UNIT A: LESSON 4

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** "The Digital Revolution and Adolescent Brain Evolution." 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 defintions 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: *In what ways has learning, playing, and interacting changed for adolescents in the last fifteen years? How can we find answers to questions about the implications of these changes?*

THE DIGITAL REVOLUTION AND ADOLESCENT BRAIN EVOLUTION

EXCERPT 1: INTRODUCTION

The way adolescents of today learn, play, and interact has changed more in the past 15 years than in the previous 570 since Gutenberg's popularization of the printing press. The Internet, iPads (Apple, Inc., Cupertino, CA), cell phones, Google (Google, Inc., Mountain View, CA), Twitter (Twitter, Inc., San Francisco, CA), Facebook (Facebook, Inc., Menlo Park, CA), and other modern marvels unleash a **virtual** gusher of information to the plugged-in teen brain.

In 2010, U.S. adolescents spent an average of 8.5 hours per day interacting with **digital devices**, up from 6.5 hours in just 2006. Thirty percent of the time they are simultaneously using more than one **device**, bringing daily total **media exposure** time to 11.5 hours. These numbers are a moving target and **vary**

by **survey**, **socioeconomic status**, **ethnicity**, and **geography**, but all indications are that the amount of **screen time** has been **dramatically** increasing and is likely to continue to do so as the **technology** improves and becomes even more widely **available**. The **pace** of "**penetration**" (i.e., the amount of time it takes for a new technology to be used by 50 million people) is **unprecedented**. For radio, technological **penetration** took 38 years; for telephone, 20 years; for television (TV), 13 years; for the World Wide Web, 4 years; for Facebook, 3.6 years; for Twitter, 3 years; for iPads, 2 years; and for Google+, 88 days.

The **pace** and **pervasiveness** of these changes, that is, the digital **revolution**, raise several questions **relevant** to adolescent health—**relevance** that extends to children, teens, parents, teachers, and **society** at large. What are the **implications**, for good or ill, of the **dramatic** changes in the way adolescents spend their time?

How can the technology be harnessed to optimize the **positive** and **minimize** the negative? Might the **unprecedented** rate of change itself **overwhelm** **adaptive mechanisms**? The digital revolution gives us unique **insight** into how experience shapes the brain, and, in turn, how these brain changes may change our experience. Consideration of the **neurobiology** and **evolutionary** history of the adolescent brain may provide some **context** to explore these questions.

WORD BANK:

38 years	development	Internet	**survey**
50 million	**ethnicity**	iPads	Twitter
6.5	**evolution**	negative	**unprecedented**
88 days	Facebook	nervous system	up
adaptive mechanisms	**geography**	**neurobiology**	**vary**
availability	Google	**positive**	
brain	improvements	**screen time**	
cell phones	increasing	**socioeconomic status**	

SUPPLEMENTARY QUESTIONS:

1. What examples does the author give of the types of "modern marvels" (amazing inventions) of information available to teens today?
The modern marvels include the Internet, iPads, cell phones, Google, Twitter, and Facebook.

2. From 2006 to 2010, did the average number of hours adolescents spend with digital devices each day increase or decrease? How do you know?

The hours teens spend with digital devices have increased (increased/decreased). The text says that in 2010, adolescents spent an average of 8.5 hours per day using a device. This number is up from 6.5 hours spent in 2006.

3. What does the author mean by "the numbers are a moving target"?
The author means that numbers about digital media use vary. That means that the numbers change.

4. What factors, or reasons, influence how the numbers vary (change)?
The factors include the type of survey used to gather information, and the socioeconomic status, ethnicity, and geography (location) of the adolescents.

5. Whatever the numbers are, what point is the author making?
Whatever the numbers, teens' exposure to a computer, tablet, or cell phone screen is increasing. This is because of improvements in technology and availability of technology.

6. What does the "pace of penetration" mean?
"Pace of penetration" is the amount of time it takes for a new technology to be used by 50 million people.

7. How long did penetration take for the radio? How long did penetration take for Google?
Radio penetration took 38 years. Google penetration took 88 days.

8. The author asks three questions about rapid, or fast, changes in media exposure. What questions does he ask?

A. What are the implications, good or bad, about adolescents spending so much screen time?
B. How can technology be used for positive instead of negative endeavors?
C. Can the unprecedented rate of change overwhelm adaptive mechanisms?

9. What does the author believe will help us answer these questions?
The author believes we can understand these questions by considering, or thinking about, neurobiology and the evolution of the adolescent brain.

10. What do "neurobiology" and the "evolution of the adolescent brain" mean?
Neurobiology is the study of the nervous system, including the brain.
Evolution of the adolescent brain means the development through history of the adolescent brain.

RESPONSE TO GUIDING QUESTION(S):

In what ways has learning, playing, and interacting changed for adolescents in the last fifteen years? How can we find answers to questions about the implications of these changes?

Suggested Response: There has been an unprecedented increase in the number of hours that adolescents spend learning, playing, and interacting using digital devices during the last fifteen years. We can find answers to questions about the implications of these changes by considering neurobiology and the evolution of the adolescent brain.

NEUROLOGIST NOTEBOOK

INSTRUCTIONS FOR TEACHERS:

- 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:

6.5, 8.5, 13, 20, 38, **adaptive mechanisms**, **device**, **experiences**, faster, fifty, four, health**, implications**, **neurobiology**, **penetration**, **positive**, **screen time, technology, unprecedented**

Introduction:

Teens are encountering more technology at a faster pace than ever before.

Main idea:	**Supporting details**:
Teens' screen time is increasing.	In 2006, teens spent 6.5 hours per day on devices. In 2010 it was up to 8.5 hours per day. Teens use more than one device thirty percent of the time.
Main idea:	**Supporting details**:
The pace of penetration is unprecedented, or faster than ever before.	Penetration is the amount of time it takes for fifty million people to use new technology. Radio penetration took 38 years, telephones 20 years, and television took 13 years. New technology is taking less than four years.
Main idea:	**Supporting details**:
There are many questions about how the digital revolution will affect teen health.	What are the implications of teens having so much screen time? Can we make technology more positive? Can technology overwhelm adaptive mechanisms?

Conclusion:

The digital revolution is a chance to see how well humans adapt to new experiences. We can use the neurobiology of the teen brain to help answer our questions.

FUNCTIONAL ANALYSIS

INSTRUCTIONS FOR TEACHERS:

- Review student instructions for functional analysis with the whole class.
- Have students analyze a sentence(s) with a partner.
- Discuss students' responses with the whole class.
- Have students rewrite the sentence in their own words.

INSTRUCTIONS FOR STUDENTS:

Work with a partner to analyze an important sentence(s) from the text.

- First, you will decide the main parts of the sentence.
- Then you will figure out the details. Write your answers in the spaces below.
- Then write the sentence again in your own words.

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

Functional Analysis:

The way adolescents of today learn, play, and interact has changed more in the past 15 years than in the previous 570 since Gutenberg's popularization of the printing press.

WHO OR WHAT: The <u>way</u>

DESCRIPTOR (What): *adolescents of today learn, play, and interact*

WHAT HAPPENED (Action): *has* <u>changed</u>

HOW: *more in the past* <u>15</u> *years*

COMPARISON: *than in the previous* <u>570</u> *[years]*

DESCRIPTOR (Time): *since Gutenberg's popularization of the* <u>*printing press*</u>

What the sentence says:	**My own words:**
The way adolescents of today learn, play, and interact	The way _____ learn, play, and interact
has changed	has changed
more in the past 15 years	more _____
than in the previous 570	than _____
since Gutenberg's popularization of the printing press	since _____ _____

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 the digital revolution. • Next, provide the three questions that the author posed, or asked, about the digital revolution. • Then write what you learned about what we will use to help us understand these changes (*what now?*).	
WORD BANK: **adaptive mechanism, implications, pace, penetration, screen time, technology**	
Information about the digital revolution:	Technology has been changing at a very fast pace. There is unprecedented technology penetration. Teens have more screen time than ever before.
Resulting questions:	1. What are the implications for teen health? 2. What can we do to make technology more positive? 3. Will technology overwhelm the adaptive mechanism?
What now?	[*Write what we will use to help us understand these changes*:]

Appendix A: Glossary

Word	Definition	Example
*adaptive mechanism**	something about a human or an animal that allows it to survive, or live in, its environment, or surroundings	Will the rate of change overwhelm **adaptive mechanisms**?
available	possible to get something	Screen time is likely to continue to increase as the technology improves and becomes even more widely **available**.
context	the set of events or situation in which something happens	Consideration of the neurobiology and evolutionary history of the adolescent brain may provide some **context** to explore changes in our behaviors.
device	electronic machine (like a computer or phone)	Thirty percent of the time they are simultaneously using more than one **device**, bringing daily total media exposure time to 11.5 hours.
digital device	electronic machine	In 2010, U.S. adolescents spent an average of 8.5 hours per day interacting with **digital devices**.
dramatic (*dramatically*)	striking (noticeable) or impressive	The amount of screen time has been **dramatically** increasing.
ethnicity	being part of a group of people who share the same language, culture, or religion, or who are the same race or nationality	These numbers vary by socioeconomic status, **ethnicity**, and geography.
evolution (evolutionary)	development through history	It will be important to consider the neurobiology and **evolutionary** history of the adolescent brain.

Word	Definition	Example
experiences	events that you have lived through	The digital revolution gives us unique insight into how **experience** shapes the brain, and, in turn, how these brain changes may change our **experience**.
expose (exposure)	allow (someone) to view, come in contact with, or experience	Teens often use more than one device at the same time, increasing daily total media **exposure** time.
geography	location on earth; study of the earth's physical features	These numbers vary by socioeconomic status, **ethnicity**, and **geography**.
implications	potential outcomes	What are the **implications** of the dramatic changes in the way adolescents spend their time?
insight	deep understanding	The digital revolution gives us unique **insight** into how experience shapes the brain.
media	allows communication with large numbers of people; for example, newspapers, magazines, radio, computers, and television	Teens often use more than one device at the same time, increasing daily total **media** exposure time.
minimize	make something as small as possible	How can the technology be harnessed to optimize the positive and **minimize** the negative?
neurobiology	the study of the nervous system, including the brain	Consideration of the **neurobiology** and evolutionary history of the adolescent brain may provide some context to explore these questions.
overwhelm	to load with an excess of something	Will the rate of change **overwhelm** adaptive mechanisms?
pace	how fast something moves, grows, or changes	The pace of "penetration" (i.e., the amount of time it takes for a new technology to be used by 50 million people) is unprecedented.

Word	Definition	Example
penetration	the amount of time it takes for a new technology to be used by 50 million people	The pace of "**penetration**" (i.e., the amount of time it takes for a new technology to be used by 50 million people) is unprecedented.
pervasive (pervasiveness)	very common; something that seems to be everywhere	The pace and **pervasiveness** of these changes raise several questions relevant to adolescent health—relevance that extends to children, teens, parents, teachers, and society at large.
positive	good or valuable	How can the technology be harnessed to optimize the **positive** and minimize the negative?
relevant (relevance)	appropriate or related to what is being discussed	The digital revolution raises several questions **relevant** to adolescent health.
revolution	a very great change from things in the past	The digital **revolution** gives us unique insight into how experience shapes the brain.
screen time	amount of time a person spends in front of a screen, including TV, computers, and video games	The amount of **screen time** has been dramatically increasing.
society	human beings as a whole	The pace and pervasiveness of these changes raise several questions relevant to adolescent health—relevance that extends to children, teens, parents, teachers, and **society** at large.
socioeconomic status*	the social standing or class of an individual or group	These numbers are a moving target and vary, or differ, by **socioeconomic status**, ethnicity, and geography.
survey	a set of questions used in research	These numbers are a moving target and vary by survey.
technology (technological)	products or methods that are developed using knowledge from science	The pace of "penetration" is the amount of time it takes for a new **technology** to be used by 50 million people.

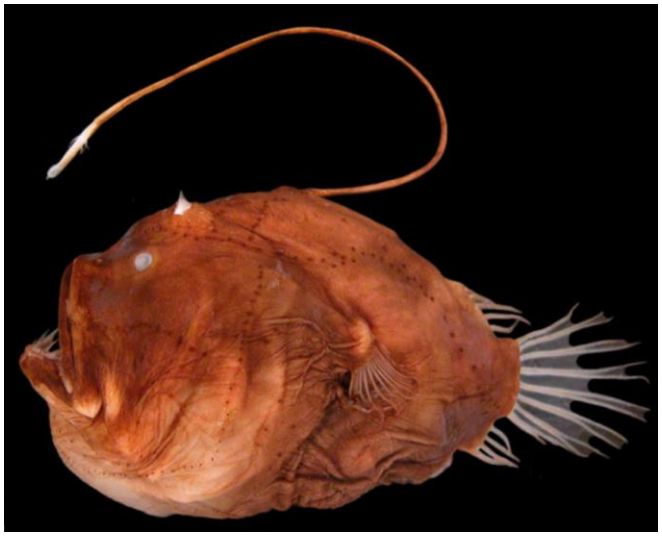
Word	Definition	Example
unprecedented	never done or known before	The pace of "penetration" is **unprecedented**.
vary	differ; change	These numbers **vary** by socioeconomic status, ethnicity, and geography.
virtual (virtually)	a) not actual or real, but seems real b) exists online	The Internet, iPads, cell phones, Google, Twitter, and Facebook unleash a **virtual** gusher of information to the teen brain.

**Vocabulary from the Expeditionary Learning lessons.*
Italicized words are from the Academic Word List.

Appendix B: Teacher Resources

socioeconomic status	
 	• Look at the pictures. These are pictures of people with different circumstances, or situations. These people have different socioeconomic status. • Socioeconomic status is a way to describe, or talk about, groups of people with different education, jobs, and income, or pay. • Partner talk: Look at the two pictures again. What do you notice? Why is it useful to think about socioeconomic status when we talk about using computers, phones, and other devices?

adaptive mechanism	


https://commons.wikimedia.org/wiki/File:Representatives_of_ceratioid_families.jpg
 
By User:Moondigger - Own work, CC BY-SA 2.5, https://commons.wikimedia.org/w/index.php?curid=1071998
	• Look at the pictures.
	  ○ The fish in the first picture lives in very deep, dark water. This fish has a light on its head. The light shines to attract other fish for food.
	  ○ Can you see the fish in the second picture? This fish is a flounder. The flounder is hidden on the ocean floor so that other fish do not eat it.
	The fish in the pictures have very different methods, or ways, to stay alive. They have different adaptive mechanisms.
	• An adaptive mechanism is something about a human or an animal that allows it to survive, or live, in its environment, or surroundings.
	• Partner talk: One fish tries to be seen in the dark. The other fish tries to stay hidden. Talk about the advantages, or good things, about each adaptive mechanism. Are there any disadvantages, or bad things, about these mechanisms?