

UNIT A: LESSON 2

LEARNING TARGETS

INSTRUCTIONS FOR TEACHERS:

- Refer students to the standards and objectives.
- Review the standards and objectives with students one at a time.
- At the end of the lesson, ask students what they did in class to meet the standards.

INSTRUCTIONS FOR STUDENTS:

Listen as your teacher reviews the standards and objectives. Your teacher will call on an individual or pair to explain what they mean.

Learning Target:

I can **determine** the **main** ideas and **supporting details** in the **article** “Teens and Decision Making.”

Learning Target:

I can **analyze** the basic **structure** of a **complex** sentence.

determine – decide

main – central or most important

supporting details – helping ideas

article – a short text in a newspaper or magazine

analyze – study something and explain it

structure – the way parts of something are joined together

complex – something that has many different parts

ACQUIRING AND USING VOCABULARY

INSTRUCTIONS FOR TEACHERS:

- Review student instructions.
- Familiarize students with their glossary. It is located in Appendix A (Glossary; labeled “Appendix: Glossary” in the student version). Tell students to use the glossary throughout the lesson.
- Pre-teach the vocabulary selected for extended instruction, provided as word cards in Appendix B (Teacher Resources). This vocabulary is abstract and critical to understanding the text.

INSTRUCTIONS FOR STUDENTS:

Your teacher will pre-teach several key words. Use your glossary for the rest of the lesson to find meanings for words you don't know. Words that are **bolded** in the text and word banks can be found in the glossary. The glossary is located in the Appendix at the end of the lesson.

THINKING LOG

INSTRUCTIONS FOR TEACHERS:

- Read the guiding question and text aloud to students, modeling appropriate pace and intonation.
- During the read-aloud, define words and phrases in context that students are unlikely to know, drawing definitions from the glossary when you can. Translations, examples, gestures, and visuals also help.
- Ask students to read the text on their own and work with a partner to answer supplementary questions.
- Ask students to use their glossary to help them with word meanings.
- Call on pairs to answer the supplementary questions.
- Discuss the guiding question(s) as a group and then have students write the answer in their student chart.

INSTRUCTIONS FOR STUDENTS:

Your teacher will ask you a guiding question that you will think about as your teacher reads the text aloud to you. As your teacher reads the text aloud, listen and follow along in your text. After the text has been read aloud, work with a partner to reread the text and answer the supplementary questions. Use your glossary to help you. Your teacher will review the answers with the class. You will then discuss the guiding question(s) with your teacher and the class. Finally, you will complete a written response to the guiding question(s).

GUIDING QUESTION:

What are processes of the brain that can help teens shape their own brain development? How can learning about the brain help teens, like you, make better choices?

TEENS AND DECISION MAKING: WHAT BRAIN SCIENCE REVEALS

FINE-TUNING THE BRAIN

Like the rest of the body, the brain needs to **mature** in order to reach peak performance. This **process** involves slow changes—strongly influenced by brain activity—that have evolved to fine-tune (or **optimize**) how neural impulses flow throughout the brain, allowing it to **process** information faster and more **reliably**.

Inside the brain, information travels through a network of **neurons**, which have thread-like fibers called **axons** and branch-like structures called **dendrites**. Dendrites bring information into the **neurons**, while axons take it away and pass it along to the next **neuron**. Thus, **neurons** are **assembled** into **circuits** where the far end of an axon

(its terminal) is positioned close to a dendrite. The small space between the two is called a synapse—where information is **exchanged**.

Throughout childhood and adolescence, the brain is busy **fine-tuning** itself through two key processes: myelination and **synaptic pruning**.

In myelination, axons wrap themselves in a fatty substance (**myelin** sheath), which works like **insulating** plastic that surrounds electrical wires. This boosts the brain's **efficiency** by increasing the speed with which a **signal** travels down the axon by 100 times. In synaptic pruning, synapses not used very often are **removed**, allowing the brain to **redirect** precious **resources** toward active synapses. This **strategic** loss of weak synapses shapes the brain and makes it more **efficient**. This important pruning **process** molds the brain in response to a person's **experiences** and activities.

This means that teens have the **potential**, through their choices and the behaviors they engage in, to **shape** their own brain development—**strengthening** some circuits and getting rid of others. This makes the type of activities teens are involved in especially important. Skill building such as many physical, learning, and creative **endeavors** not only provides stimulating **challenges**, but can **simultaneously** build strong **brain pathways**. When teens learn and repeat **appropriate** behaviors, they are helping to **shape** their brains—and their futures.

WAIT A MINUTE!

Learning how your brain works can help explain why sometimes you behave like you do. With this knowledge, you can be better equipped to make smart choices.

One tip to follow is to take a moment before acting. When making a decision, something as simple as stopping to think can mean the difference between a **positive** and a **negative outcome**. By waiting a minute before acting, you allow yourself to:

- consider consequences
- weigh harmful outcomes (e.g., harm to yourself or others) against short-term benefits (e.g., fitting in or feeling high)
- determine whether peer pressure is making you do something you'd otherwise not do
- get information or advice, if you need it

WORD BANK

100	creative	learning	reliably
active	decision	mature	remove
activities	dendrites	myelination	speed
advice	efficiency	negative	stop and think
axons	efficient	pass	strengthen
behave	exchange	peer pressure	synapse
bring	experiences	physical	synaptic pruning
choices	fitting in or feeling high	positive	
consequences	harm	pruned	

SUPPLEMENTARY QUESTIONS:

1. *When does the brain reach its peak, or best, performance?*

The brain reaches its peak performance when it is fully mature.

2. *What does the process of change and maturation help the brain do?*

The process of brain maturation helps the brain process information faster and more reliably (dependably).

3. *What are the thread-like fibers in the network of neurons called? (Recall, or remember, what "network" means from yesterday's lesson.)*

The thread-like fibers are called axons.

4. *What are the branch-like structures called?*

The branch-like structures are called dendrites.

5. *What do dendrites do?*

Dendrites bring information into the neurons.

6. *What do axons do?*

Axons remove information from the neuron and pass the information to the next neuron.

7. *What is the small space between the axon and the dendrite called?*

The space is called a synapse.

8. *What happens in the synapse space?*

The axon and the dendrite exchange information in the synapse space.

9. *What key processes are helping to fine-tune, or improve, the brain in children and adolescents (teens)?*

The processes that help fine-tune the brain are myelination and synaptic pruning.

10. *How does myelination work? How do you know?*

In myelination, axons wrap themselves in a fatty substance. It is like wrapping plastic around electrical wires; it makes the brain work faster (slower/faster).

I know this because the text says, "This boosts the brain's efficiency by increasing the speed with which a signal travels down the axon by 100 times."

11. *What happens during synaptic pruning?*

During synaptic pruning, synapses that are no longer needed are pruned (removed).

12. *How does synaptic pruning help the brain become more efficient?*

The brain becomes more efficient because it can use precious resources on active synapses (the synapses we use more often).

13. *These processes mold the brain. What is the brain responding to when myelination and synaptic pruning take place?*

The brain is responding to a person's experiences and activities.

14. *How does this give teens the ability to shape their own brains?*

Teens can choose the activities that they do often. This will strengthen the brain's ability to do these things well.

15. *What kind of activities can teens do to help them build strong pathways in their brains?*

Teens can be involved in physical, learning, and creative activities to build skills and strong, positive pathways.

16. *The text says, "WHAT A MINUTE!" Does this mean we need to take a one minute break now?*

No, this phrase is an idiom. These words mean something different than what they say. They mean, "let's stop and think about this."

17. *Think about lesson 1. What is another way learning about the brain can help you?*

Learning about the brain can help explain how you behave, or act, so you can make better choices.

18. *What one simple tip does the author recommend, or suggest?*

The author recommends that you stop and think before you make a decision.

19. *What can this mean for you?*

It can mean the difference between positive and negative outcomes.

20. *What four things can you do if you wait a minute before acting?*

- You can consider consequences.
- You can think about whether your decision will harm, or hurt, you or others. At the same time, you can think about whether the short-term benefits are worth it (like fitting in or feeling high).
- You can decide whether peer pressure is making you do something that you normally wouldn't do.
- You can get information or advice before acting.

RESPONSE TO GUIDING QUESTION(S):

What are processes of the brain that can help teens shape their own brain development? How can learning about the brain help teens, like you, make better choices?

Suggested Response: Myelination and synaptic pruning are key processes that can help teens shape their own brain development. Learning about the brain can help teens, like me, choose to be involved in activities that build strong and positive pathways in the brain. In addition, knowing that the teen brain is not yet mature helps me understand that taking time to think about my decisions will lead to more positive outcomes.

NEUROLOGIST NOTEBOOK

INSTRUCTIONS FOR TEACHERS: <ul style="list-style-type: none"> Review student instructions. 	
INSTRUCTIONS FOR STUDENTS: Work with a partner. Use your neurologist notebook to write down key, or important, information from the text. You will write down main ideas and some details, or specific information, about each main idea. You can use information from your Thinking Log. Some information is already filled in for you.	
WORD BANK: adults, axons , brains, dendrites , faster, feelings, logic , mature , myelin , neurons , pathways , positive , shape , slower, smart, synaptic pruning , teens, think	
Summary from yesterday: Teens make decisions differently than adults because their brains are different. Teens are more likely to make decisions based on feelings instead of logic.	
Brief background: Information in the brain travels through neurons, which have axons and dendrites. Neurons can become more efficient, or faster, at moving information through two processes. First, they can cover themselves in myelin. Second, the brain can use synaptic pruning to remove, or get rid of, the slower neurons.	
Main idea: Teens can shape their brains through positive activities.	Supporting details: As brains mature, activities reinforce, or strengthen, brain pathways.
Main idea: Teens can make smart choices by stopping to think.	Supporting details: Stopping to think gives you time to choose a positive outcome.
Conclusion: Teens can influence, or affect, how their brains mature, or develop. They can strengthen brain pathways connected with positive activities.	

FUNCTIONAL ANALYSIS

INSTRUCTIONS FOR TEACHERS:

- Review student instructions for functional analysis with the whole class.
- Complete the functional analysis with the whole class.
- Have students work with a partner to rewrite the sentence in their own words.

INSTRUCTIONS FOR STUDENTS:

Work with your class to analyze an important sentence(s) from the text.

- Every sentence has someone or something that *does* something. First you determine this *who* or *what*.
- Every sentence has something that they *do* or *did*. Figure that part out next. Now you have the most important parts of the sentence in place.
- Then you will figure out what they did the action *to* or *for*.
- Finally, you will write the descriptive details.
- Write your answers in the spaces below.
- When you are done, write the sentence again in your own words.

You may want to use definitions from the glossed text in the sections above.

Functional Analysis:

Learning how your brain works can help explain why sometimes you behave like you do.

WHO OR WHAT: Learning

DESCRIPTOR (What): *how your brain works*

WHAT HAPPENED (Action): *can help explain*

WHAT: *why sometimes you behave*

DESCRIPTOR (How): *like you do*

What the sentence says:

My own words:

Learning

Learning

how your brain works

how _____

can help explain

can help _____

why sometimes you behave

why you _____

like you do

like _____

Write the sentence in your own words and then explain it to your partner.

_____ .

EXIT TICKET

INSTRUCTIONS FOR TEACHERS:

- Review student instructions with the whole class.

INSTRUCTIONS FOR STUDENTS:

This graphic organizer will help you keep track of information about the brain for all of the readings. Each day you will write down new information from each reading.

- First, write information about how the whole brain matures, or develops, as you get older.
- Next, provide, or write, information you are learning about processes in the brain: synaptic pruning, myelination, and decision making.
- Then write what you learned about how teens can influence, or affect, brain development (*so what?*).

WORD BANK: efficient, myelin, neurons, pathways, positive, slower, stop, think

Information about how the brain develops	Synaptic pruning	Myelination	Decision Making	So what?
You can strengthen brain <u>pathways</u> through <u>positive</u> activities.	Synaptic pruning removes <u>neurons</u> that are not used as much, or that are <u>slower</u> .	Neurons become more <u>efficient</u> when they are covered in <u>myelin</u> .	Teens can make better decisions when they <u>stop</u> to <u>think</u> .	[Write what you learned about influencing brain development:]

Appendix A: Glossary

Word	Definition	Example
<i>appropriate</i>	correct or right	When teens learn and repeat appropriate behaviors, they are helping to shape their brains in a good way.
<i>assemble</i>	put something together; join parts together	Neurons are assembled into circuits.
axon*	the long part of the neuron that conducts electrochemical impulses	Myelination increases the signal speed down the axon by 100 times.
brain pathway	neurons that connect different regions of the brain to each other	Skill building and learning can build strong brain pathways .
<i>challenge</i>	an interesting or difficult task	Physical activities and learning can be fun challenges to build strong brain pathways.
circuit	the path that an electric current follows	Neurons are assembled into circuits .
dendrite*	the branching end of the neuron	Dendrites bring information into the neurons.
development	growth	Teens have the potential to shape their own brain development .
efficient (efficiency)	when you get something done with little wasted time or effort	Myelination boosts the brain's efficiency by increasing signal speed by 100 times.
endeavor	effort or serious attempt at something	Creative endeavors can build strong brain pathways.
exchange (exchanged)	give and take	The synapse is where information is exchanged .
experience	an event that you have lived through	Synaptic pruning molds the brain in response to a person's experiences and activities.
fine-tune (fine-tuning)	make small changes to improve something	Throughout childhood and adolescence, the brain is busy fine-tuning itself.
insulate	cover with something that reduces or stops heat or electricity from escaping	The myelin sheath works like insulating plastic that surrounds electrical wires.

Word	Definition	Example
logic	thinking or reasoning	In other words, when teens make choices in emotionally charged situations, those choices are often more weighted in feelings (the mature limbic system) over logic (the not-yet-mature prefrontal cortex).
mature	develop or grow older	Like the rest of the body, the brain needs to mature in order to reach peak performance.
myelin*	soft, white, fatty matter that covers neurons to protect them	Axons wrap themselves in myelin , which works like the plastic that surrounds electrical wires.
<i>negative</i>	bad	Stopping to think can mean the difference between a positive and a negative outcome.
neuron	specialized cell in the brain	Dendrites bring information into the neurons, while axons take it away and pass it along to the next neuron .
neurons	specialized cells in the brain	Inside the brain, information travels through a network of neurons , which have thread-like fibers called axons and branch-like structures called dendrites.
optimize	make something as perfect or effective as possible	Slow changes fine-tune (or optimize) how neural impulses flow throughout the brain, allowing it to process information faster and more reliably.
<i>outcome</i>	result	Stopping to think can mean the difference between a positive and a negative outcome .

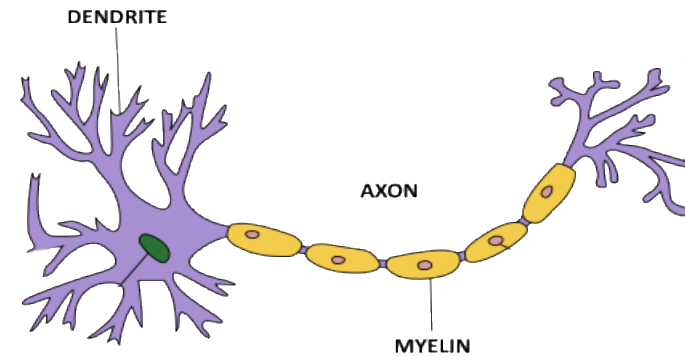
Word	Definition	Example
(brain) pathway	neurons that connect different regions of the brain to each other	Skill building such as many physical, learning, and creative endeavors not only provides stimulating challenges, but can simultaneously build strong brain pathways .
<i>positive</i>	good	Stopping to think can mean the difference between a positive and a negative outcome.
<i>potential</i>	possibility	Teens have the potential to shape their own brain development.
<i>process (n.)</i>	a series of actions	This important pruning process changes the brain.
<i>process (v.)</i>	handle or deal with something in a systematic way	The way neural impulses flow throughout the brain allows it to process information faster and more reliably.
redirect	to send something to a different place	In synaptic pruning, inactive synapses are removed, allowing the brain to redirect precious resources toward active synapses.
<i>reliable (reliably)</i>	dependable and accurate	This process allows the brain to process information faster and more reliably .
<i>remove (removed)</i>	take away	Synapses that are not used very often are removed .
<i>resource</i>	a useful thing that you have	The brain becomes more efficient because it can use precious resources on active synapses.
shape	give something a certain form or direction	Teens have the potential to shape their own brain development.
signal	an electric wave that is sent or received	Myelination increases the signal speed down the axon by 100 times.

Word	Definition	Example
simultaneously	at the same time	Skill-building activities not only provide stimulating challenges, but can simultaneously build strong brain pathways.
<i>strategic</i>	something you plan to achieve a good result	This strategic loss of weak synapses makes the brain more efficient.
strengthen	make something stronger	Teens have the potential to shape their own brain development— strengthening some circuits and getting rid of others.
synaptic pruning*	extra neurons and synaptic connections are eliminated to increase the brain's efficiency	The brain improves itself through synaptic pruning .

**Vocabulary from the Expeditionary Learning lessons.*

Italicized words are from the Academic Word List.

Appendix B: Teacher Resources



https://en.wikipedia.org/wiki/Axon#/media/File:Neuron_Hand-tuned.svg

1. Recall, or remember, from the last lesson when we talked about neurons. Neurons are cells in your brain. The first picture shows a neuron.
2. Neurons have two main parts. You can see these parts in the second picture. They are the dendrite, which is the branching end of the neuron; and the axon, which is the long stem. The axon is covered in myelin, which protects the axon, or keeps it safe.
3. Partner talk: Look at the first picture. Point to the dendrite. Point to the axon. Where is the myelin?