

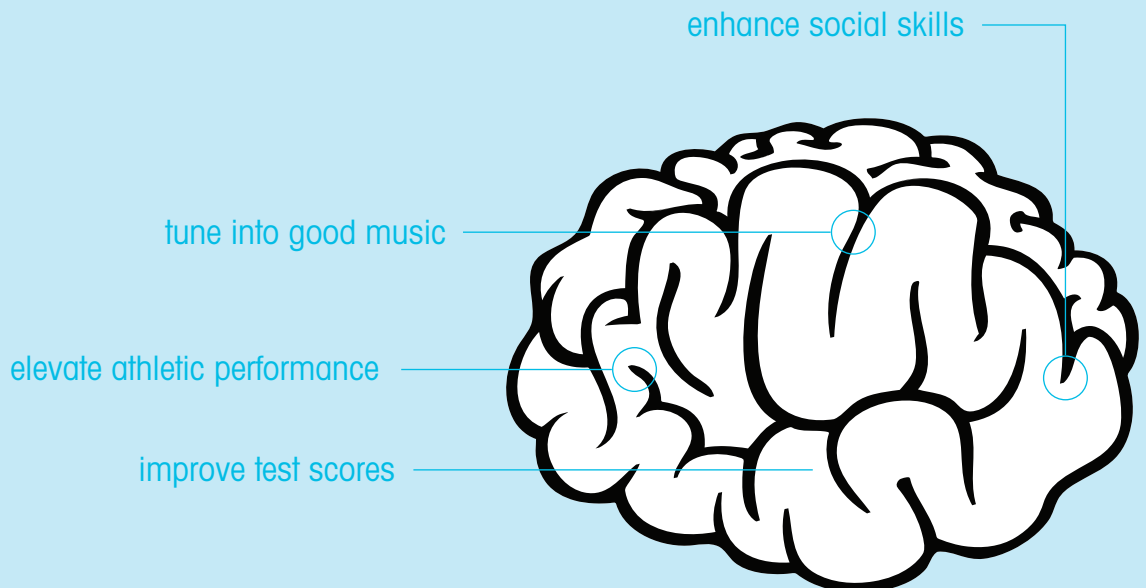
# human brain

## OPERATOR'S MANUAL

Guide to getting the most out of a growing brain.

How to sleep, what to eat, where to spend extra time. How not to look like a drunken idiot. Party tricks, sports performance, IQ tests, and more.

**What you need... to think quickly.**

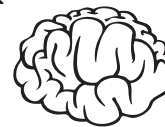


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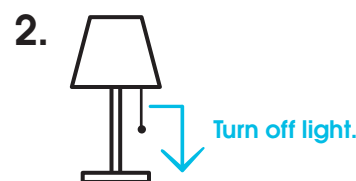
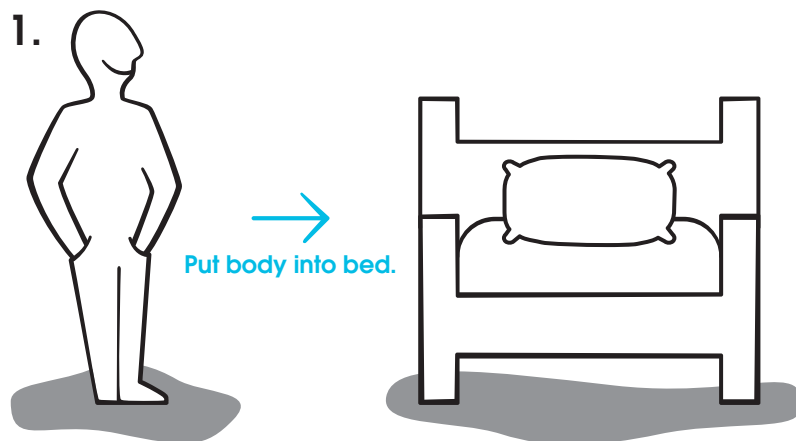
Get it?  
Table of...



WHAT PART OF THE BRAIN MAKES US LAUGH?  
NO CLUE? BRAIN SCIENTISTS DON'T KNOW EITHER.

# HOW TO SLEEP

Giving it a rest



**Yeah, it actually makes a difference:**  
Your touchy little brain doesn't sleep well unless it's dark. Sleeping in complete darkness lets your brain re-charge. Like a power boost.

 TRY RUNNING A FAN FOR WHITE NOISE TO BLOCK OUT DISTRACTING SOUNDS.

**The brain loves to sleep.** It's lazy that way: that giant organ in our head is hungry for shut-eye. It yearns to rest—more than nine hours a night when it's a teenager, the experts tell us. Apparently, it wants time to organize what it collects all day, processing time so when we want to fetch a memory we can get it—quickly.

And it's not just more rest the brain wants. No, that's not good enough. It wants better rest. Solid sleep. Brain time.

## TURN IT OFF (1-A)



## WATCH WHAT YOU CONSUME (1-B)



**Unless you want to feel miserable** in the morning, you probably also want to turn off things like your cell phone, iPod or TV (DIAGRAM 1-A).

People who drink find that downing a beer or whatever doesn't help you sleep. It just makes you feel worse in the morning (DIAGRAM 1-B).

Do not consume coffee or soda if you plan to sleep in the near future. If you haven't been sleeping much, maybe you forgot that caffeine is a stimulant that keeps people awake. (Diagram 1-B).



## Mr. Brain Complains

IF YOU DON'T SLEEP, GUESS WHAT YOU GET.

**You get stupid.** Scientists say we need, on average, 9¼ hours of sleep, more if we play sports. But it turns out every little bit counts: In this one study, kids who cut their sleep by 15 minutes a night scored two grade levels lower on intelligence tests. So we say—grab whatever sleep you can. Keeps those angry red marks off the pop quizzes.

**You can get fat.** So here's the theory—when you get overtired, your brain thinks: Need. Fuel. Now. If you don't give it sleep, your brain craves food instead. Sleeping fights midnight snack attacks, and not just because you can't eat an entire bag of cheese puffs when you're unconscious.

**You get zits.** Skipping sleep makes your hormones go haywire, and pumps up the stress. You will wear the results on your face.

**You get depressed.** It could be a drop in serotonin—a tired body produces less of this neurotransmitter. Or it could just be some mysterious deep-sleep brain happy dance. Scientists don't know exactly why, but you need sleep to feel good. (Bad news: a 10 p.m. bedtime is a proven depression fighter).

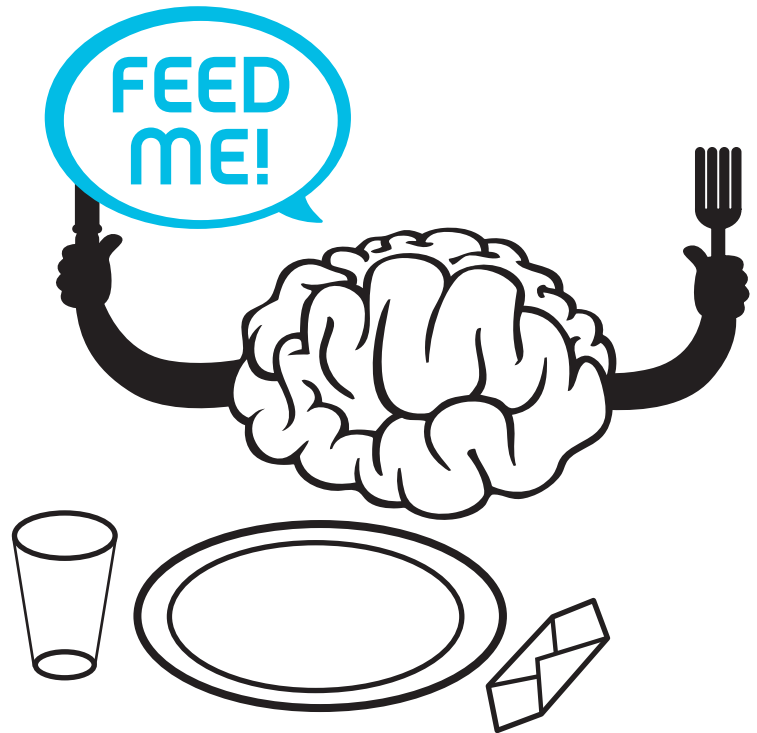
## WHAT TO EAT

### Brain fuel

**Brains like to eat.** About 20% of our calories are sucked up as brain fuel. In a way, how we think goes back to what we eat: Half the chemicals carrying messages around our brains start in our stomach. And without the right chemicals, it's tough for our brains to make the right connections.

In fact, all the way past age 21 we can mess up our brain long term because it's still growing. Not enough good stuff or too much bad stuff and our brain falls a little short. Like teenagers who drink a lot of alcohol—they end up with smaller brains.

Need to think fast, move quickly, or crack better jokes? You can get a boost from the strangest foods. Check it out the charts to the right.



#### WHAT'S GOOD: Fuel for your brain

Fish	Brains love fish. Salmon, tuna, even those weird sardines in a can. Fish has Omega-3 fatty acids, little brain builders that boost energy, problem-solving skills and memory power.
Avocado	It's an IQ thing. Avocado increases circulation, giving our brains fresh oxygen they can use to get smart.
Broccoli	Another brain super food, right up there with fish. It's full of things our brain loves, including vitamin K. (Anybody know what the K stands for? Or any of those vitamin letters?)
Eggs	Scrambled or hardboiled, however you like them eggs keep your memory sharp. Eggs have an essential brain nutrient called "choline." Without it, your brain is fried.
Bananas	It's like texting for the brain. The potassium in bananas helps our brain transmit messages (no monthly charges).
Blueberries	Thinking fast. Blueberries boost cognitive processing (that's a fancy way of saying, um, thinking fast).
Walnuts	Ever notice walnuts look like a brain? Walnuts have lots of those brain-building Omega 3s (in case you don't like fish).
Chocolate	Sound too good to be true? Well it sort of is. Chocolate boosts memory, but only the really dark kind without a lot of sugar. Hershey's kisses don't count.
Yogurt	It's Zen food. Yogurt has a super-chilling amino acid called lysine that keeps our brain calm when we're under stress.



#### WHAT'S NOT: Stuff that slows you down

Fatty foods	Clogs synapses that brains use to transmit information. Sort of like a traffic jam in the brain.
Too much sugar	Quick high, quick crash. And the crash lingers. Our brain gets spacey.
Nothing	Go long enough without eating and you... can... get... real... slow. Brains don't store fuel. You need to keep eating to keep thinking.
Eating too much	Your brain is like Goldilocks. A picky little thing. Not too much. Not too little.
Getting drunk	Alcohol is a toxin that affects every part of the brain (which is why drunks fall down, slur their words and generally look stupid) until the liver can clean up the mess. Alcohol is worse for teenage brains, because they are still growing and can be permanently damaged.
A boring diet	Your brain craves variety. Eating only your favorite foods is like listening just to your favorite song—you end up sick of it.
Caffeine	Caffeine perks your brain up. And if you drink too much, your brain stays perked up all through the night. That means no deep sleep, which puts your brain in a really, really bad mood.
Zombies	You're right, you don't eat or drink zombies—they eat you. Your brain, as a matter of fact. So definitely steer clear of the undead.
Anything you can't pronounce	The more syllables an ingredient has, the less likely it's good for your brain. So flip over the package and read—we dare you.

## WHERE TO SPEND EXTRA TIME

Got a minute? Give it to your brain

### ✓ Hanging out with friends

Getting together with friends, talking on the phone, Facebooking and texting all keep our brain's synapses firing. Studies show communicating with another person for just 10 minutes a day improves performance on memory and test scores—and the more socializing, the better.

### ✓ Growing the prefrontal cortex\*

Our brain likes to be taken care of. After all, it's still growing. Some of the last parts of our brain to develop are some of the coolest ones. Like the prefrontal cortex. It's the part that's in charge of planning ahead and sticking to goals, so we can get what we want out of life. Avoiding alcohol is one way to help—drinking stunts the prefrontal cortex. It never gets a chance to fully grow up.

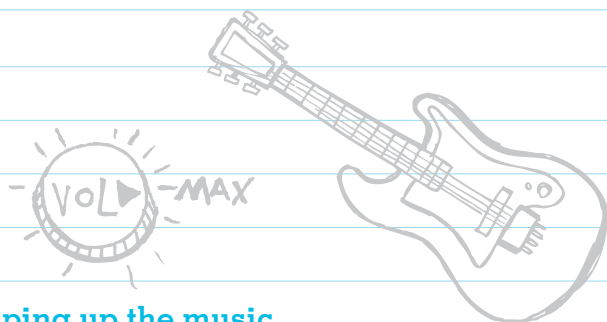
\* SEE DIAGRAM 8-A ON PAGE 18.

### ✓ Playing video games

Our mom might think we're wasting time, but experts say video games expand our brain. Unlike watching TV, video games engage higher-order thinking. We have to set goals, create a hypothesis (how we're going to get the bad guys), and then weigh the evidence, analyze situations, and make decisions as the game unfolds. So hunt down those aliens—it's educational.

#### BRAIN CELLS: A USER'S GUIDE

When we were little, they told us that we use only 10% of our brain. We always wondered why 90% of our intelligence would just hang around up there. Anyway, it turns out it's not true. New research says we use nearly all of our brain every day.



### ✓ Pumping up the music

Rap. Rock. Country. Pop. Indie. Classical. Music of any kind is a great way to feed our brain. And while there's a lot scientists still don't understand about how music affects our brain, here are some things they do know:

- **Music** can boost memory and raise IQ scores.
- **Listening** to classical music does not in fact turn babies into geniuses.
- **When** musicians play together, their brain waves get into synch.
- **Most** people use their right brain while listening to music. Musicians use both sides of their brain.
- **Musicians** are worse when they drink alcohol (though they may think they sound better).
- **Music** helps us sleep better, controls food cravings and relieves depression.

## Five easy ways to get smart

(no books required)



- 1 **Wiggling our toes.** Moving our toes activates nerves that stimulate our brain. Try this in class.
- 2 **Taking a hike.** Walking just 20 minutes a day wakes up our brain and helps us concentrate.
- 3 **Eating lunch with the opposite hand.** If we really want a challenge, we close our eyes, too. We just warn our friends first.
- 4 **Skipping the booze.** Our brains are still growing. Alcohol retards brain growth, so you end up with a smaller, slower-thinking brain.
- 5 **Watching less TV.** We know, we know. Sad but true. TV puts our brain in neutral. Nearly anything else—including just sitting and staring at our belly button—gets our brain into a higher gear.

# HOW NOT TO LOOK LIKE A DRUNKEN IDIOT

Brain damage tips

## Should I pickle my brain in alcohol?

Depends on your goal. Studies show that if you drink like a drunken idiot, you will tend to act like a drunken idiot. You will also dehydrate your brain and look (and feel) like puke the next day. Then there's this new research about how much of the brain is still being formed through high school. Getting smashed in high school can mess that up and make you... a... little... bit... slower.

## I want long-term brain damage. How can I make that happen?

Getting drunk works if you do it enough and at the right time, which is to say before we get out of high school. You don't even have to try that hard. Some studies suggest as few as 20 drinks a month in high school can break down a teenager's white matter\*\* —that's the connective stuff that sends messages around the brain. No worries, just use "um" a lot.

## What specific types of brain damage can I get?

Teenagers who drink a lot tend to have smaller frontal lobes\* and a tinier hippocampus\*—parts of the brain that guide memory and learning. Heavy teenage drinkers talk, read and write at a lower level, and they aren't as good at problem solving. The longer a teen keeps getting drunk, the more intense the damage.

# Q & A

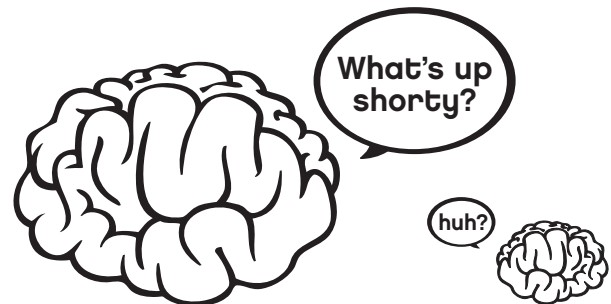
## What if I wait? What if I just started getting drunk later in life?

You will have to try harder to get the same amount of brain damage. Your brain will no longer be developing. It's much easier to get brain damage if you drink before you leave high school while your brain is still growing. Get this: Teenagers only need to drink half as much as adults to suffer the same bad effects.

## What if I just want to fit in?

When they're not bragging out loud, most Broward teens say they don't drink alcohol. They prefer soda (we didn't ask what kind, but look around and you can figure it out).

## Drinking & brain development



The brain goes through rapid development and "wiring" changes from ages 12 to 21. The prefrontal cortex\* and hippocampus\* are especially vulnerable to alcohol damage during this time. Alcohol damage in middle and high school can be "long-term and irreversible," according to the American Medical Association. Here's what the science says:

**Pea brain:** The brain's hippocampus\* (a key to memory) can be 10% smaller in heavy underage drinkers.

**Can't communicate:** Teenage drinkers score worse than non-drinkers on vocabulary and memory tests.

**Growing up weird:** Alcohol affects the sleep cycle, disrupting the hormones necessary for normal growth and maturation.

**Flunkers:** Teen drinkers do worse in school, and are more likely to end up depressed and considering suicide.

\* SEE DIAGRAM 8-A ON PAGE 18. \*\* SEE DIAGRAM 8-B ON PAGE 18.

## PARTY TRICKS

Having a little fun with our brains

### TRICK #1

Math = vegetables? Only the brain knows...

#### Step 1

Ask a friend the five questions below. After each question, wait until your friend gives the answer, then ask the next question.

1. What's  $5+1$ ?
2. What's  $3+3$ ?
3. What's  $4+2$ ?
4. What's  $1+5$ ?
5. What's  $2+4$ ?

#### Step 2

Tell your friend to close their eyes.

#### Step 3

Tell your friend to repeat the answer in their mind 15 times.

#### Step 4

Ask your friend, "Quick, what's the first vegetable you think of?"

#### Step 5

Write down your friend's answer below. Then give three other friends the same test, and see which vegetable they pick.

Friend 1 \_\_\_\_\_

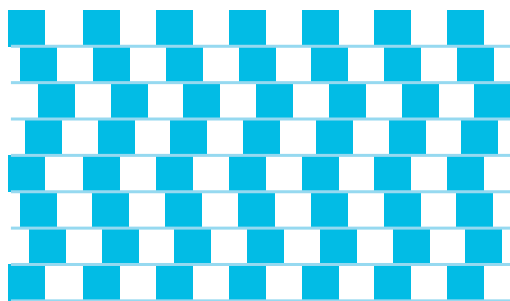
Friend 2 \_\_\_\_\_

Friend 3 \_\_\_\_\_

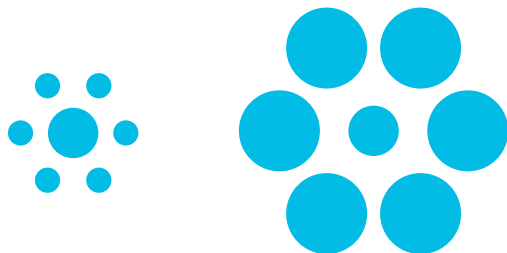
Friend 4 \_\_\_\_\_

### TRICK #2

Seeing is believing. Or not.



Do the horizontal lines slope?



Which center circle is bigger?



#### ? WHY IS OUR BRAIN ACTING STUPID?

Don't blame the brain—it's just got too much to do. Thinking about lunch, trying not to trip on the stairs, remembering our homework... It never gets a break. So our brain takes short cuts. It looks for patterns—things it has experienced before—so it can make quick decisions. Sometimes those decisions are just a little too quick. It's not all the brain's fault though—the eyes are a little lazy. They get tired easily, and don't always send information to the brain in the right order. Our poor brain ends up seeing things that aren't there.

# HOW TO GET BETTER AT SPORTS

It's all in your head



**Practice. Then you can think like a lizard.** We want our brain in the game—except when we don't. Focus and mental stamina keep us sharp and determined. But our brain can also get in the way. When we think too much, our brain ends up second-guessing us—we hesitate, and miss the pass. In sports, the lizard brain rules. The primitive part of the brain—the “danger, RUN” part—is the automatic part. Do something over and over (practice, practice, practice) and a skill will move from the thinking part of the brain to the automatic part. It becomes a reflex.

**Move fast. Get the blood flowing.** Moving fast makes the heart pump and the lungs suck in air, sending more oxygen-filled blood cells to the brain—it's like brain cell Miracle Grow. The result? Our reflexes quicken, our hearing gets sharper and we think faster. We recall what's needed when it's needed even when the other guys are screaming in our face.

In the NFL game today, there are a lot of better athletes than I am... But I kind of stick to my roots of the disciplined quarterback...working hard, getting ready to play and making good decisions on Sundays.

: PEYTON MANNING  
NFL Quarterback

**Ninety percent of my game is mental. It's my concentration that has gotten me this far.**

: CHRIS EVERT, Tennis Champion  
(and Fort Lauderdale native)

**Feed and water your brain regularly.** Things our brain likes: food, water, sleep. It's kind of like a pet that way.

**Keep moving. Then start moving again.** Sitting around saps oxygen flow to the brain. The brain gets lethargic. The eyes droop, head drops, and... hey, did you just fall asleep? The more active we get, the better the body gets at moving oxygen to the brain. We can stay alert longer, even under stress like the two-minute drill.

**Party with club soda. Win the next day.** There's no getting around it: Alcohol reduces athletic ability, even days after a drink. The body sees alcohol as a toxin—technically it is a toxin after all. So the body concentrates on getting rid of it. Everything else gets slower and weaker. That means sucking wind (less endurance), forgetting plays (memory is slower), and wimping out (less testosterone).



## HOW SMART ARE YOU?

Test your IQ

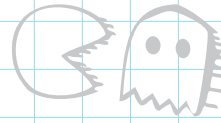


**1** Sam has a bag of apples. If all of the apples in the bag are red apples and all red apples have a stem, can Sam predict how long till wedding bells will ring?

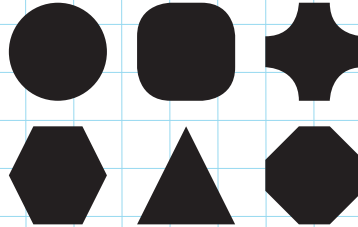
- a. Yes, by twisting the stem
- b. No, Sam hates apples
- c. Is this some stupid Internet test?

**2** Susie has a cake that she splits into six pieces to share with all her friends. If each person with a piece of cake then splits their piece in half to give to another friend, how many pieces of cake are there in the end?

- a. None, they all got eaten
- b. Is the frosting chocolate or vanilla?
- c. Susie's friends are allergic to wheat



**3** Which image belongs next in the sequence?



- a. STOP
- b. HOMEWORK
- c.

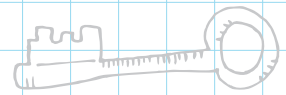
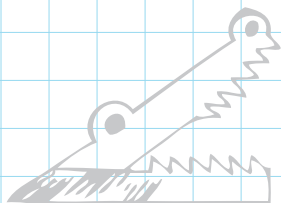


**4** All work and no play makes Jack \_\_\_\_\_.

- a. A grownup
- b. The best person to pick for your group project
- c. Jack's just whining. He doesn't really work that hard.

**5** If some of the pens are blue and some of the pens are in the drawer, then should you use a pencil sharpener?

- a. Duh, if you have a pencil
- b. Which drawer?
- c. My classroom doesn't have a pencil sharpener



## ANSWER KEY

(TURN UPSIDE DOWN TO READ)

If you answered a, b, or c to any of the answers above, or decided this test was totally bogus and tossed it, or at the very least are reading this right now, our money-back guarantee, double-blind scientifically proven test shows beyond any reasonable doubt that you have a brain. Congratulations!

# MAP OF THE BRAIN

What's inside our heads

( **prefrontal cortex** )

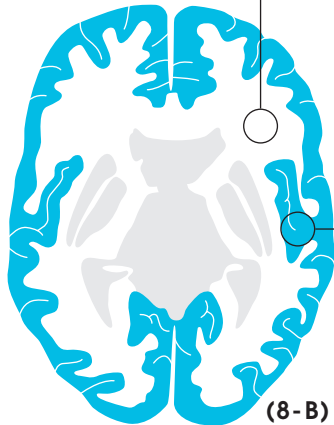
Our brain's CEO. The prefrontal cortex is the part of the frontal lobes responsible for planning, good judgment, and impulse control. It's not fully developed until after age 21.

( **white matter** )

The brain's message system. White matter is made up of nerve fibers that sends messages to and from different parts of the brain. It also regulates body temperature, heart rate, and other automatic functions.

( **gray matter** )

Our information processing centers. Grey matter is in charge of things like muscle control, seeing and hearing, memory, emotions and speech.

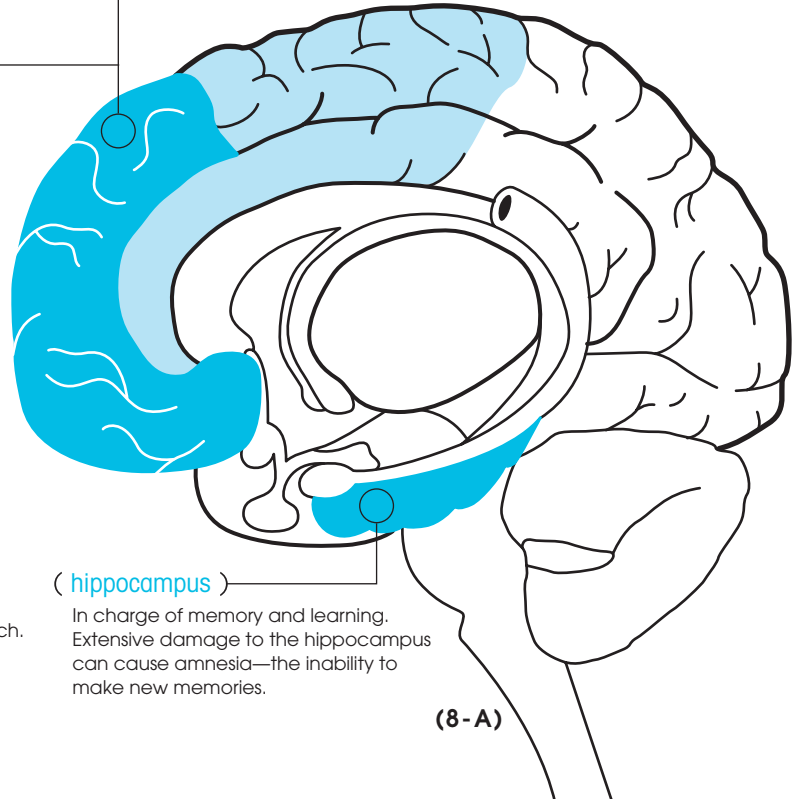


( **frontal lobes** )

Our emotional control center and home to our personality. The lobes are behind our forehead, one for each side of our brain.

( **hippocampus** )

In charge of memory and learning. Extensive damage to the hippocampus can cause amnesia—the inability to make new memories.



Hey good looking.

