



EXPEDITIONARY  
LEARNING

# **Grade 7: Module 4A: Unit 1: Lesson 2**

## **Identifying Main Ideas and Supporting Details: What's Going On in the Teenage Brain?**



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**Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)**

- I can cite several pieces of text-based evidence to support an analysis of informational text. (RI.7.1)
- I can use a variety of strategies to determine the meaning of unknown words or phrases. (L.7.4)
- I can determine the meaning of words and phrases in text (figurative, connotative, and technical meanings). (RI.7.4)

**Supporting Learning Targets**

- I can determine the main idea and supporting ideas/details in “Teens and Decision Making”
- I can determine the meaning of unknown technical words.

**Ongoing Assessment**

- Neurologist notebook #1 (from homework)
- Thinking Logs



Agenda	Teaching Notes
<ol style="list-style-type: none"><li>1. Opening<ol style="list-style-type: none"><li>A. Entry Task: Thinking Logs (10 minutes)</li></ol></li><li>2. Work Time<ol style="list-style-type: none"><li>A. Introducing the Brain Development Anchor Chart (10 minutes)</li><li>B. Vocabulary in Action (15 minutes)</li></ol></li><li>3. Closing and Assessment<ol style="list-style-type: none"><li>A. Adding to the Brain Development Anchor Chart (10 minutes)</li></ol></li><li>4. Homework<ol style="list-style-type: none"><li>A. Read “What’s Going On in Your Brain?” by Linda Bernstein. Complete neurologist’s notebook #2.</li></ol></li></ol>	<ul style="list-style-type: none"><li>• In this lesson, students are introduced to two important classroom routines: Thinking Logs and the Brain Development anchor chart. They also continue to add to the Domain-Specific Vocabulary anchor chart. These routines help scaffold students toward RI.7.1, RI. 7.2, RI. 7.4, and L.7.4.</li><li>• First, students begin working with the Thinking Log, which is used throughout Units 1 and 2 as a way to track and reflect on their understanding of the development of the adolescent brain. The Thinking Log serves as a scaffold to SL 7.2—how new information has helped them clarify the issues. See Unit 1 overview for details. Note that the entire Thinking Log for Units 1 and 2 is included in the supporting materials of this lesson: if possible, prepare this as a packet for students.</li><li>• The Brain Development anchor chart is important scaffold for the student’s writing in Unit 3 (see Unit 1 overview). It also provides a common point of reference and a place to hold class thinking about brain development. Like all anchor charts, this one can be created and updated either in an electronic format to be displayed using a projector, on a regular-size piece of paper to be displayed via a document camera, or on a large piece of chart paper to be posted. Students will also maintain their own copy of this anchor chart and update it along with the class anchor chart.</li><li>• The Brain Development anchor chart will hold the students’ learning around the three major aspects of brain development—the prefrontal cortex, the limbic system, and the neurons. Use the Model Brain Development anchor chart for suggested information to include on the anchor chart, but ultimately let the anchor chart reflect the class discussion. To help you guide the students to the background knowledge they need in order to be successful in this module, familiarize yourself with the final essay prompt (Mid-Unit and End of Unit 3 Assessment), model essay, and the content of Unit 2.</li><li>• Work Time B focuses on RI 7.4 and L 7.4 and will help students grasp difficult and technical scientific terms in an engaging and kinesthetic way. To transition smoothly to this activity, be sure to prepare the materials in advance.</li><li>• To close, students return to the Brain Development anchor chart and add their learning from the last two sections of the text. Asking the students to complete a sticky note invites everyone to participate in building the class anchor chart in a low-risk way. Alternatively you could collect the students’ anchor charts and give formative feedback.</li></ul>



Agenda	Teaching Notes (continued)
	<ul style="list-style-type: none"> <li>• In advance:               <ul style="list-style-type: none"> <li>– Prepare the Thinking Log packet.</li> <li>– Prepare the materials for Understanding Axons, Dendrites, and Synaptic Pruning: A Vocabulary Play.</li> </ul> </li> <li>• Post: Learning targets.</li> </ul>

Lesson Vocabulary	Materials
<p>(from “Teens and Decision Making”) neural impulse (para. 9), axons (para. 10), dendrites (para. 10), synapse (para. 10), myelination (para. 11), synaptic pruning (para. 11), brain pathways (para. 12); (from homework) reckless, localization, regenerate, solidifies</p>	<ul style="list-style-type: none"> <li>• Thinking Logs (one per student)</li> <li>• Brain Development anchor chart—student version (one per student)</li> <li>• Brain Development anchor chart (new; co-created with students in Work Time A)</li> <li>• Document camera</li> <li>• Model Brain Development anchor chart (for teacher reference)</li> <li>• “Teens and Decision Making: What Brain Science Reveals” (from Lesson 1; one per student)</li> <li>• Domain-Specific Vocabulary anchor chart (begun in Lesson 1)</li> <li>• Understanding Axons, Dendrites, and Synaptic Pruning: A Vocabulary Play (10 copies; one copy for each character in the play)</li> <li>• Model Domain-Specific Vocabulary anchor chart (for teacher reference)</li> <li>• Note cards or sticky notes (one per student)</li> <li>• “What’s Going On in Your Brain?” (one per student)</li> <li>• Neurologist’s notebook #2 (one per student)</li> <li>• Neurologist’s notebook #2 (answers, for teacher reference)</li> </ul>



Opening	Meeting Students’ Needs
<p><b>A. Entry Task: Thinking Logs (10 minutes)</b></p> <ul style="list-style-type: none"> <li>• Distribute the <b>Thinking Logs</b>. Explain to the students that today they will be starting a routine they will use many times in Unit 1. The Thinking Log contains questions that will be completed on most days. The purpose of this log is to help them reflect on and clarify their thinking on the neurological development of teenagers and their learning from the homework (if they complete the log as an entry task) or their learning from the day’s lesson (if they complete the log as an exit ticket).</li> <li>• From the Thinking Log, read aloud the two questions for Lesson 2 and ask students to complete them based on their current thinking:             <ul style="list-style-type: none"> <li>* “The main idea of last night’s reading was that knowing how the brain works was helpful to Dr. Jensen and her sons. How was it helpful to them? How do you think knowing something about how the adolescent brain works would be helpful to you? To your parents? To your school?”</li> <li>* “What else are you wondering about adolescent brain development?”</li> </ul> </li> <li>• After a few minutes, cold call on students to explain how the information about the neurological development of teens was useful to Dr. Jensen and her sons. Listen for them to say it helped Dr. Jensen realize there was a scientific explanation for her sons’ behavior. It also helped her sons understand why certain behaviors (like taking drugs and staying up all night) are counterproductive for a teenager. Press students to give an example from the text as evidence to explain their ideas.</li> <li>• Ask students to give a Fist to Five on how easily they were able to identify the main idea of last night’s reading. A “fist” indicates that they struggled, whereas a “five” indicates that it was easy. It’s likely that many students identified that the science information was important but were less sure how the Jensen’s story fit into the main idea. Acknowledge the difficulty of this assignment.</li> <li>• If time permits, have students popcorn out some of their answers for the second half of the first question.</li> <li>• Ask them to put their logs in a place where they can easily retrieve them each day.</li> <li>• Collect the neurologist’s notebook #1 from homework and use it as a formative assessment to inform your teaching for Lessons 3 and 4.</li> </ul>	



Work Time	Meeting Students’ Needs
<p><b>A. Introducing the Brain Development Anchor Chart (10 minutes)</b></p> <ul style="list-style-type: none"> <li>• Distribute a blank <b>Brain Development anchor chart—student version</b> to each student. Post a class <b>Brain Development anchor chart</b> to work from on a <b>document camera</b> (or on chart paper).</li> <li>• Tell students that today they will be starting an anchor chart to help them track their learning about adolescent brain development. They will maintain their own copy in addition to the class copy used during discussions.</li> <li>• Point out the five columns: Other Developmental Info, Neurons, Prefrontal Cortex, Limbic System, and So What?</li> <li>• Explain that over the next two weeks they will be learning about two specific regions of the brain (the prefrontal cortex and the limbic system). They will also learn about the way neurons are growing and changing. This happens all over the brain and in particular in the frontal lobes. Any other miscellaneous learning can go in the first column. They will use the fifth column later. Remind students to note where they learned the information so they can go back and reread it if necessary.</li> <li>• Ask: <ul style="list-style-type: none"> <li>* “The prefrontal cortex is part of the frontal lobe. What did you learn about the frontal lobe in last night’s homework?” Add students’ answers to the anchor chart and ask them to do the same on their own copy, referencing the <b>Model Brain Development anchor chart (for teacher reference)</b> as needed.</li> </ul> </li> <li>• Invite students to give you other important information from the homework. When students begin to give answers about “myelin” or “neural insulation,” thank them for helping you transition to the text they’ll be reading today.</li> <li>• Invite students to get out their copy of “<b>Teens and Decision Making: What Brain Science Reveals</b>” (from Lesson 1). They will continue reading it today.</li> <li>• Ask a student to reread the third paragraph from “Teens and Decision Making.” Then ask: <ul style="list-style-type: none"> <li>* “This is all about how neurons work. How can we capture this information in the Neurons column?” Add students’ answers to the chart, using the Model Brain Development anchor chart (for teacher reference) for guidance.</li> </ul> </li> <li>• Ask the students to silently skim the section of the article they read yesterday titled “The Teen Brain: Under Construction,” looking for information to add to the anchor chart.</li> <li>• Ask students to raise their hands when they have some information. Wait for most students to raise their hands. Add the students’ answers to the chart. Prompt with questions such as: “What did we learn about the limbic system? At what age does the brain fully mature? Where does that go on the anchor chart?”</li> </ul>	<ul style="list-style-type: none"> <li>• Anchor charts and recording forms engage students more actively and provide the necessary scaffolding that is especially critical for learners with lower levels of language proficiency and/or learning.</li> </ul>



Work Time (continued)	Meeting Students’ Needs
<ul style="list-style-type: none"> <li>The Model Brain Development anchor chart (for teacher reference) is provided as a guide, but you should let the anchor chart reflect the discussion in the class. Be sure students walk away with a basic understanding of the prefrontal cortex (what it is and that it is underdeveloped), the limbic system (what it is and how it matures first), and that neurons are in a dynamic branching and pruning stage.</li> </ul>	
<p><b>B. Vocabulary in Action (15 minutes)</b></p> <ul style="list-style-type: none"> <li>Ask students to read silently as you read aloud the section titled “Fine-Tuning the Brain.” Set the intention for students: “Underline words that should go on the Domain-Specific Vocabulary anchor chart.”</li> <li>Read the entire section fluently as students read along in their heads.</li> <li>Ask students to identify any words that should go on the <b>Domain Specific Vocabulary anchor chart</b>. Add them without the definition for now. Be sure to include neural impulse, axons, dendrites, synapse, myelination, synaptic pruning, and brain pathways.</li> <li>Tell students that these are difficult vocabulary words and that you have a short play that will help them visualize these concepts.</li> <li>Lead the students through the <b>Understanding Axons, Dendrites, and Synaptic Pruning: A Vocabulary Play</b>.</li> <li>Refocus the class on the Domain-Specific Vocabulary anchor chart. Add the definitions at this time, referencing the <b>Model Domain-Specific Vocabulary anchor chart</b> (for teacher reference) as needed. Clarify other vocabulary as needed.</li> </ul>	<ul style="list-style-type: none"> <li>Acting out the vocabulary is an engaging way to reach some of your kinesthetic learners.</li> </ul>



Closing and Assessment	Meeting Students’ Needs
<p><b>A. Adding to the Brain Development anchor chart (10 minutes)</b></p> <ul style="list-style-type: none"> <li>• Distribute <b>note cards</b> (or sticky notes if the anchor chart is on a chart paper on the wall).</li> <li>• Ask students to read silently as you reread aloud the sections “Fine-Tuning The Brain” and read “Wait a Minute!” Set the intention for students: “As you follow along, put a check mark on information that should go on the Brain Development anchor chart. Be sure to look for what causes neurons to be strengthened or pruned.”</li> <li>• After you have finished reading, briefly discuss the purpose of the last section and how it implies that kids have some control over their brains and that slowing down and thinking is a good strategy. You’ll revisit this section in the next lesson.</li> <li>• Ask students to write down five facts from these two sections on the note cards (or sticky notes).</li> <li>• As students leave, ask them to place the sticky notes in the corresponding column on the class anchor chart.</li> <li>• Tell students that you will use students’ sticky notes as a way to help build the class anchor chart (see Teaching Notes, above).</li> <li>• Distribute <b>“What’s Going On in Your Brain?”</b> and <b>neurologist’s notebook #2</b>. Preview homework as needed.</li> </ul>	
Homework	Meeting Students’ Needs
<ul style="list-style-type: none"> <li>• Read “What’s Going On in Your Brain?” by Linda Bernstein. Complete neurologist’s notebook #2.</li> </ul> <p><i>Note: Transfer the information onto the class anchor chart. Be sure students have identified that synaptic pruning occurs based on the environment, choices, and behavior of an individual. This information is central to the module. Use the note cards or sticky notes to inform the entry task in Lesson 3. At that time, you can clarify any misunderstandings.</i></p>	



EXPEDITIONARY  
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# Grade 7: Module 4A: Unit 1: Lesson 2

## Supporting Materials



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Thinking Log:  
Unit 1

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**Name:**  
\_\_\_\_\_  
**Date:**  
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The Thinking Log is a place for you to track and reflect on your understanding of the neurological development of teens. Each entry in your Thinking Log will ask you to explain your current understanding of this issue.

**Lesson 2:** “Teen Brain—It’s Just Not Grown Up Yet” by Richard Knox

The main idea of last night’s reading was that knowing how the brain works was helpful to Dr. Jensen and her sons. How was it helpful to them? How do you think knowing something about how the adolescent brain works would be helpful to you? To your parents? To your school?

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What else are you wondering about the development of the adolescent brain?

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**Lesson 4: Entry Task** “What You Should Know about Your Brain”

Dr. Willis says that when you stimulate neuron pathways over and over again, they become stronger. As she says, “Practice makes permanent.” What implications does this have for the kinds of activities that teens do repeatedly?

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What else are you wondering about the adolescent brain’s development?

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**Lesson 4: Exit Ticket: “Insight into the Teenage Brain”**

What did Dr. Galván’s experiments prove about how teens react differently to dopamine levels than adults and children? How might this explain teen behavior?

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What else are you wondering about the adolescent brain’s development?

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**Lesson 7**

How has revisiting the resources in the Gallery Walk clarified your thinking about adolescent brain development?

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Reread what you wrote in Lesson 4. How might Dr. Galván’s findings relate to the popularity of video games with teenagers specifically?

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**Lesson 8:** In “Attention Economy,” Dr. Giedd implies that “real life” activities like traditional homework, talking with friends, and working toward a long-term goal usually don’t provide the same jolt of dopamine of media devices. Why might that be a problem for students?

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What else are you wondering about adolescent brain development?

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**Lesson 10**

How did today's reading help clarify your thinking about the issue of the teen brain and screen time?

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What else are you wondering about adolescent brain development?

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**Lesson 3**

How did today's reading help clarify your thinking about the issue of teen brains and screen time?

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What else are you wondering about adolescent brain development?

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**Lesson 4**

What role do video games play in your life? How often do you play them? With whom? What in your view are the benefits of playing video games?

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What else are you wondering about adolescent brain development?

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**Lesson 11**

How did today's reading and video help clarify your thinking about adolescents and screen time?

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What else are you wondering about adolescent brain development?

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**Lesson 15**

What have you found most personally interesting about the risks and benefits of screen time? Why?

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**Lesson 17**

How did the Fishbowls clarify your thinking about entertainment screen time and adolescent neurological development?

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Brain Development Anchor Chart—Student Version

Other developmental info	Prefrontal cortex	Neurons	Limbic system	So what?



Model Brain Development Anchor Chart  
(For Teacher Reference)

**Note:** Different parts of the anchor chart are completed in different lessons. The bolded items are added in this lesson.

Other developmental information	Prefrontal cortex	Neurons	Limbic system	So what?
<p><b>The brain needs sleep to take things from your short-term memory to your long-term memory (Knox)</b></p> <p><b>Your brain does not fully develop until the mid-20s (Scholastic)</b></p>	<p><b>Also called the “frontal lobe” (Knox)</b></p> <p><b>This area helps with insight and understanding the effect of your behavior on someone else (Knox)</b></p> <p><b>Matures later than other parts of the brain (Scholastic)</b></p> <p><b>Right behind your forehead (Scholastic)</b></p> <p><b>Helps with thinking ahead and sizing up risk and reward (Scholastic)</b></p>	<p><b>“White matter” is called myelin, and it coats the nerves and makes them “communicate” more effectively (Knox)</b></p> <p><b>In order for your brain to make a decision, tiny specialized cells “talk” with each other through a series of neurotransmitters, like a circuit in a computer. Then the whole network puts out a response, which becomes your outward behavior. (Scholastic)</b></p>	<p><b>Develops earlier than the PFC (Scholastic)</b></p> <p><b>Plays a central role in your emotional response (Scholastic)</b></p> <p><b>Associated with decisions made in feeling (Scholastic)</b></p> <p><b>When teens make decisions in emotionally charged situations—this one weighs in heavily (Scholastic)</b></p>	



Model Brain Development Anchor Chart  
(For Teacher Reference)

Other developmental information	Prefrontal cortex	Neurons	Limbic system	So what?
		<p><b>Information travels from neuron to neuron by way of their axons and dendrites (Scholastic)</b></p> <p><b>The space between one neuron’s axon and the other neuron’s dendrites is called its synapse (Scholastic)</b></p> <p><b>To make the connection better, the axons wrap themselves in myelin through a process called myelination (Scholastic)</b></p> <p><b>Also, if a synapse isn’t used often, it is pruned through synaptic pruning. Then that energy is redirected into more active synapse. (Scholastic)</b></p> <p><b>Synaptic pruning occurs based on the choices, the behavior, and the environment of an individual (Scholastic)</b></p>		



Understanding Axons, Dendrites and Synapse: A Vocabulary Play

**Materials**

- Name tags for each of the characters
- One roll of toilet paper (myelin sheath)
- 10 objects to pass (like rulers, tennis balls, small books, etc.)

**Characters**

Brain	Axon #2	Dendrite #3
Axon #1	Dendrite #2	Neurotransmitter
Dendrite #1	Axon #3	Myelin

Narrator (this may work better if the teacher plays this role)

**Script**

**Narrator:** Welcome to your brain in action. Here we have three neuron cells: Axon and Dendrite #1, Axon and Dendrite #2, and Axon and Dendrite #3. *(The six students should stand together in groups of two. The groups should be far enough away that they cannot touch each other with outstretched arms.)*

**Narrator:** One day, an electrical impulse came down from the brain. *(Brain hands one of the 10 objects to Dendrite #1).*

**Brain:** Hey Cell Body #1, pass this electric message to Cell Body #2.

**Dendrite #1:** (to Axon #1) Oh, no? How will you pass the message to Dendrite over at Cell Body #2? There's a big empty synapse in the way! *(Axon #1 looks sad.)*

**Narrator:** Suddenly a big, handsome Neurotransmitter came on to the scene.

**Neurotransmitter:** I'll help you. Bridging the synapse is what I do best! *(Neurotransmitter grabs the object and passes it into the waiting hand of Dendrite #2.)*

**Narrator:** This was working pretty well. So the brain kept giving electric impulses. And another. And another. *(Brain, Axon #1, Dendrite #1, Neurotransmitter, and Dendrite#2 keep passing three objects.)*

**Axon #1:** (to Brain) You know, Brain, we could use some help. You know what would make this easier? If we had some myelin sheath—why, that would help us work faster and more efficiently.



## Understanding Axons, Dendrites and Synapse: A Vocabulary Play

**Brain:** You know, that's a good idea. Since this is a pathway that gets used a lot, I will send over a message to the cells in the Myelin Department. They will wrap you up.

**Myelin:** Here I am. Did someone order some neural insulation?

**Axon #1:** I did! (*Myelin wraps the Axon's arms in toilet paper.*)

**Narrator:** Axon #1 was right. Myelin helped him/her pass the electric impulse faster. So the brain sent more messages. And more myelin. And more messages. And more myelin. (*Students repeat the sequence of sending a message, wrapping the arms in toilet paper, and sending a message three more times. Each time the message gets sent faster.*)

**Axon and Dendrite #3:** Hey, no one is passing us an electric impulse! We're shriveling up here. (*Students sink to the ground.*)

**Brain:** Yeah, you're right. Turns out we don't need you guys. I guess you've been pruned.

**Narrator:** And so, since Cell Body #1 and Cell Body #2 were used all the time, they grew more and more efficient at sending messages. Tune in next time to see if poor Cell Body #3 will ever get a chance to grow and shine, or if they will continue to be a victim of synaptic pruning!

(*Students take a bow.*)



Model Domain-Specific Vocabulary Anchor Chart  
(For Teacher Reference)

\* Note: This chart is added to throughout Units 1 and 2. The items below are added in Lesson 2.

<b>Word</b>	<b>Definition</b>
neural impulse	an electric and chemical signal that gets passed between neurons
axons	thread-like fibers in neurons that take the electrochemical impulse away from the cell body.
dendrites	branch-like fibers in neurons that bring information into the neurons
synapse	a small space between axons and dendrites where neurons exchange information
myelination	the process in which axons become wrapped in a fatty myelin sheath
synaptic pruning	cutting back on the number of synapses
brain pathways	bundles of elongated, myelin-insulated neurons that collectively connect different regions of the brain.



“What’s Going On in Your Brain?”

**What's Going On in Your Brain?**  
Bernstein, Linda  
*Current Health 2*; Feb 2006; 32, 6; ProQuest  
pg. 20

**YOUR BODY**

# What's Going On in Your Brain?

Your control center is in version 2.0.

By Linda Bernstein

**H**ere's a good comeback the next time an adult complains that you're taking too many risks. Just say, "My brain made me do it." Of course, in the real world, you can't use that excuse to cover reckless behavior. However, it's true that "the brain's inclination for sensation seeking becomes more intense during adolescence," Laurence Steinberg, a professor of psychology at Temple University and an expert on the teenage brain, told *Current Health 2*. At the same time, the brain mechanisms that regulate these desires are not yet fully developed. That's why teens want to do things like bungee jump or drive fast but often don't experience the fear or anxiety adults often associate with such risky activities.

**Picture This**

Your brain is a mass of cells contained inside your skull. It is, in fact, the boss of you. As the diagram at right shows, there are many parts to the brain, and each has a different function—bossy functions. In fact, the brain is the only organ that has *localization*, explains Dr. Nancy

L. Kuntz, a consultant in child and adolescent neurology at the Mayo Clinic in Rochester, Minn; one specific part controls movement, another helps decode vision, and so on.

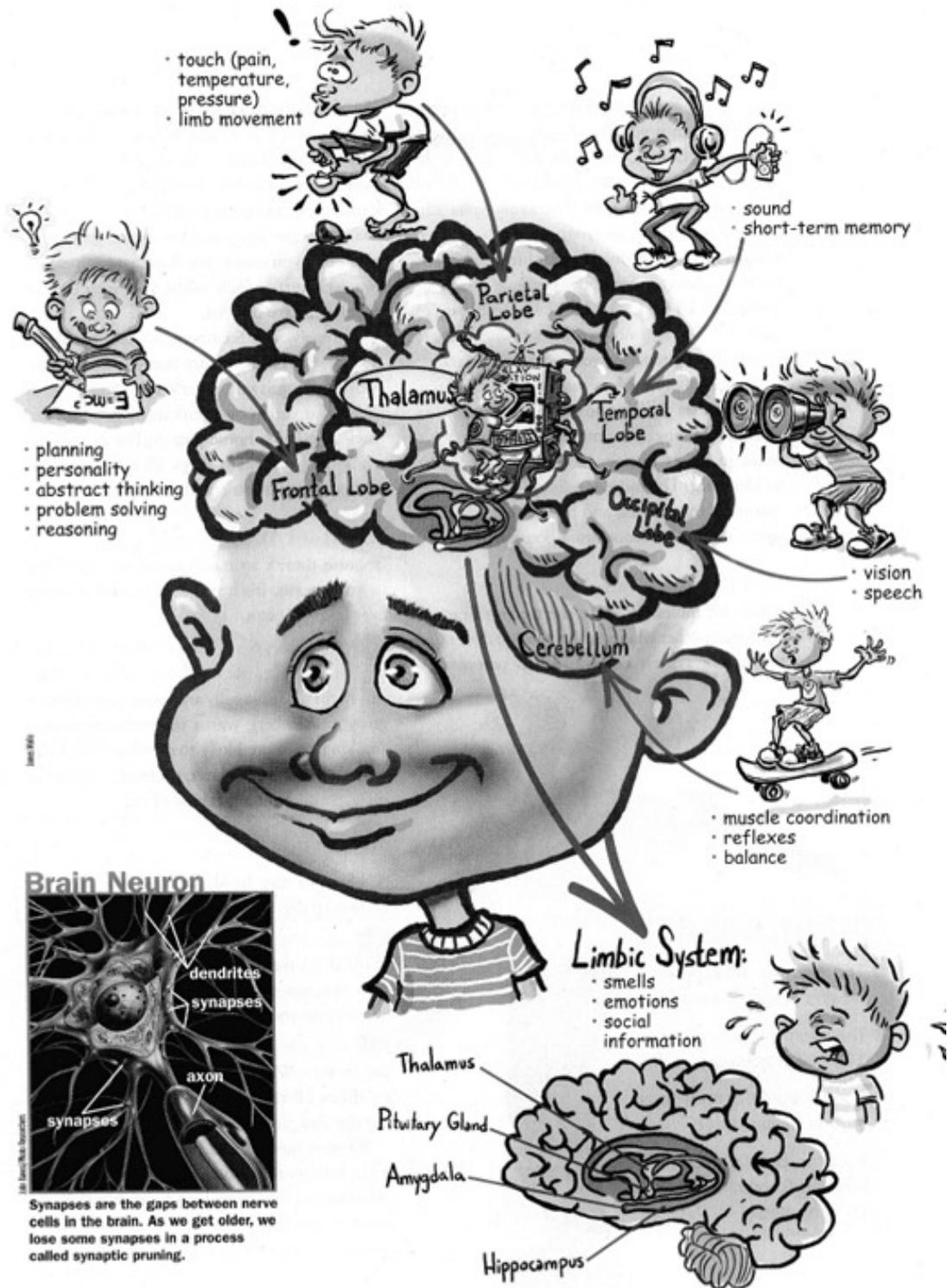
Especially important to the teen brain are synaptic pruning and myelin. In childhood, the brain produces many *synapses*—gaps between nerve cells connected by electrical impulses called *neurotransmitters*. As you grow, the brain starts to shed some of those synapses because you don't need them. As Steinberg explains, "the brain starts out like a road map with dirt roads. Those synapses that you need turn into highways, and those not used disappear." That process is *synaptic pruning*.

Pruning is a good thing because the synapses you use get stronger and work better. For instance, during adolescence, as some synapses drop away and others take hold, your thinking becomes clearer and more mature. You get better at planning and controlling impulses.

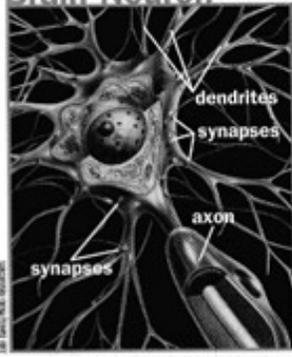
Everyone has about 99 percent of the same synapses, but that still leaves billions that can differ from one person to another, Steinberg says. For instance, if you play guitar every



“What’s Going On in Your Brain?”



**Brain Neuron**



Synapses are the gaps between nerve cells in the brain. As we get older, we lose some synapses in a process called synaptic pruning.

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## “What’s Going On in Your Brain?”

day, your brain will have more fine-motor synapses than if you spend a lot of time listening to Fall Out Boy on your MP3 player. (In that case, audio synapses would rule.) The cool thing, says Steinberg, is that brain cells can actually regenerate, so synapses that have been pruned can be re-formed if your life direction or interests change. Synaptic pruning peaks at about age 12 or 13 but continues until you’re about 24. So right now your brain chemistry is pretty active, preparing you to become an adult.

The production of *myelin*—the white matter that insulates the neurons—is as important as synaptic pruning. The amount of myelin in your brain increases during adolescence, according to Steinberg. The more myelin, the faster information is transmitted and the more adept, efficient, and mature your brain becomes.

### Get Touchy-Feely

Amid this molecular stuff, the teenage brain is witnessing other changes. Deep inside the brain, the *limbic system* controls smell perceptions

and emotions, and processes social information, Steinberg says, and is one of the first to fully develop. Thus a teen experiences feelings more intensely than he or she did as a child and learns how to control emotions. Notice that you no longer have tantrums when your mom won’t buy you candy, but if a friend snubs you, you feel hurt, which when you were 6, you might not have noticed.

Strangely, says Steinberg, a teen’s *prefrontal cortex*—the brain’s smart part—is out of sync with limbic growth. That’s why you may do things that you know aren’t really good for you (such as coming home past curfew or eating a whole bag of potato chips all at once) while feeling that you just couldn’t help doing it.

### Maintain Your Brain

Because there’s so much going on right now in your brain, it’s important to give it whatever help you can.

Stay away from harmful substances, such as illegal drugs, alcohol, and nicotine. They can harm sensitive cells and undermine natural growth. Steinberg warns that teens who start smoking are more likely to develop a life habit than those who start later, probably because of the synaptic pruning taking place.

Wear a helmet when you bike, skateboard, or ski, and wear seat belts in cars. A blow to the head, says Kuntz, may be a blow to the brain. So don’t take chances.

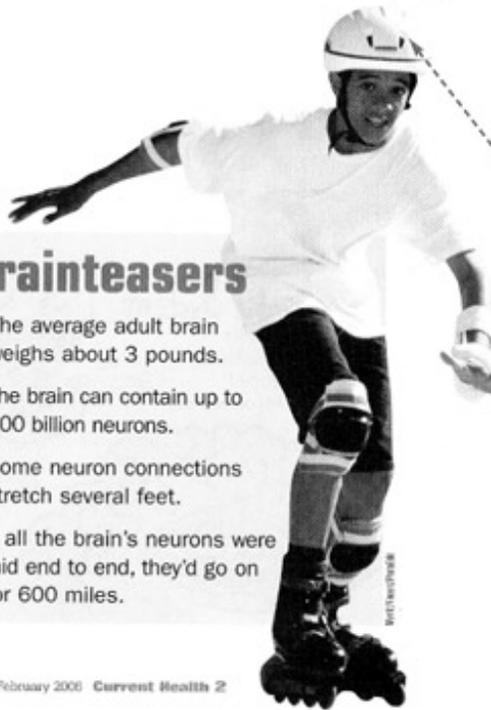
Exercise your mind. Do puzzles, read, think about the world or your life—such activities develop synapses you need and prune away those you don’t, Steinberg says.

Get a lot of sleep. Rest is important to the brain. While you snooze, your brain solidifies all the information it took in during the day, Steinberg says.

By now, having read this article, you might feel a little pumped because absorbing all this information has revved up your mind! Brain work is good for you, and it goes on every minute of every day, whether you think about it or not.

## Brainteasers

- The average adult brain weighs about 3 pounds.
- The brain can contain up to 100 billion neurons.
- Some neuron connections stretch several feet.
- If all the brain’s neurons were laid end to end, they’d go on for 600 miles.



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**Neurologist Notebook #2:**  
“What’s Going On in the Teen Brain?”

Name:

Date:

**Directions:** Use this note-catcher to get the gist of the reading. Remember that the main idea and supporting details are often not just a single sentence of the text; rather, they may involve multiple sentences.

Main idea:	
Brief background:	Supporting idea/detail:
Supporting idea/detail:	Supporting idea/detail:
Supporting idea/detail:	Supporting idea/detail:



**Neurologist Notebook #2:**  
“What’s Going On in the Teen Brain?”

\_\_\_\_\_  
**Name:**

\_\_\_\_\_  
**Date:**

**Vocabulary**

<b>Word</b>	<b>Definition</b>	<b>Context clues: How did you figure out this word?</b>
reckless		
localization		
regenerate		
solidifies		



**Neurologist Notebook #2:**  
“What’s Going On in the Teen Brain?”  
(Answers, For Teacher Reference)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:** Use this note-catcher to get the gist of the reading. Remember that the main idea and supporting details are often not just a single sentence of the text; rather, they may involve multiple sentences.

<p>Main idea: <b>Your Brain is still developing. This means that your actions can influence your development and your actions are influenced by your forming brain.</b></p>	
<p>Brief Background: <b>The brain is a mass of cells and each part serves a different function</b>  <b>Your brain grows synapse in childhood.</b></p>	<p>Supporting idea/detail: <b>During the teen years your brain is synaptic pruning or getting rid of the ones you don’t need based on what you are using them for.</b></p>
<p>Supporting idea/detail: <b>Pruning is good because it helps the synapse that are left work better. Myelin also helps the synapse work better.</b></p>	<p>Supporting idea/detail: <b>Even if synapse are pruned they are not gone forever because they can regrow if you need them</b></p>
<p>Supporting idea/detail: <b>The limbic system is one of the first to fully develop and is out of sync with the prefrontal cortex. Therefore a teen can control his or her emotions more and feel things more deeply but sometimes make poor decision because the teen “felt” like it.</b></p>	<p>Supporting idea/detail: <b>You should do things to take care of your brain, like exercise, sleep, and avoid harmful substances.</b></p>



**Neurologist Notebook #2:**  
“What’s Going On in the Teen Brain?”  
(Answers, For Teacher Reference)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Vocabulary**

<b>Word</b>	<b>Definition</b>	<b>Context clues: How did you figure out this word?</b>
reckless	<b>Risky or dangerous</b>	
localization	<b>One specific part controls aspect of brain activity</b>	
regenerate	<b>To grow back</b>	
solidifies	<b>To make solid, to make come together</b>	