



EXPEDITIONARY
LEARNING

Grade 7: Module 4A: Unit 1: Lesson 6

Close Reading: Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

Exempt third-party content is indicated by the footer: © (name of copyright holder). Used by permission and not subject to Creative Commons license.



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 determine a theme or the central ideas of informational text. (RI.7.2)
- I can read above-grade-level texts with scaffolding and support. (RI.7.10)
- I can use a variety of strategies to determine the meaning of unknown words or phrases. (L.7.4)

Supporting Learning Targets

- I can determine the main idea of Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution.”
- I can use a variety of strategies to figure out the meaning of new vocabulary.
- I can read above-grade-level texts with support.

Ongoing Assessment

- Homework: Summarize Your Learning (from Lesson 5)
- Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” text-dependent questions



Agenda	Teaching Notes
<ol style="list-style-type: none"> 1. Opening <ol style="list-style-type: none"> A. Book Frenzy (13 minutes) 2. Work Time <ol style="list-style-type: none"> A. Introducing the Digital Revolution (7 minutes) B. Excerpt 2: Text-Dependent Questions (20 minutes) 3. Closing and Assessment <ol style="list-style-type: none"> A. Adding to the Anchor Chart (5 minutes) 4. Homework <ol style="list-style-type: none"> A. Catch up on any reading from the first part of this unit. B. Read your independent reading book. 	<ul style="list-style-type: none"> • In this lesson, students continue to read excerpts of the “The Digital Revolution and the Adolescent Brain Evolution.” See Teaching Notes from Lesson 5 and the Module Overview to see the rationale behind this text. Today’s excerpt explores the adaptability of the brain to the new digital environment. This could be the major premise of a student on the position paper in Unit 3. Taking enough time to add to the anchor chart will support students in using this reasoning in their writing. • “The Digital Revolution and the Adolescent Brain Evolution” is a challenging text. Reading complex texts with the proper scaffolding can increase students’ stamina. To help students be successful, you should read each excerpt aloud twice. You will have the opportunity to model strategies for attacking difficult texts—like identifying vocabulary, paraphrasing long sentences, and rephrasing the main idea. The vocabulary work will help students progress toward L.7.4. The close reading and text-dependent questions in this lesson will guide students to identify the main ideas of the article that are most relevant to their position paper in Unit 3. • Collect the “Summarize Your Learning” homework from Lesson 5 and use it to identify students who may need some additional instruction to understand the basics of brain development before moving on to how brain science relates to the digital revolution. This is foundational learning that they will need in order to be successful throughout the remainder of this unit and in Units 2 and 3. • In this lesson and the following lessons, students listen to a multimedia feature that is linked thematically to the day’s reading. These powerful testimonies from real teenagers are an engaging entry point for students. • In addition, students add their learning to the Brain Development anchor chart. They continue to add to the chart with “if/then” statements. Help students understand that the conclusions from brain research that they will read about are theoretical correlations, not necessarily statements of definitive facts or causations. Their use of words like “may” and “it seems reasonable” when making “if/then” statements will help reinforce this point. This practice with reasoning skills will be very valuable when students write the position paper in Unit 3.



Agenda	Teaching Notes (continued)
	<ul style="list-style-type: none">• In this lesson, students launch their independent reading for this module with a Book Frenzy. Prepare for the Book Frenzy by laying out books from the Recommended Texts list (in the Module Overview) on multiple tables so students can easily browse the selections. Use your professional judgment and experience when pairing books with this module. Many popular coming of age stories will fit well with the content of this module and may help the students think about the characters and the brain science in a new light. This lesson assumes that independent reading projects have been launched in previous modules and that a structure is in place before this lesson. Please see two separate stand-alone documents on EngageNY.org: The Importance of Increasing the Volume of Reading and Launching Independent Reading in Grades 6–8: Sample Plan, which together provide the rationale and practical guidance for a robust independent reading program. You may wish to spend time before this lesson reviewing the independent reading materials and the recommended texts so they can better meet your students’ needs.• In Lesson 7, students will revisit the Gallery Walk from Lesson 1. Be prepared with those materials.• In advance:<ul style="list-style-type: none">– Ready the books for the Book Frenzy. For a list of recommended books, see the Module Overview document.– Load the multimedia feature from the <i>New York Times</i> Web site and be sure you can locate the audio under “Needing to Answer That Text: Allison Miller”: http://www.nytimes.com/interactive/2010/11/21/technology/20101121-brain-interactive.html?ref=technology.– Preview the Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” Close Reading Guide.– Post the following question from Excerpt 1 of “The Digital Revolution and the Adolescent Brain Evolution”: “What are the implications, for good or ill, of the dramatic changes in the way adolescents spend their time?” Leave this posted for the remainder of Unit 1.• Post: Learning targets.



Lesson Vocabulary	Materials
<p>theorized, abstract, brain plasticity; (from Excerpt 2): adaptable, vessels orbiting, entail (section 1), epigenetic, noteworthy (section 2), plastic brain (section 3), advent, physiology (section 4), specialized, gray matter volume, trajectory, cortical gray matter volume, complementary (section 5)</p>	<ul style="list-style-type: none"> • Independent reading books (various titles; one per student; see Teaching Notes) • Digital projector • “Students and Technology: Constant Companions” (multimedia feature; http://www.nytimes.com/interactive/2010/11/21/technology/20101121-brain-interactive.html?ref=technology) (From The New York Times, November 20, 2010 © 2010 The New York Times. All rights reserved. Used by permission and protected by the Copyright Laws of the United States. The printing, copying, redistribution, or retransmission of this Content without express written permission is prohibited.) • Document camera • Digital Revolution Text Structure graphic organizer (one to display) • Posted question from Excerpt 1 (see Teaching Notes, “in advance,” above) • Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” (one per student) • Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” text-dependent questions (one per student; one to display) • Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” Close Reading Guide (for teacher reference) • Domain-Specific Vocabulary anchor chart (begun in Lesson 1) • Model Domain-Specific Vocabulary anchor chart (for teacher reference) • Brain Development anchor chart—student version (begun in Lesson 2) • Brain Development anchor chart (begun in Lesson 2) • Model Brain Development anchor chart (for teacher reference)



Opening	Meeting Students’ Needs
<p>A. Book Frenzy (13 minutes)</p> <ul style="list-style-type: none"> • Display an assortment of independent reading books for students to examine and choose from, ideally including some of the titles from the Recommended Texts lists for this module. Consider brief teacher book talks of those titles related to the module. • Give students time to browse and “shop” for books and to select a few titles to try out. 	
Work Time	Meeting Students’ Needs
<p>A. Introducing the Digital Revolution (7 minutes)</p> <ul style="list-style-type: none"> • Using a digital projector, cue up the multimedia feature “Students and Technology: Constant Companions.” • Play the audio under “Needing to Answer That Text: Allison Miller.” The audio is about 1 minute, 30 seconds long. Then ask: <ul style="list-style-type: none"> * “How does what this young woman is saying relate to the reading you did last night?” • Listen for students to understand that she is an example of a “digital native.” She typifies someone who is immersed in modern technology. • Explain that over the next couple of lessons they will continue reading excerpts of “The Digital Revolution and the Adolescent Brain Evolution,” the first of which they read for homework. They will not read the entire text; rather, they will read excerpts that are most relevant to their performance task for this module. This is a difficult text that asks a lot of questions about “digital natives”—like this young woman and also themselves. The author of this text is Dr. Jay Giedd, the researcher featured in the video they watched in Lesson 5. Though the article was written for other researchers, students will be able to read it as well, with support. Explain to students: “This is a good introduction to the kinds of reading and writing people do after they are out of school. If you become a scientist, you may write or read texts just like this.” • Use a document camera to display the Digital Revolution Text Structure graphic organizer. Point out that this graphic organizer lays out the different sections of “The Digital Revolution and the Adolescent Brain Evolution.” • Ask the students to note from the graphic organizer that this text is structured very similarly to the other informational texts they have read. Point out: <ul style="list-style-type: none"> * “Research papers have two introductions—an <i>abstract</i> and an introduction. The abstract is a summary of the major points of the article, and the introduction is the place where the writer explains the main idea of the paper.” 	<ul style="list-style-type: none"> • Graphic organizers engage students more actively and provide the necessary scaffolding especially critical for learners with lower levels of language proficiency and/or learning. • Guiding questions provide motivation for student engagement in the topic and give a purpose to reading a text closely.



Work Time (continued)	Meeting Students’ Needs
<ul style="list-style-type: none">• Point out that they read the introduction last night in Excerpt 1 for homework. Ask:<ul style="list-style-type: none">* “What was difficult about the assignment? What was easy?”• Listen for students to say the vocabulary was difficult and reading a long list of statistics was difficult. But finding the main idea was easier because the author said it outright.• Draw students’ attention to the posted question from excerpt 1, which the author poses at the end of the introduction (Excerpt 1 from homework): “What are the implications, for good or ill, of the dramatic changes in the way adolescents spend their time?”• Tell students that throughout “The Digital Revolution and the Adolescent Brain Evolution,” the author goes on to explain the relevant experiments and findings in education, entertainment, and social interaction, as noted on the graphic organizer. Tell students that they will not be reading from the education section because their final position paper centers on entertainment screen time, but they will read excerpts from the other sections. Read the questions listed in each supporting detail box.• Explain that in the conclusion, Dr. Giedd writes very clearly that because this issue is so new and the research is so new, nobody really knows for sure the answer to these questions. He urges more research be done. Over the course of the module, students will grapple with these big and important questions.• Indicate that in today’s lesson, students will read some of the background of this issue. Then, in Lessons 7 and 8, they will read excerpts from the entertainment and social interaction sections.	



Work Time (continued)	Meeting Students’ Needs
<p>B. Excerpt 2: Text-Dependent Questions (20 minutes)</p> <ul style="list-style-type: none"> • Ask a student to read the learning targets: <ul style="list-style-type: none"> * “I can determine the main idea in Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution.” * “I can use a variety of strategies to figure out the meaning of new vocabulary.” * “I can read above-grade-level texts with support.” • Explain that they will answer a set of text-dependent questions to help them read this above-grade-level text. • Distribute Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution.” Also distribute and display the Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” text-dependent questions. • Work through this handout in concert with the Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution” Close Reading Guide. • Be prepared to add to the Domain-Specific Vocabulary anchor chart during this activity. Use the Model Domain-Specific Vocabulary anchor chart (for teacher reference) for guidance. • Give students specific positive feedback for their work grappling with a difficult text. 	<ul style="list-style-type: none"> • Hearing a complex text read slowly, fluently, and without interruption or explanation promotes fluency and comprehension for students: They are hearing a strong reader read the text aloud with accuracy and expression, and are simultaneously looking at and thinking about the words on the printed page. Be sure to set clear expectations that students read along silently in their heads as you read the text aloud. • Asking students to identify challenging vocabulary helps them to monitor their understanding of a complex text. When students annotate the text by circling these words, it can also provide a formative assessment for the teacher.



Closing and Assessment	Meeting Students’ Needs
<p>A. Adding to the Anchor Chart (5 minutes)</p> <ul style="list-style-type: none"> • Invite students to retrieve their Brain Development anchor chart—student version and focus their attention on the class Brain Development anchor chart. • Explain that you would like to summarize the main idea of the reading today in the “So what?” column of the anchor chart. Refer to the Model Brain Development anchor chart (for teacher reference) as needed. Consider modeling this way: <ul style="list-style-type: none"> – Circle one of the quotes from the neurons column that explains synaptic pruning and write in the last column: “<u>If</u> the brain is branching and pruning in adolescence, <u>then</u> it is highly adaptable.” • Ask students to turn and talk with a partner to articulate another “if/then” statement from the reading. • After a few minutes, add the class thinking to the anchor chart. Remind students to add to their own anchor chart. Be sure to add: <ul style="list-style-type: none"> – “<u>If</u> it adapted in the past, <u>then</u> it may adapt today. <u>If</u> it is adaptable, <u>then</u> it may be able to adapt to the digital world.” • Stress the word “may” and remind students that Dr. Giedd and other researchers have <i>theorized</i>—that is, made an educated guess—that this is true. Ask: <ul style="list-style-type: none"> * “According to what you read last night, what is the difference between the adaptation of today and the adaptation of the past?” • Prompt by reading this quote from Excerpt 1: “Might the unprecedented rate of change itself overwhelm adaptive mechanisms?” Read this several times. Ask a student to simplify it. Listen for students to understand that the digital environment is changing much faster than the environment has ever changed before. 	<ul style="list-style-type: none"> • Allowing students to discuss with a partner before writing or sharing with the whole class is a low-stress strategy to help them process in a risk-free situation.
Homework	Meeting Students’ Needs
<ul style="list-style-type: none"> • Catch up on any reading from the first part of this unit. • Read your independent reading book. 	



EXPEDITIONARY
LEARNING

Grade 7: Module 4A: Unit 1: Lesson 6

Supporting Materials



This work is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

Exempt third-party content is indicated by the footer: © (name of copyright holder). Used by permission and not subject to Creative Commons license.



Digital Revolution Text Structure Graphic Organizer

Abstract (This is a special feature of science writing. It's a brief summary of the issue, the research, the findings, and the recommendation.)

Introduction
(This is where the main idea or issue is introduced.)

What is the issue this paper will examine?
What are the questions that drive the research and inquiry?

History
(This is where the author gives relevant history to the issue or past experiments.)

What is relevant history of this issue?
How does this relate to what I already know about the brain?

Supporting Idea: **Education**
(These boxes are where the author examines research findings in key areas relating to the main idea.)

Supporting Idea: **Entertainment**
Why is it significant that video games increase dopamine levels in the brain?
What is a potential problem of humans spending attention on entertaining activities that raise dopamine levels to artificial levels?

Supporting Idea: Digital Revolution-Social

Why is the human brain a "social brain"?
What skills does a human being need in order to understand another person?

Conclusion
(In a science article, the conclusion is where the author interprets the research or findings, makes a claim, and suggests further areas of study. Remember, scientists use evidence to hone existing questions or create new ones—not necessarily to come up with "the answer.")



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”

Name: _____

Date: _____

From “The Adolescent Brain: Evolution and Neurobiology”	Gist Notes and Vocabulary
<p>(1) Humans, on the other hand, are remarkably adaptable. We can survive everywhere from the frigid North and South poles to the balmy islands on the equator. With technologies developed by our brains we can even live in vessels orbiting our planet. Survival skills in cold climates may entail learning how to find shelter and obtaining nutrients from hunting. In tropical climates it may be more a matter of avoiding certain predators or identifying which fruits are edible and which are toxic.</p>	<p>Vessels orbiting = Entail =</p>
<p>(2) The changes in demands across time are as striking as the changes across geography. Ten thousand years ago, a blink of an eye in evolutionary terms, we spent much of our time securing food and shelter. Modern humans now spend relatively little time and energy obtaining calories (a factor that may, through epigenetic or other factors, be related to earlier puberty and greater height/weight). Instead many of us spend the majority of our waking hours dealing with words or symbols—a particularly noteworthy departure given that reading, which is approximately 5,000 years old, did not even exist for most of human history.</p>	<p>Epigenetic = change in the function of cells that is not due to changes in the DNA</p> <p>Noteworthy = interesting</p>
<p>(3) Having a highly plastic brain is particularly useful during the second decade, when the evolutionary demands of adolescence—being able to survive independently and reproduce—rely critically on the ability to adapt.</p>	<p>plastic brain= plastic here means “able to be changed”</p>



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”

From “The Adolescent Brain: Evolution and Neurobiology”	Gist Notes and Vocabulary
<p>(4) Insight into the neurobiology of the developing brain has been greatly enhanced by the advent of magnetic resonance imaging (MRI), which allows exquisitely accurate pictures of brain anatomy and physiology without the use of ionizing radiation.</p> <p>(5) After puberty the brain does not mature by growing larger; it matures by growing more specialized. Gray matter volumes during the first three decades of life follow an inverted “U” shaped developmental trajectory with peak size occurring at different ages in different regions. Total cortical gray matter volume peaks at around age 11 in females and 13 in males. The complementary mechanisms of overproduction/selective elimination allow the brain to specialize in response to environmental demands.</p>	<p>advent—the invention of physiology—the way the brain function</p> <p>Specialized = more suited to a specific purpose Gray matter volume = how many synapses there are in the brain Trajectory = path Cortical gray matter volume—how much gray matter there is in the brain</p> <p>Complementary =</p>

Geidd, Jay N., M.D. "The Digital Revolution and Adolescent Brain Evolution." National Center for Biotechnology Information. National Institute of Health, 5 Aug. 2012. Web. <<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3432415/>>



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”:
Text-Dependent Questions

Questions	Notes
<p>In section 1, Dr. Giedd writes, “Humans, on the other hand, are remarkably adaptable.”</p> <ol style="list-style-type: none">1. What does it mean to be <i>adaptable</i>?2. What evidence does he give to support this statement? <p>Later in section 1, Dr. Giedd gives another example of <i>adaptation</i>.</p> <ol style="list-style-type: none">3. He says that humans used to spend all their time trying to find food, but now we spend our time doing what?4. How is this an example of being adaptable?5. How might being adaptable in the past relate to the “digital revolution” you read about last night?	



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”:
Text-Dependent Questions

Questions	Notes
<p>In section 3 Dr. Giedd writes: “Having a highly plastic brain is particularly useful during the second decade, when the evolutionary demands of adolescence—being able to survive independently and reproduce—rely critically on the ability to adapt.”</p> <p>6. How might having a brain that is changing be necessary for someone to adapt?</p> <p>7. Is Dr. Giedd saying that a teenager is more adaptable than an older person? Explain your thinking with evidence from the text.</p> <p>In section 5, Dr. Giedd explains a process you know a lot about. He is talking about myelination, synaptic branching, and pruning. He says, “The complementary mechanisms of overproduction/selective elimination allow the brain to specialize in response to environmental demands.”</p> <p>8. Why would <u>both</u> overproducing and cutting back on synapses make a brain more <i>adaptable</i>?</p>	



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”:
Close Reading Guide
(For Teacher Reference)

Total time: 20 minutes

Questions	Close Reading Guide
<p>In section 1 Dr. Giedd writes, “Humans, on the other hand, are remarkably adaptable”</p> <ol style="list-style-type: none"> 1. What does it mean to be <i>adaptable</i>? 2. What evidence does he give to support this statement? <p>Later in section 1, Dr. Giedd gives another example of <i>adaptation</i>.</p> <ol style="list-style-type: none"> 3. He says that humans used to spend all their time trying to find food, but now we spend our time doing what? 4. How is this an example of being adaptable? 5. How might being adaptable in the past relate to the “digital revolution” you read about last night? 	<p>(7 minutes) Read through the excerpt once.</p> <p>Then reread Paragraph 1 (it is separated into two chunks on the paper; read them both). Clarify any vocabulary in this section.</p> <p>Ask the questions one at a time. For each question, ask students to think individually and then raise their hands when they know the answer. When most of the class has a hand up, cold call on several students to share out.</p> <p>Listen for students to say:</p> <ol style="list-style-type: none"> 1. <i>To be able to figure out ways to survive in whatever environment you are in.</i> 2. <i>He says that people can live in extremely different environments—like space, the cold, and the tropics.</i> 3. <i>We spend our time reading and decoding symbols.</i> 4. <i>We have changed our intellectual abilities according to what we need to be able to do.</i> 5. <i>Answers will vary. People’s brains will have to be adaptable to be able to handle the “gusher of information.” The past indicates that we will.</i>



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”:
Close Reading Guide
(For Teacher Reference)

Questions	Close Reading Guide
<p>In section 3, Dr. Giedd writes: “Having a highly plastic brain is particularly useful during the second decade, when the evolutionary demands of adolescence—being able to survive independently and reproduce—rely critically on the ability to adapt.”</p> <p>6. How might having a brain that is changing be necessary for someone to adapt?</p> <p>7. Is Dr. Giedd saying that a teenager’s brain is more adaptable than an older person? Explain your thinking with evidence from the text.</p>	<p>(4 minutes)</p> <p>Reread Paragraph #2. Clarify any vocabulary. Explain that “plastic” is a technical term. Add it to the Domain-Specific Vocabulary anchor chart along with <i>brain plasticity</i>.</p> <p>Explain to students the subordinate clause starting with “being” modifies “evolutionary demands of adolescence.” They could simplify that sentence by skipping this part and repeating “evolutionary demands of adolescence rely on the ability to adapt.” Ask a student to rephrase the sentence further into simpler words.</p> <p>Remind students that they have read in several texts that the environment and behavior shape the brain. Listen for students to say:</p> <p>6. <i>If someone’s brain is changing, then it can be shaped to be perfectly suited to the environment it is in.</i></p> <p>7. <i>Yes, because their brains can change more easily while an older person’s brain will change more slowly.</i></p>



Excerpt 2 of “The Digital Revolution and the Adolescent Brain Evolution”:
Close Reading Guide
(For Teacher Reference)

Questions	Close Reading Guide
<p>In section 5, Dr. Giedd explains a process you know a lot about. He is talking about myelination, synaptic branching, and pruning that is unique to the adolescent brain. He says, “The complementary mechanisms of overproduction/selective elimination allow the brain to specialize in response to environmental demands.”</p> <p>8. Why would <u>both</u> overproducing and cutting back on synapses make a brain more <i>adaptable</i>?</p>	<p>(7 minutes)</p> <p>This is a difficult paragraph. Students should only be expected to get the gist of the paragraph. Read the question before you reread the paragraph.</p> <p>As you reread, model the skill of rereading and summarizing by pausing after every sentence and repeating it in simpler language. For example, after the first sentence you may say something like: “So, now we can study the brain better because we can take pictures of the inside of the brain.” You may wish to invite students to grapple with this skill.</p> <p>Focus the students on the word <i>specialization</i> and <i>complementary</i>. These will most help them answer the questions.</p> <p>Listen for students to say:</p> <ul style="list-style-type: none"> – <i>* Overproducing would make the brain more adaptable because the brain will find new ways to deal with the environment. The more synapses one has, the greater chance one will have a synapse to match the environment.</i> – <i>* Cutting back would make the brain more adaptable because the brain will become more efficient at living in the new environment.</i>



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

*Note: This chart is added to over the course of several lessons. The items below are added in Lesson 6

Word	Definition
plastic	Something that is plastic can be changed and formed into a different shape. It will hold the new shape until it is changed again.
brain plasticity	the ability of the brain to change



Model Brain Development Anchor Chart
(For Teacher Reference)

Note: This chart is filled out in different lessons. The bolded items are added in this lesson.

Other developmental information	Prefrontal cortex	Neurons	Limbic system	So what?
<p>The brain needs sleep to take things from your short-term memory to your long-term memory (Knox)</p> <p>Your brain does not fully develop until the mid-20s (Scholastic)</p>	<p>Also called the “frontal lobe” (Knox)</p> <p>This area helps with insight and understanding the effect of your behavior on someone else (Knox)</p> <p>Matures later than other parts of the brain (Scholastic)</p> <p>Right behind your forehead (Scholastic)</p> <p>Helps with thinking ahead and sizing up risk and reward (Scholastic)</p>	<p>“White matter” is called myelin, and it coats the nerves and makes them “communicate” more effectively (Knox)</p> <p>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)</p>	<p>Develops earlier than the PFC (Scholastic)</p> <p>Plays a central role in your emotional response (Scholastic)</p> <p>Associated with decisions made in feeling (Scholastic)</p> <p>When teens make decisions in emotionally charged situations—this one weighs in heavily (Scholastic)</p>	<p>So <u>if</u> the PFC is not as efficient, <u>then</u> teens may make decisions without fully realizing long-term consequences. <u>If</u> they do that, <u>then</u> this can be good (they take daring risks) and bad (they take dangerous risks).</p>



Model Brain Development Anchor Chart
(For Teacher Reference)

Note: This chart is filled out in different lessons. The bolded items are added in this lesson.

Other developmental information	Prefrontal cortex	Neurons	Limbic system	So what?
		<p>Information travels from neuron to neuron by way of their axons and dendrites (Scholastic)</p> <p>The space between one neuron’s axon and the other neuron’s dendrites is called its synapse (Scholastic)</p> <p>To make the connection better, the axons wrap themselves in myelin through a process called myelination (Scholastic)</p>	<p>The limbic system in the teen brain is more sensitive to risk and reward and gets a bigger shot of dopamine in rewarding situations. So it is more biased toward seeking out new information. (Galván)</p>	<p><u>If the brain is branching and pruning in adolescence, then it is highly adaptable.</u> (Giedd)</p> <p><u>If it adapted in the past, then it may adapt today. If it is adaptable, then it may be able to adapt the digital world.</u></p>



Model Brain Development Anchor Chart
(For Teacher Reference)

Note: This chart is filled out in different lessons. The bolded items are added in this lesson.

Other developmental information	Prefrontal cortex	Neurons	Limbic system	So what?
		<p>Also, if a synapse isn't used often, it is pruned through synaptic pruning. Then that energy is redirected into more active synapse. (Scholastic)</p> <p>Synaptic pruning occurs based on the choices, the behavior, and the environment of an individual (Scholastic)</p>		<p>So if synapses are being pruned or strengthened by the activities that teens spend their time on, then teens can shape their brain. And if activities shape one's brain, then one should be mindful about the activities that one is doing. As Dr. Willis says, "Practice makes permanent."</p>