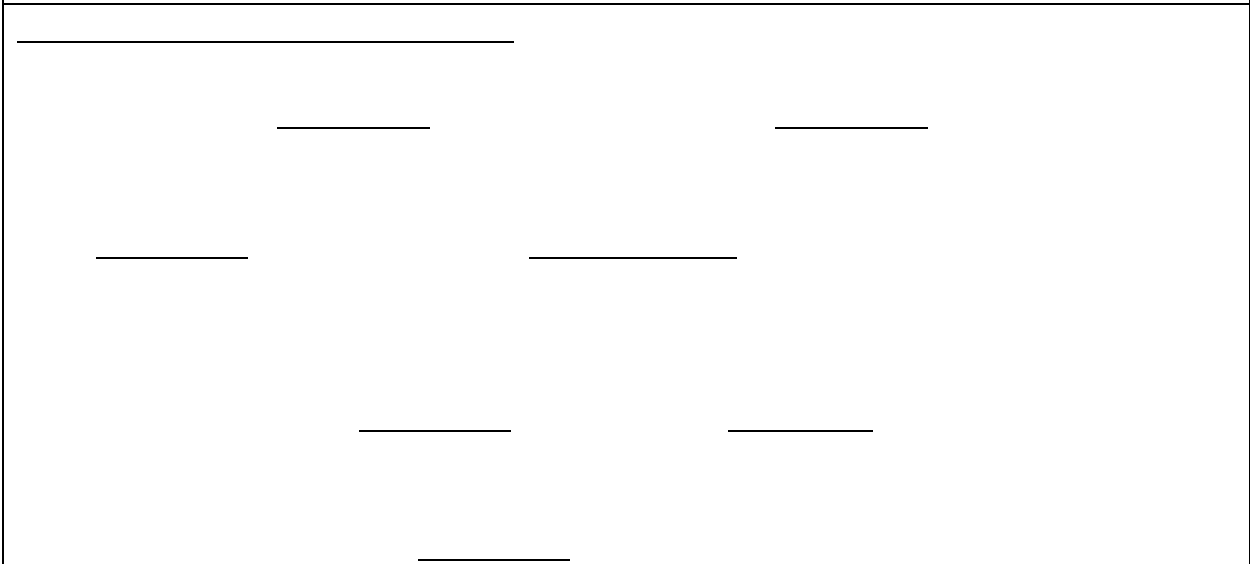


THINKING LOG

[Large shaded rectangular area for notes]

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5. What four things is the teenage brain really good at doing?

The teenage brain is really good at:

- A. seeking, or looking for, new _____
- B. enjoying _____, or excitement
- C. seeking _____
- D. recognizing, or being able to sense, _____ and _____ information

6. Why is the prefrontal cortex the last brain region, or area, to develop?

The brain develops from _____ to _____, and the prefrontal cortex is in _____ of your brain.

7. What does the prefrontal cortex do?

The _____ helps you think about the _____ of your _____.

Watch Part 2 of the video. Pay attention to the graphs and images (pictures). The graphs and images will help you understand who liked sugar the most. Then work individually or with a partner to answer the supplementary questions.

Insight Into the Teenage Brain

PART 2: 02:40 – 06:37

But we now know that the story is far more interesting and complicated than that. And in fact what we really need to do is think about how brain regions that are not at the surface of your brain, but in the deeper layers, how they change. One region we focus on is called the striatum, and the striatum is the key component of the reward system. So when you receive something that you find rewarding, your striatum is very responsive and it releases something called dopamine. And this is the case not just in humans, but in kids, and in mice, and in rats, and in monkeys. And in birds, and in fish, and in insects, and in plants, and in fungi, and in bacteria, and in archaea, and in viruses, and in all other organisms.

W*ñBT/TT0 0/9.11 323.81 re(o)-t429.07/4264 87.024 467.11 323.81 reW*ñBT/T

And so to study the reward system, what we did is, not simply show people pictures of reward, which is what mostly happens in brain imaging studies, but instead what we did is we actually gave someone a reward. And what's something that people find rewarding? Sugar! So what we did is 4 reWñBT/TT0 1 Tf0 Tc 0 Tw 0 Ts 100 Tz 0 Tr 12 0

The striatum is a key component of the _____ system.

9. What does the striatum do when you receive, or get something rewarding?

The striatum releases _____.

10. What happens when kids, mice, rats, or monkeys get something they really like?

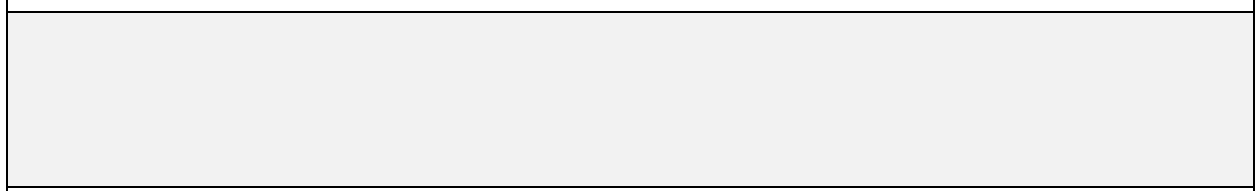
All of these animals respond, or react with _____ in their _____ when they get something they really like.

11. What is special about the functional magnetic resonance imaging scan (fMRI)?

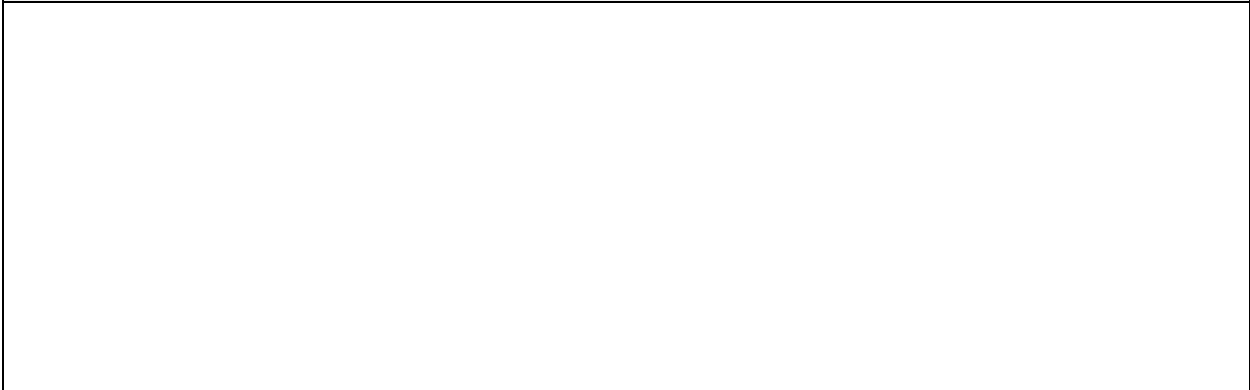
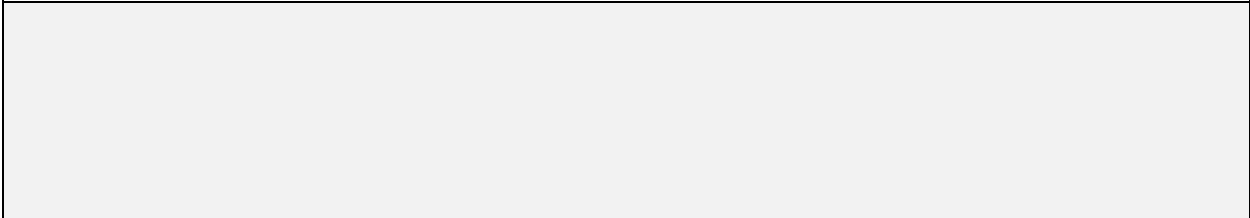
The fMRI can take a _____, or picture of the brain while it is _____. That means researchers can take a _____ of your brain while you are doing something you _____.

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But to ensure that this wasn't just specific to something as simple as sugar, we gave people something else that everybody likes. And we did this while they were in the MRI. And what's something else that everyone loves to get? Money! Right? Everybody likes money. So we brought in a whole separate group of teenagers and adults, and this time we threw in a group of kids in there who were between about seven and ten. And we found that again, the part of the brain that was most responsive was the striatum, shown here on the left. This is a brain scan showing the average activation but what you can see really clearly is that, not only were the teenagers more reactive to the money than the adults, which you might argue is because maybe they have less of it they like it more. But that's not the case, because the kids probably have even less than the teenagers, and the teens still showed this exaggerated response.



So what does this all mean for behavior and for your everyday life? Well there are a few things. From my perspective this is really exciting time to study the teenage brain. Although scientists have made significant progress in understanding what makes a teenage brain unique, we still have a lot to learn.

rewards and to emotions, might lead teenagers to make poor choices sometimes. But it also presents an excellent opportunity to seek out new adventures, to meet new people, and to confront interesting challenges in ways that people don't typically do later in life. And I predict that as we continue to conduct more of this research we will learn how to take advantage of the sensitivity of the brain during adolescence to generate new ideas and to promote creative thinking. There's a lot that we can and will learn from the adolescent brain, and from adolescents in general in the coming decade. And perhaps we'll learn that taking risks and seeking out rewards are really adaptive behaviors in many contexts that actually lead to really good decisions, and that help individuals navigate the often challenging and intimidating transition from childhood to adulthood.

So with that I encourage you to savor the excitability of your teenage brain and to enjoy all the new people you meet and all the adventures you take. Thank you.

SUPPLEMENTARY QUESTIONS :

20.

This research tells us that _____ brains are _____. Teens more responsive to _____ and new _____.

21.

The prefrontal cortex is more developed in _____. The prefrontal cortex helps regulate, or control _____ response to rewards.

22.

Teenagers sometimes make bad _____.

23.

- A. Teenagers can have _____.
- B. Teenagers meet new _____.
- C. Teenagers have new _____.

24. What might we learn from the teenage brain?

We might learn that taking _____ and seeking, or looking for, _____ are _____ behaviors.

RESPONSE TO GUIDING QUESTION :

How are teen brains different from the brains of adults and children, and how do we know?

Response:

NEUROLOGIST NOTEBOOK

INSTRUCTIONS FOR STUDENTS:

Work with a partner. Use your neurologist notebook to write down key, or important information from the video. 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:

adult , adults, adventures , challenges, children, decisions , experiences, information, money, people, positive , rewards, sugar, teens

Main Idea :

Teenage brains are different than the brains of _____ and _____.

Support 1:

Teenage brains have a stronger response to _____ than _____ brains. In the study, _____ brains responded to _____ more strongly than _____. In the study, _____ brains responded to _____ more strongly than _____ or _____. This may lead teens to poor choices sometimes.

Support 2:

Teens are more open to new _____ and _____

PREPARE FOR WRITING / COMPARE AND CONTRAST

INSTRUCTIONS FOR STUDENTS:

Work with a partner to fill out the graphic organizer about teen brains.

- x Use information from the Lesson 8 graphic organizer for the column on the left.
- x Write ideas from the text and the video that are similar, or the same.
- x Then write ideas from the text and video that are different, or not the same.

	_____	_____
	_____ _____ _____	_____ _____ _____
	_____ _____ _____	_____ _____ _____

<p>What do you think the perspective, or point of view, is?</p>	<p>This is a _____ time for teens. Teenagers get into _____.</p>	<p>Sometimes teens make bad _____ but it is also a time when teens learn and try _____ things.</p>
<p>What is your perspective? And why?</p>	<p>This is a(n) _____ time for teens I think this because _____ _____ _____ _____</p>	

		development, and especially in teenagers.
thrills	something that makes you suddenly excited or happy	Because your brain as an adolescent is built to help you do that, compared to children and adults, the teenage brain is really good at seeking out new experiences, enjoying thrills , and seeking out risks.
transition	changing from one thing to another	The prefrontal cortex is starting to mature as teen transition into adults.