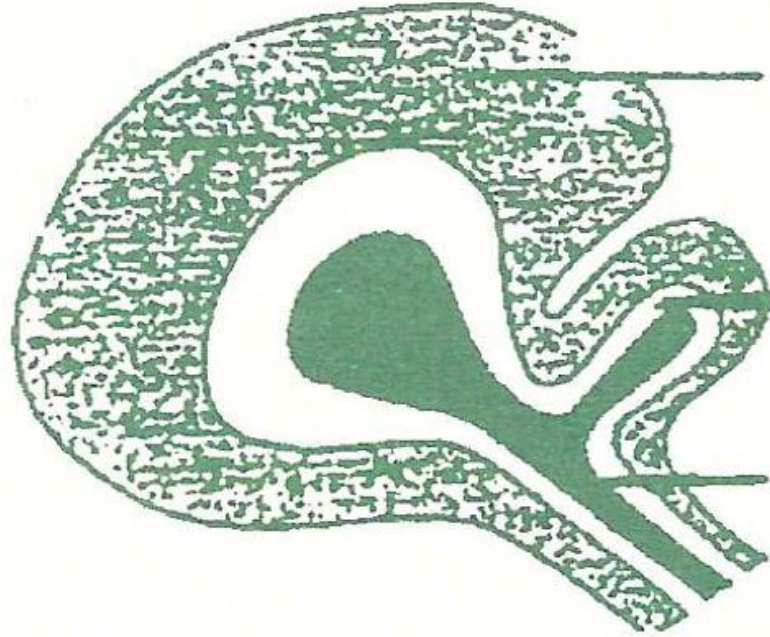


The Three Brains



Thought

New Mammalian
"Human" Brain

Feeling

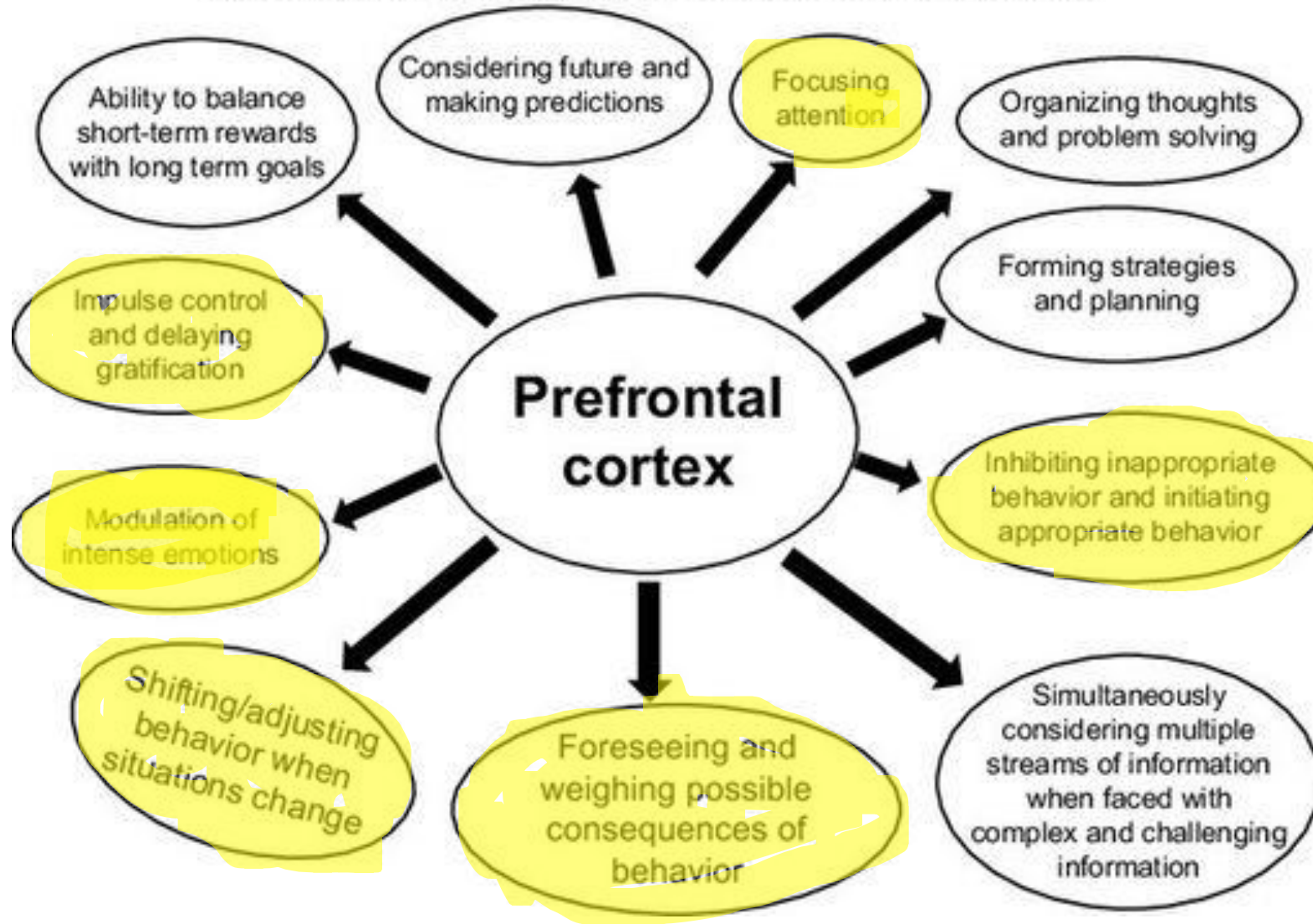
Old Mammalian
Limbic System

Action

Reptilian
R-System

(Pearce 1992)

Executive human brain functions



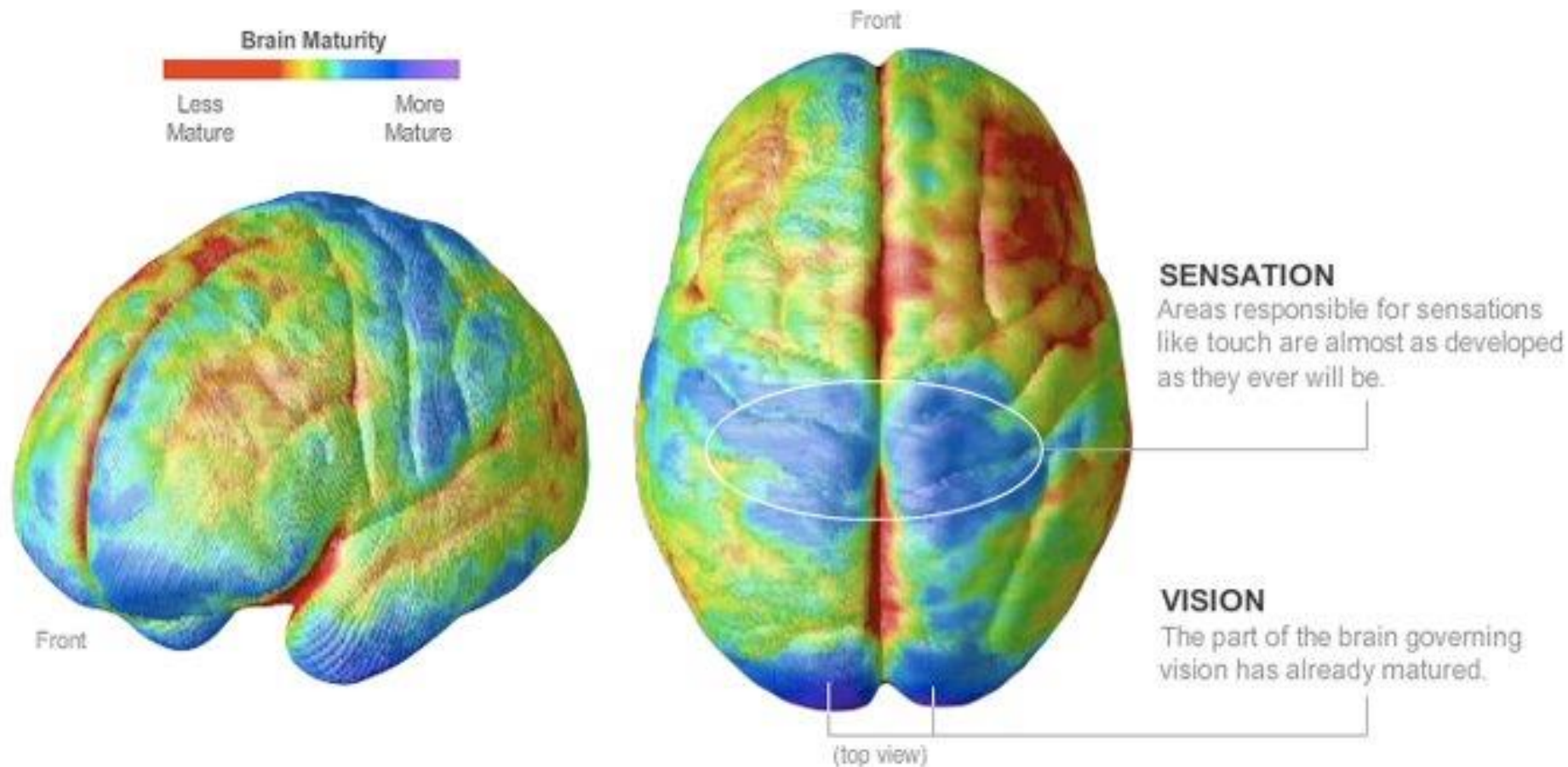
Brain Development

(Images by Dr. Paul Thompson, PhD)

Ages 4 to 21

EARLY DEVELOPMENT

In the first few years of life, areas of the brain devoted to basic function change at a rapid pace. By age 4, primary senses and basic motor skills are almost fully developed. The child can walk, hold a crayon and feed himself.

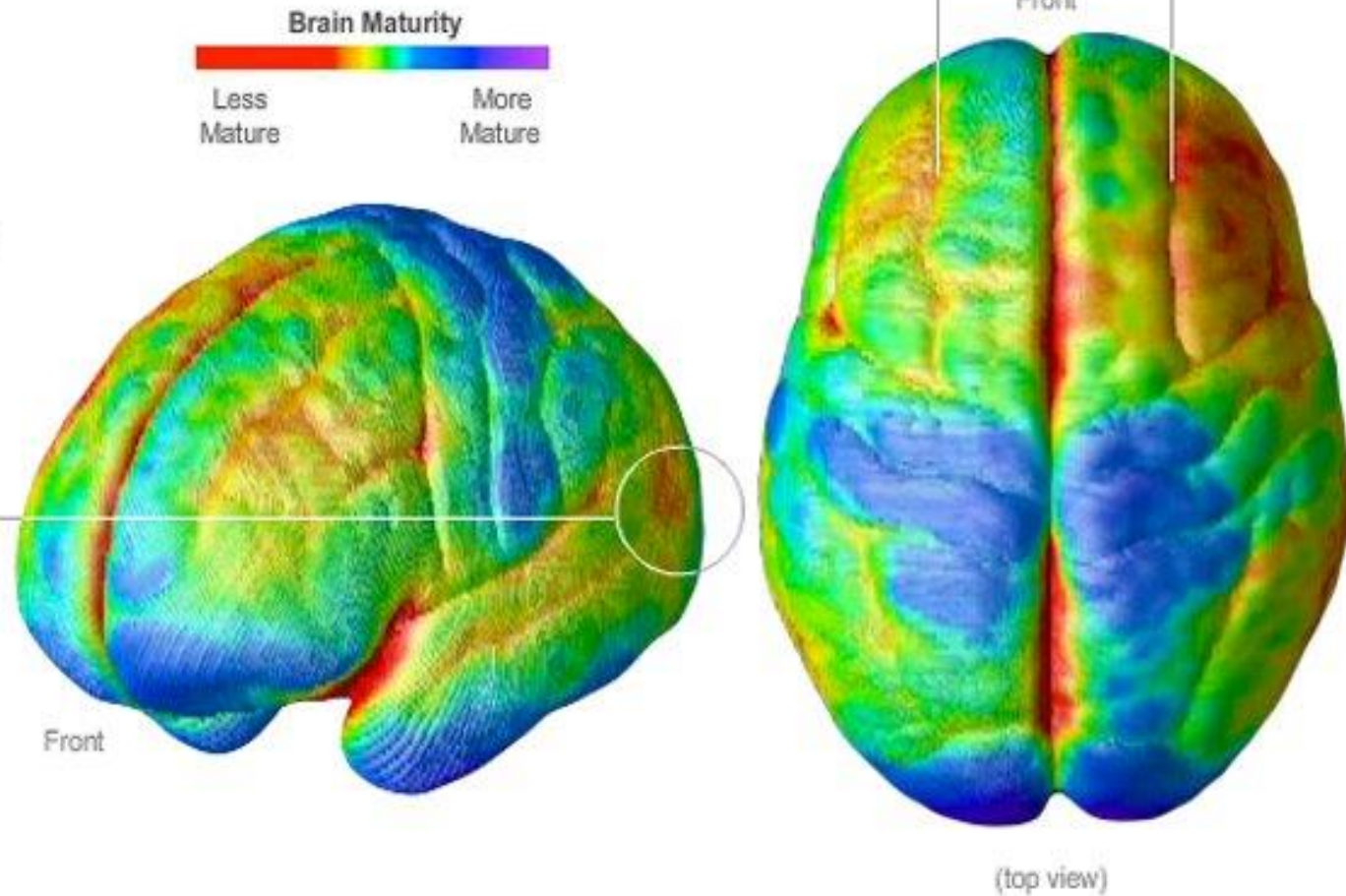


4 years old



LANGUAGE

The area of the brain governing language is immature, as indicated in orange, but continues to develop rapidly in children through age 10. The brain already has begun a "pruning" process, eliminating redundant neural links. This will accelerate in later years, one reason why learning a new language is easy for children and virtually impossible for many adults.



REASON

The dappled yellow and red areas of the prefrontal cortex indicate that this part of the brain, which affects abstract thinking, reasoning skills and emotional maturity, has yet to develop. This lack of maturity is one reason young children can't juggle a lot of information and throw tantrums when presented with too many choices.

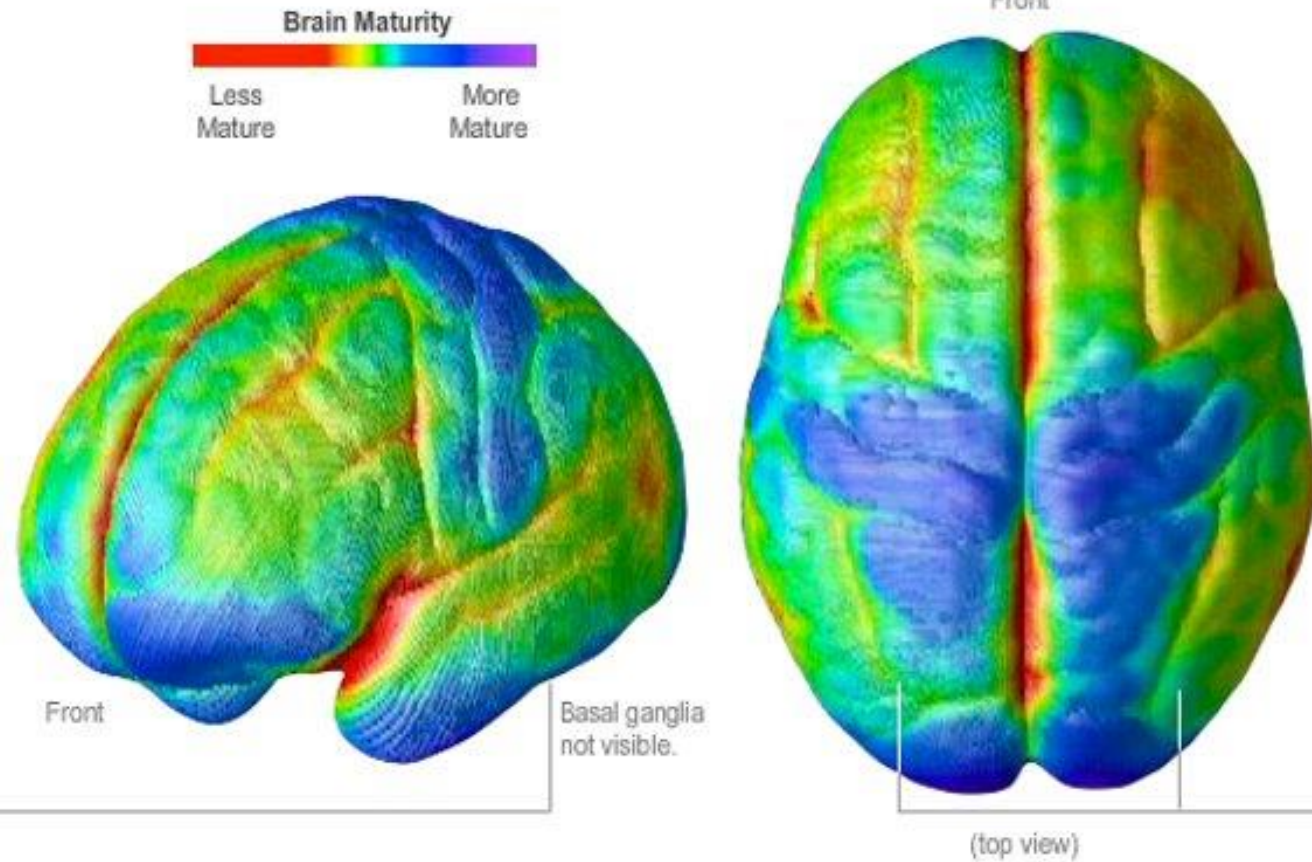
6 years old



Go to Age 9

FINE MOTOR SKILLS

While basic motor skills are well developed by age 5, children experience a burst of fine motor-skill development between ages 8 and 9, helping to explain gains in the ability to use scissors, write neatly or in cursive, and manipulate models and craft projects.



MATHEMATICS

By the age of 9, the parietal lobes are beginning to mature. Development here allows children to acquire math and geometry skills. The pace of learning at this age is fast and can be enhanced with flashcards and math drills.

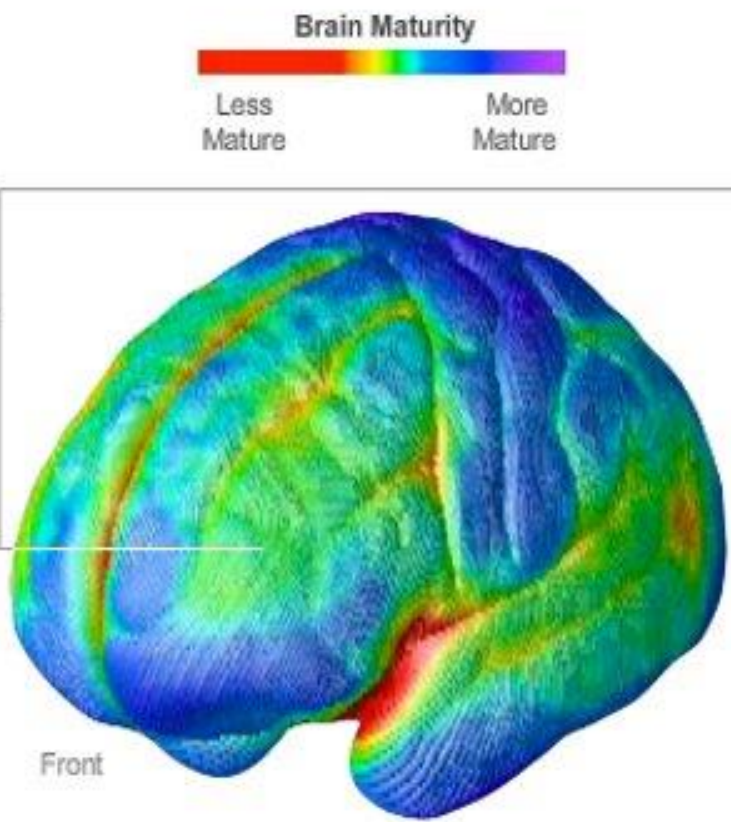
9 years old



[Go to Age 13](#)

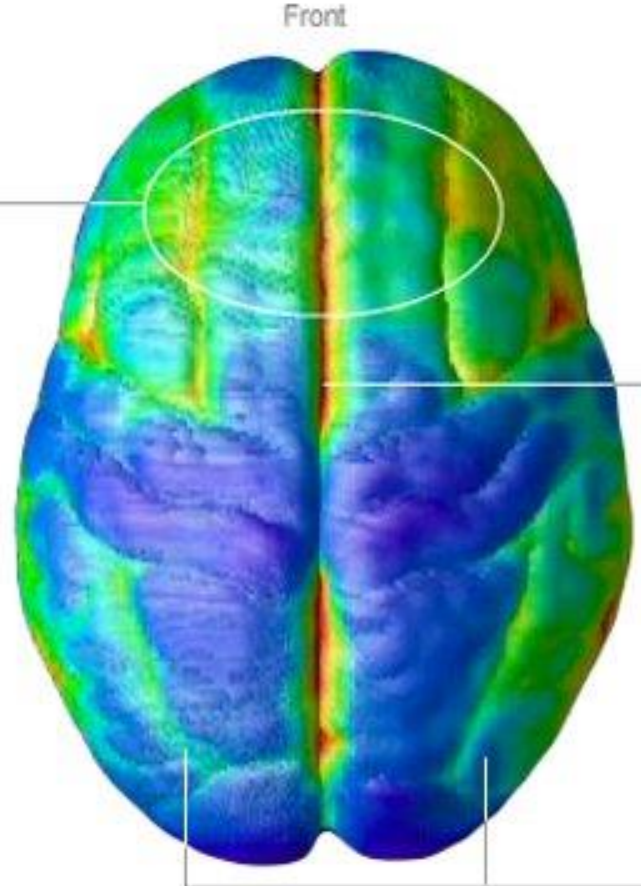
JUDGMENT

The prefrontal cortex is among the last areas to mature. Until it does, children lack the ability to adequately judge risk or make long-term plans. Ask kids at this age what they want to be when they grow up, and the answer is likely to change often.



EMOTION

Deep in the limbic system, a capacity for creating emotion increases. As yet, this capacity is unrestrained by the prefrontal cortex, which lags behind. That's why some teens can seem emotionally out of control.



LOGIC

The parietal lobes are developing rapidly at this age, as shown here in blue. The child's intelligence and analytical abilities are expanding.

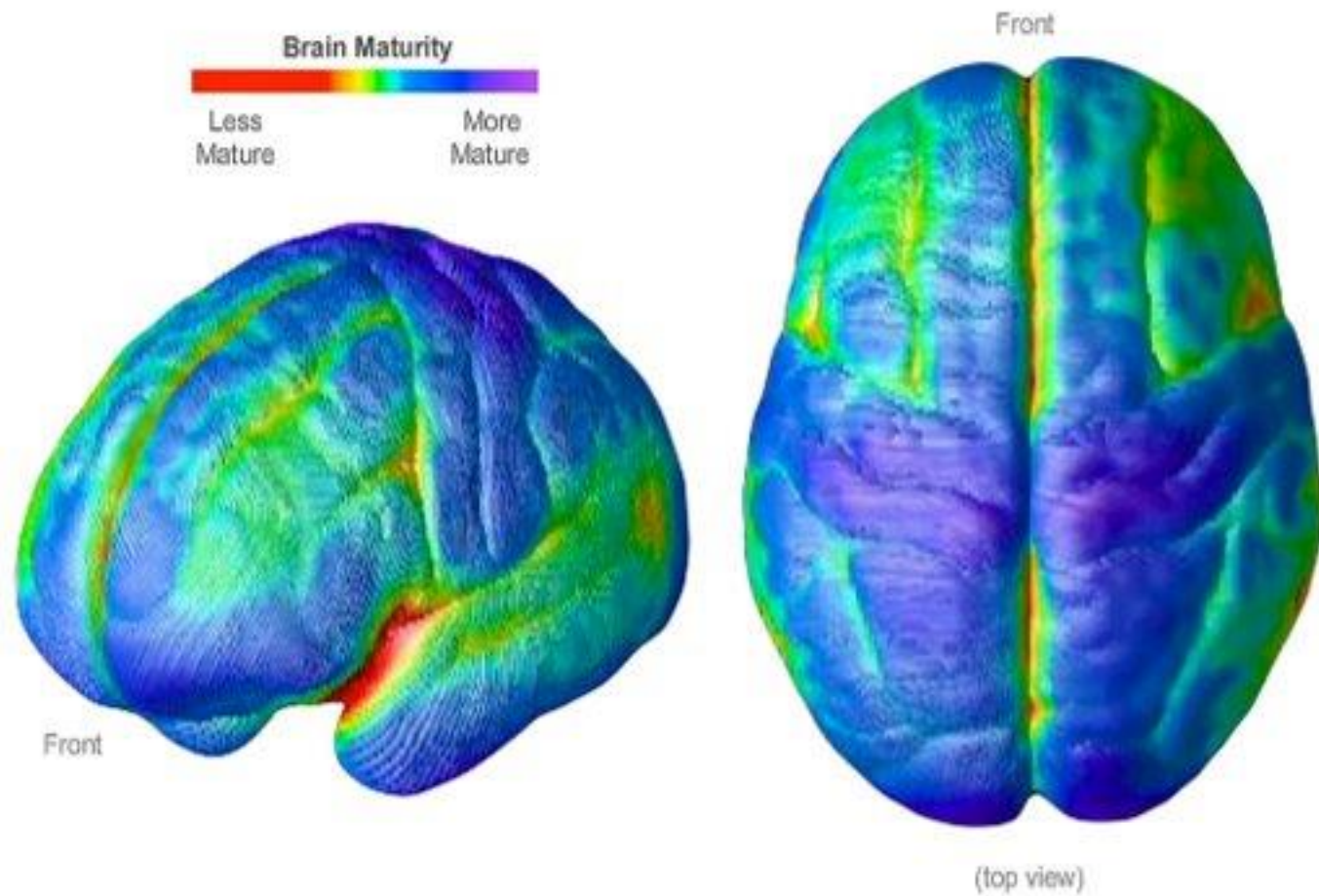
(top view)

13 years old



SPECIALIZATION

In the teen years, an abundance of neural links continue to be discarded. Underused connections will die to help more active connections thrive. As a result, the child's brain will become more specialized and efficient.

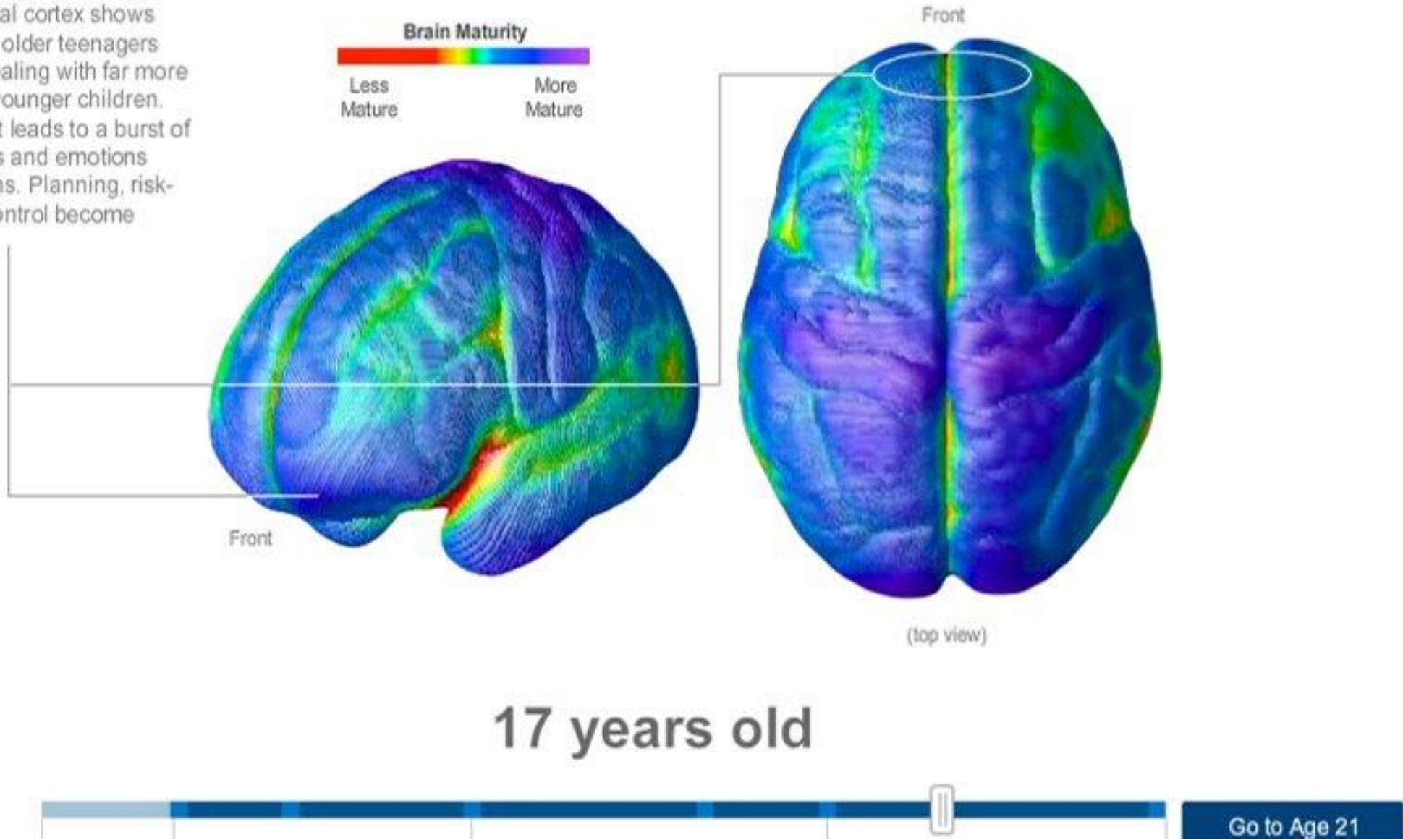


15 years old



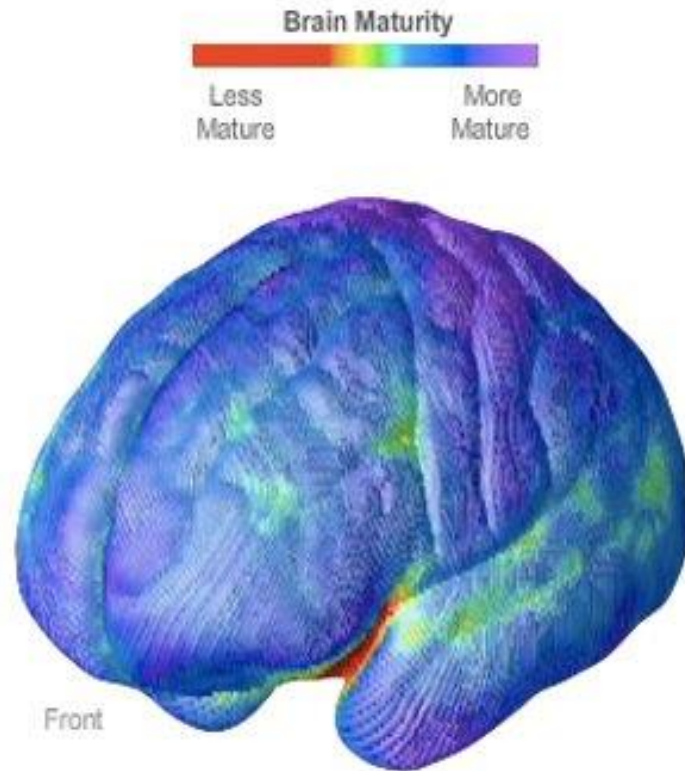
ABSTRACT THOUGHT

The deep blue and purple of the maturing prefrontal cortex shows why the brains of older teenagers are capable of dealing with far more complexity than younger children. This development leads to a burst of social interactions and emotions among older teens. Planning, risk-taking and self-control become possible.



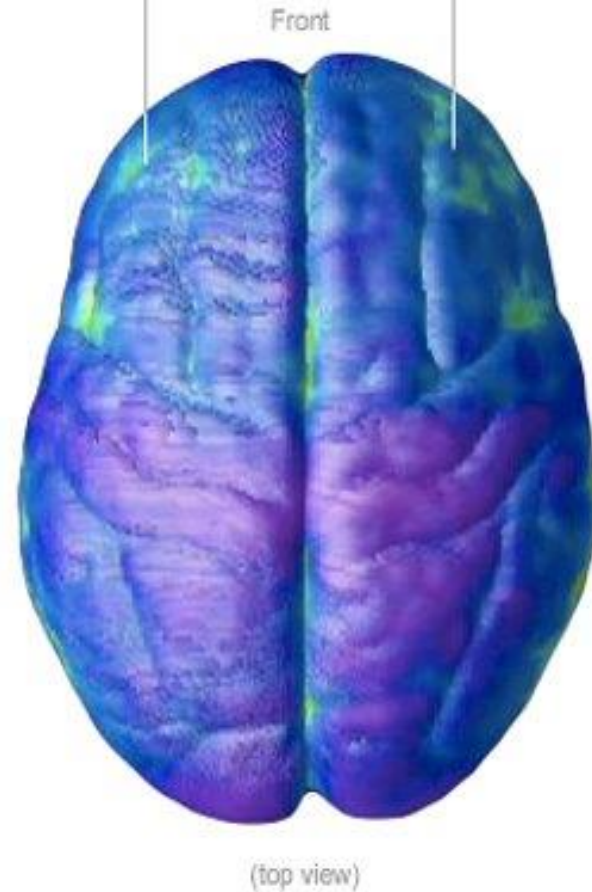
EXECUTIVE FUNCTIONS

Although the brain appeared to be almost fully developed by the teen years, the deepening blue and purple areas here show that tremendous gains in emotional maturity, impulse control and decision-making continue to occur into early adulthood.



MATURATION

The 21-year-old brain is mostly mature, but the areas of green show that even at the threshold of legal adulthood, there is still room for increases in emotional maturity and decision-making skills, which will come in the next few years.



21 years old

