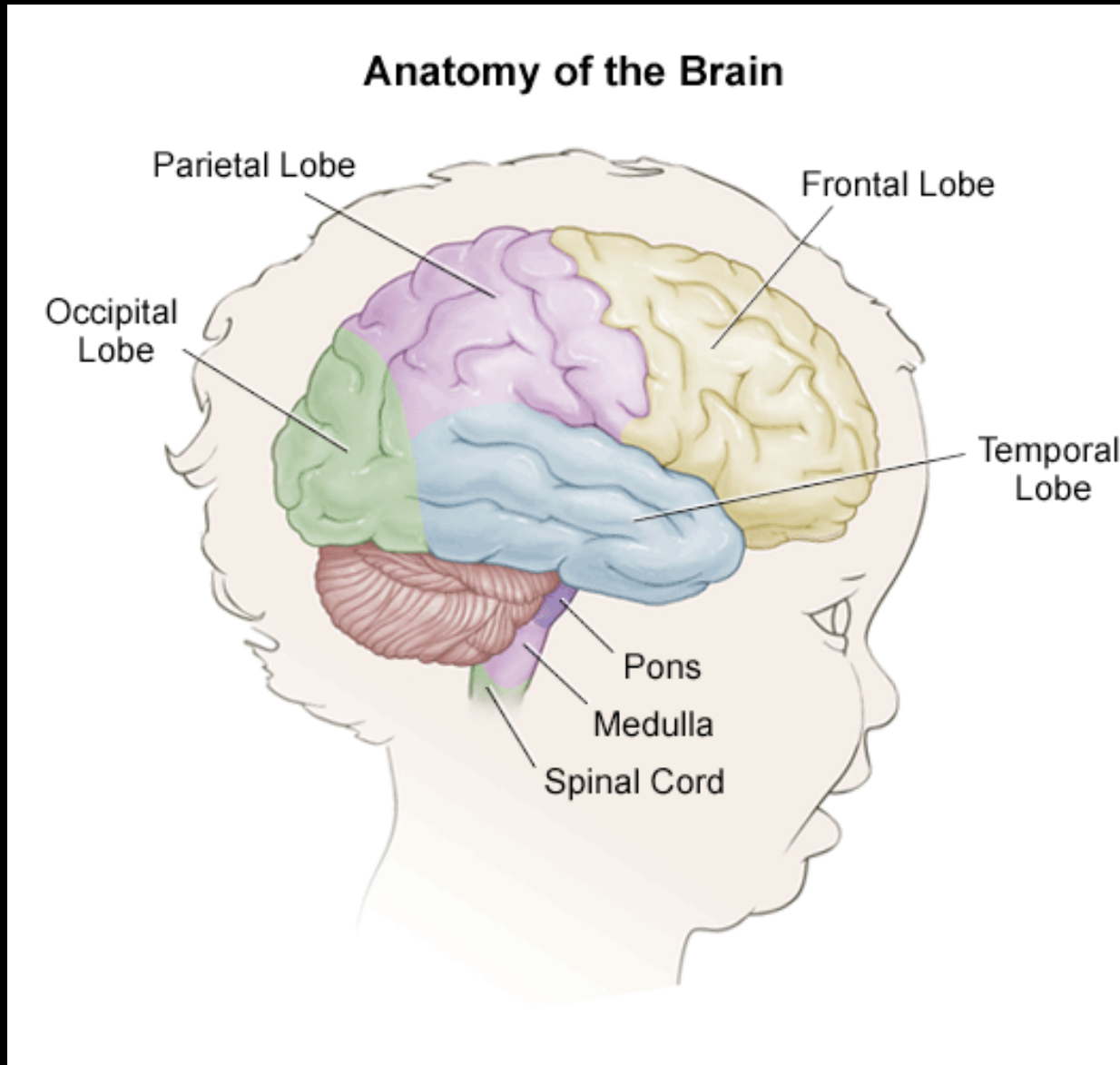
(Talk with your partner and write  
down what they say)

Do you think these ideas  
are true?

Why or why not?

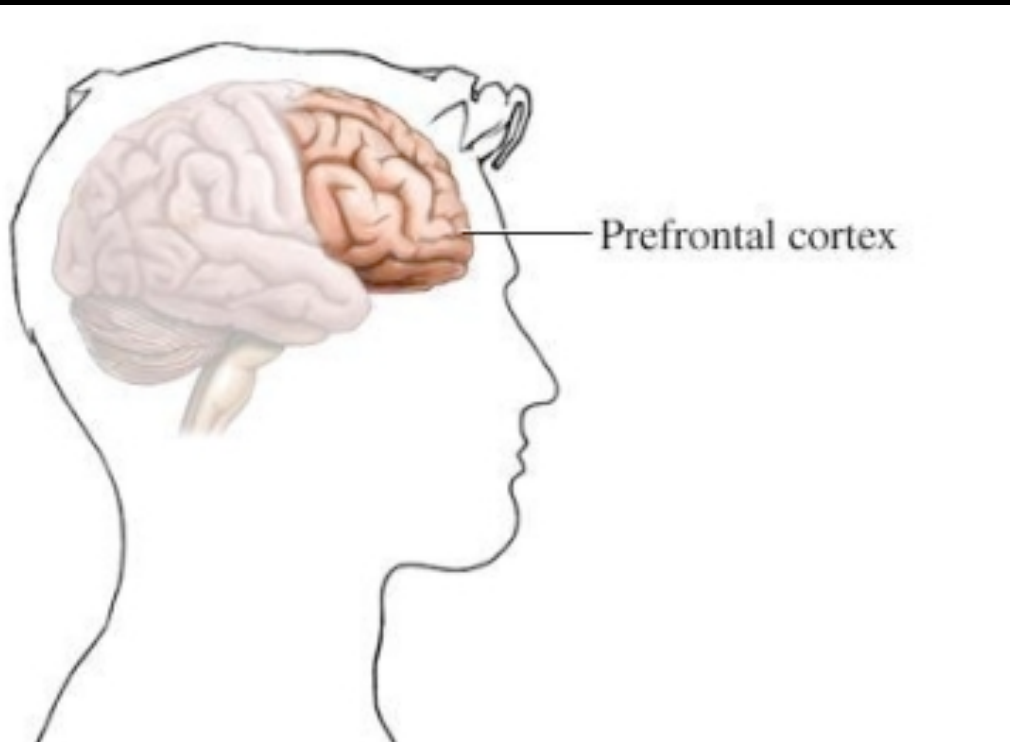
**What is so different  
about middle  
school brains?**

# Some basic brain anatomy:



The brain is made up of “lobes” or regions that each perform specific functions.

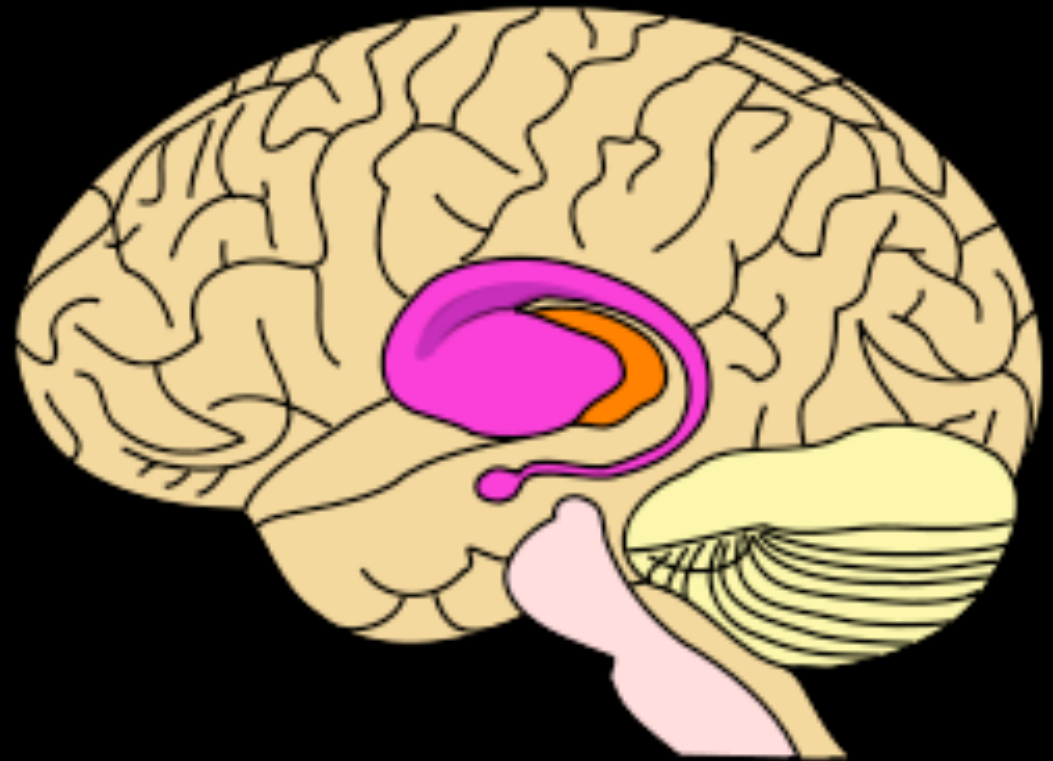
# The Prefrontal Cortex



- decision making
- judgement and considering consequences
- considering other peoples' perspectives
- moderating social behavior
- organization
- controlling impulsive behavior

# Ventral Striatum

- reward-based decision making
- risk-taking
- dopamine



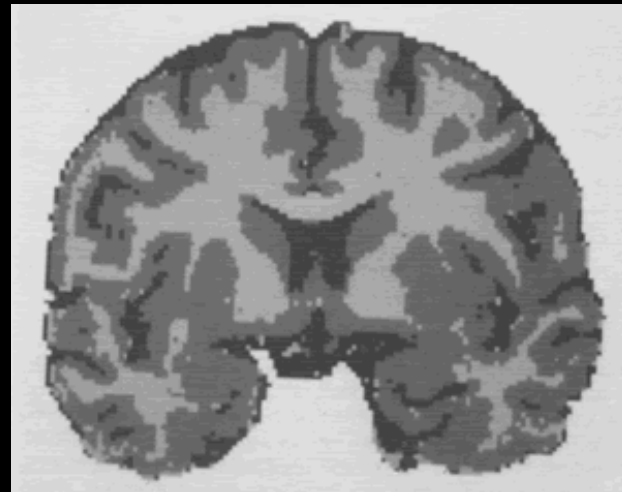
# What's happening to your brain

- By the time you hit puberty, your brain has grown to about 90% of its full, adult size.



# What's happening to your brain

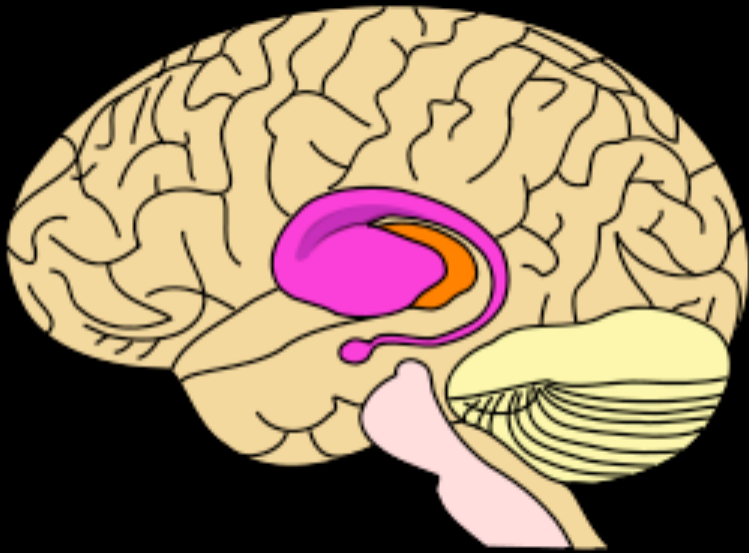
- Around age 11 for girls and 12 for boys, your brain starts adding more grey matter to your prefrontal cortex. Grey matter is one of the most important tissues that make up the brain.



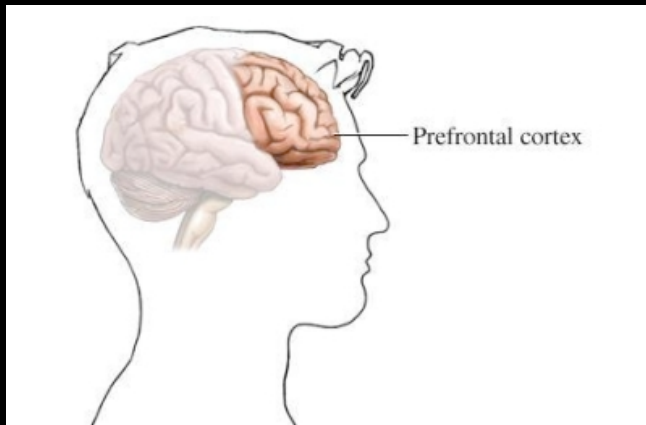


# What's happening to your brain

- Starting around the age 12, there is an increase in risk-taking behavior in connection with the Ventral Striatum

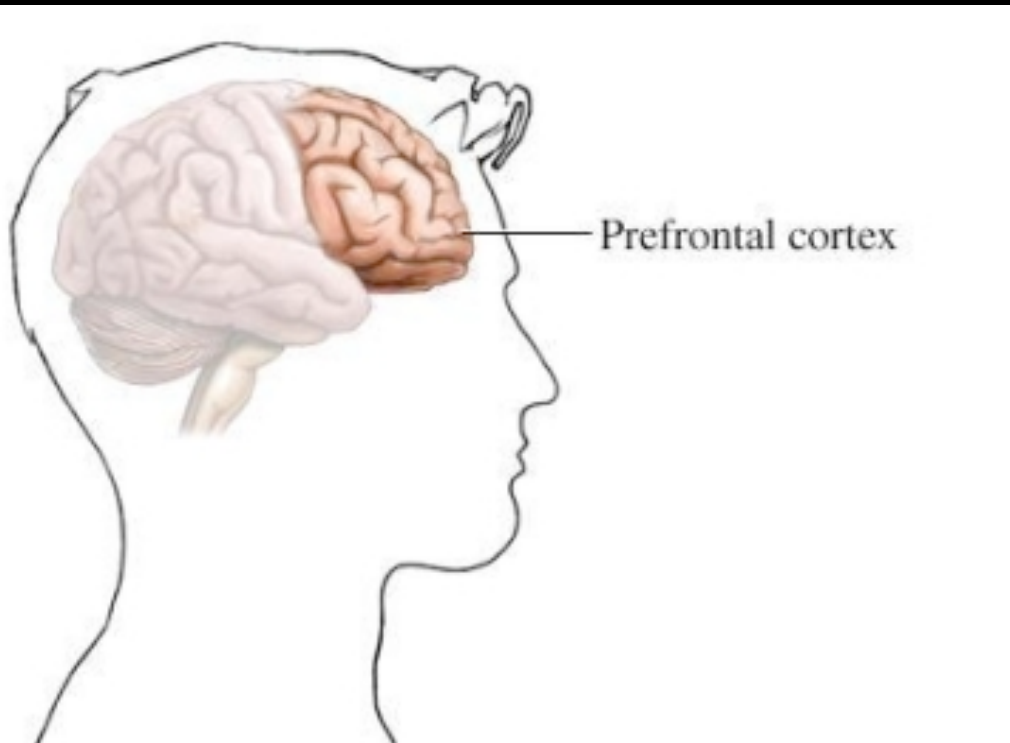


# What's happening to your brain



- BUT, the development of the **Prefrontal Cortex** has not caught up.
- Remember what the prefrontal cortex does?

# The Prefrontal Cortex



- decision making
- judgement and considering consequences
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Thus, the choices of adolescents often can be confusing to the older and younger people around them.



- Moody
- Unorganized
- Risk-taking
- Not thinking about the consequences

# But this is also an important process to go through



- Developing your own personality
- “Trying on” new ideas
- Thinking about things in creative and unusual ways
- Becoming independent from your parents - this is important for **SURVIVAL!!**

During middle school, your brain  
also goes through a process called  
**Synaptic Pruning**



# Synaptic Pruning

In this process, your brain gets rid of synapses you are not using, this makes your brain run more efficiently.

# USE IT OR LOSE IT



This is why some things are easier to learn when you are young (before puberty). It is especially important in middle school that you are using your brain to practice and learn the things you want to do as an adult.



# FRONTLINE:

Clip 2 - The Wiring of the Adolescent Brain (7 min)

Clip 5 - From Zzz's to A's (11 min)

<https://www.pbs.org/wgbh/frontline/film/inside-the-teenage-brain/>

# Neuroscientist Sarah-Jayne Blakemore talks about teenage development

