Teacher's Guide for ODYSSEY

March 2015, Volume 24, Number 3

All In Your Head

Teacher Guide prepared by: Nancy I. Colamussi, Elementary Education, B.S., M.A.
Shoreham Wading River School District, Long Island, New York

Teacher's Note:
This guide contains project ideas, short answer, extended response, fill-in, and true/false with correction. The variation is designed to have the students think critically, as well as to test their comprehension. An answer key to the short answer sections can be found at the end of the guide.

Extended Response: Comprehension & Critical Thinking
The questions below can be used as written, simply answered in complete sentences or easily transformed into longer essay (ELA) style questions, or even research topics. In any case, have the students support their answers with details from the text or use critical thinking skills to create a thorough and interesting answer. The questions, essays and projects have been aligned with the **Common Core Standards**. Consider the level of your students when deciding how to use the questions.

"The Debt We Owe to the Adolescent Brain" p. 6-10

1. How does the long adolescence of humans contribute to the species' adaptability?
2. What is myelin? What is its function?
3. Why does Giedd refer to adolescence as the gold age of the brain?
4. According to Dr. B.J. Casey, what behaviors are the hallmarks of human adolescence?
5. Why is it necessary to have some push-pull tension in evolution?
6. Describe the studies that show that the adolescent brain is wired for risk-taking?
7. What types of rewards does the teenage brain respond to?
8. Explain the role that dopamine plays in the adolescent brain.
9. How do drugs interfere with the adolescent brain's development?
10. Give one example of risk taking behavior that can have both positive and negative consequences. (Include a modern day example, as well as an example from hunting/gathering societies of the past.)
11. Why is that during adolescence when humans are generally the strongest and healthiest they'll ever be, there is a 200 percent increase for their chance of dying during that time?
12. Why is the potential for change so beneficial during adolescence? Do you think this potential offsets some of the risks? Why or why not?

"Use It or Lose It" p. 14-15

1. Explain the competition for survival taking place in your brain regarding neurons.
2. How do neurons process information?
3. Why do certain brain connections thrive while others disappear? What is meant by 'use it or lose it' in this situation?
4. How is the pruning process so important to the brain?

Essay: *The question arises in this article whether or not it is easier for teen brains to pick up new information or skills due to the fact that there are extra connections. Write a persuasive essay using an example from real life to convince the reader of your point of view. Include details.*

"Embarrassed? Blame Your Brain!" p. 18-21

Mark the following statements TRUE or FALSE. Provide the correct answer if false.

1. _____ During adolescence, hormones power up the brain's reward system, making hanging out with friends more fun than ever before.
2. _____ During this time, threat-detection systems focus on what other people think and scan for any hints of danger.
3. _____ Our brains often react to physical pain and social rejection in the same way.
4. _____ Brain scans show that pleasure activates the same brain systems that physical pain triggers.
5. _____ Adult brains can quickly fire up systems to soothe anxiety and generate positive thoughts; therefore they will feel less hurt and embarrassed by rejection than teens.
6. _____ Brain scans show that teens with strong pain-response systems give more support to other kids.

"Mind Reading Machine" p. 23-25

1. How does a technique called functional magnetic resonance imaging (MRI) help scientists discover important information regarding brain functioning?
2. Why is it helpful for a child to have a parent in the room during an MRI?
3. What are some of the differences between how a teen brain and adult brain choose an answer to a question?
4. What are some of the disadvantage of a sleep-deprived brain?
5. How does lying activate different types of brain centers?

"Mindset Matters" p. 26-29

1. Why is it advantageous to understand the growth mindset of the brain?
2. Briefly describe how the brain works.
3. Explain the difference between a fixed mindset and a growth mindset.
4. Why are babies the best example of the growth mindset?
5. How can it be helpful for middle school students to understand the different mindsets?

Essay: *Write a paragraph describing how your mindset has affected your performance at school, in sports, the arts or emotionally. Use a real world experience and use supporting details in your paragraph.*

"Need Those ZZZZZZs" p. 30-33

1. Make a list of all of the things in your life that can cause a late bedtime.
2. How can your 'relaxing' activities actually delay sleep?
3. What needs to happen in the brain in order to promote sleep?
4. What are the physical and emotional effects that screen time has on your body's ability to promote sleep?
5. What chemical changes are happening in the teen body that can shift the circadian rhythm?
6. Why does the American Academy of Pediatrics consider teen sleep deprivation to be a serious public health problem? Do you agree? Why or why not?

Activity: *Discuss the "Sleepytime Tips" with a classmate. Which of these tips would you be willing to try for a week? Discuss which ideas seem the most appropriate for you. Challenge yourself to commit to making a change. A little change can make a BIG difference!*

"What's Left, That's Right?" p. 34-35
Read the article in its entirety and then fill in the blanks. Refer back to the text if necessary.

1. New research shows that to perform even simple functions, we often use widely _____ regions on both sides of our brains.
2. _____ is when a mental process occurs mostly on one side of the brain or the other.
3. Scientists know that both sides of the brain are connected by _____ tissue.
4. Neuroscientists have discovered that people do not tend to have a stronger brain network on either the left or right _____.
5. Originally, the left/right brain model was based largely on observations of patients whose brain hemispheres had been separated _____ for medical reasons.

"Wire You So Smart" p. 36-39

1. What are the basic building blocks of the brain?
2. How do the way neurons connect affect how they work?
3. What are neurotransmitters?
4. How is a memory created in the brain?
5. Why don't we remember everything we've ever seen?
6. What is the difference between short term memory and long term memory?
7. What technology have scientists recently used to help them study brain cells in the laboratory?
8. How does the classic memory game, "Concentration" offer a surprisingly accurate model of how the human memory works?

"Schooled in Hard Knocks" p. 40-43

1. List the signs of a concussion.
2. Explain what each letter of mTBI stands for and how it is used to help evaluate a head injury.
3. What are some of the activities that put a brain at risk for injury?
4. What is the danger of the fact that the signs of some brain injuries can be subtle?
5. What are some of the actions that you can take to prevent brain injuries?
6. What can heal battered and bruised brain tissues?
7. Why are teen brains particularly tender?

ANSWER KEY

"Embarrassed?"

1. *True*
2. *False, sense of disapproval*
3. *True*
4. *False, refection*
5. *True*
6. *True*

"What's Left"

1. *separated*
2. *lateralization*
3. *nerve*
4. *hemisphere*
5. *surgically*