Pandemic Preparedness Action Plan

Home Academic Resources

Christina School District Families;

As the global outbreak of the Coronavirus (COVID-19) continues to evolve, the Christina School District, working with other districts in Delaware, as well as the Division of Public Health, is taking steps to prepare for the possibility of transmission to our community. As part of the Christina School District’s Pandemic Preparedness Action Plan we are providing the following academic resources in the event of an extended school closure.

The attached resources are meant to provide students with an opportunity to practice previously learned skills while schools are closed. These resources are also available on our website www.christinak12.org for downloading and printing. We ask that your child practice their skills by working on these resources daily. Students should complete the packet to the best of their ability. Students should work at their own pace and can receive support from family members. If students reach a point of frustration, please stop and move on. We also encourage our students to read daily for a minimum of 30 minutes per day. Completion of these activities will help maintain your child’s academic progress until school reopens. Please stay tuned to the Christina School District website for the most recent news and announcements regarding potential school closures.

Grade Level: 8
The Distracted Teenage Brain

Scientists discover that teens are easily distracted by behaviors that were once — but are no longer — rewarding

By Alison Pearce Stevens 2014

When most people think of distraction, they think of loud music or television, but in 2014 psychologist Zachary Roper conducted a study that offered a different definition of distraction. The results show why young adults may seem impulsive and easily distracted.

[1] Teens have a reputation for making some not-so-smart decisions. Researchers have blamed those poor decisions on the immaturity of a teen’s prefrontal cortex. That is the part of the brain involved in making plans and decisions. But scientists now find the answer may be simpler: the allure of rewards. Rewards, even small ones, entice teens more than they do adults.

And, perhaps surprisingly, teens tend to continue doing things they once found rewarding, even after the actual payoff is long gone. Both findings come from a new study by researchers at the University of Iowa in Iowa City.

Psychologist Zachary Roper and his team worked with two groups of volunteers: 13- to 16-year olds and 20- to 35-year-old adults. Each volunteer had to play a game of sorts. During a training phase, a computer displayed six circles, each a different color. The players had to find the red or green circle. These targets had either a horizontal or vertical line inside. The remaining circles had lines at other angles. When the participant found the correct target, they had to press one of two keys on a keyboard. One key would report they had found the vertical line. The other reported finding a horizontal line.

When a volunteer hit the right key, the screen flashed the amount of the reward they had earned. For some volunteers, green circles provided a large (10-cent) reward and red circles provided a small (2-cent) reward. For other volunteers, the amounts were reversed, with red circles worth more. All other colors had no reward.

[5] By the end of this training, volunteers had learned the value of each color. But they weren’t aware that they had, notes Iowa’s Jatin Vaidya. When the scientists asked the players about the value of red versus green circles, both teens and adults had no awareness that a circle’s color had any effect on how much they had earned during any given trial.

1. Allure (noun): attraction, appeal
After this training ended, it was time to begin testing in earnest. The scientists informed the volunteers they had a new target. Each had to report the orientation of the line inside a blue diamond. Again, groups of six symbols appeared on a computer screen. Only one was a diamond. The other five were still circles. In some trials, one of those circles was red or green. In other trials, there were no red or green circles.

The recruits were told to answer as quickly as possible. And for this phase of the experiment, no additional money would be earned.

The researchers now measured how long it took people to find the diamond and record their answers.

When no red or green circles were among the onscreen options, both adults and teens responded quickly. But when a red or green circle showed up, both groups initially took a bit longer. Adults, though, quickly stopped paying attention to the colored circles. Their response times sped up.

[10] Teens reacted differently. They took longer to respond whenever a red or green circle showed up. Their response times never sped up. Their attention still was drawn to the previously valued circles — even though the shapes no longer brought any reward. Clearly, the red and green circles were distracting teens from their objective.

Roper’s team reported the findings September 10 in Psychological Science.

“The study demonstrates that the attention of adolescents is especially drawn to rewarding information,” says Brian Anderson. A psychologist at Johns Hopkins University in Baltimore, Md., he was not involved with the study. These data may help explain why teens engage in risky behavior, he says.

Some behaviors, such as texting or using social media, trigger the brain’s reward system. Once the teenage brain has linked a behavior to that reward, it continues to seek the reward again and again. That’s why teens are likely to opt for the reward of social media when they should be studying. Or why they respond to texts while driving.

How can someone overcome their brain’s attempts to distract? Vaidya suggests physically removing distractions whenever possible. Shut down the phone when driving or disconnect from Wi-Fi while doing homework. When distractions are not readily available, it will be easier to focus attention on the things that matter most. Like arriving home safely.

“The Distracted Teenage Brain” by Alison Pearce Stevens from societysforscience.org. Copyright © 2014 by Society for Science. Reprinted with permission, all rights reserved. This article is intended only for single-classroom use by teachers. For rights to republish Science News for Students articles in assessments, course packs, or textbooks, visit: https://www.societysforscience.org/permission-republish.

2. The phrase "in earnest" means that someone is sincere or passionate in their convictions.
3. direction, as in vertical or horizontal
4. An adolescent is a young person who is in the transitional stage from a child into an adult.
Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following statements best expresses the central idea of the article?
   A. Teenagers' brains are more easily distracted because they use social media and text while driving more often than adults.
   B. Teenagers are more likely than adults to take risks for money based on a study in Iowa City.
   C. Teenagers are more prone to distraction because they are more attracted to or focused on potential rewards.
   D. Teenagers often do not realize why they want rewards because their brains are still developing.

2. PART B: Which of the following quotes best supports the answer to Part A?
   A. "For some volunteers, green circles provided a large (10-cent) reward and red circles provided a small (2-cent) reward." (Paragraph 4)
   B. "The study demonstrates that the attention of adolescents is especially drawn to rewarding information." (Paragraph 12)
   C. "These data may help explain why teens engage in risky behavior, he says." (Paragraph 12)
   D. "When distractions are not readily available, it will be easier to focus attention on the things that matter most." (Paragraph 14)

3. PART A: What does the word "entice" mean as used in paragraph 1?
   A. to discourage
   B. to inspire
   C. to challenge
   D. to attract

4. PART B: Which of the following phrases from paragraph 1 best supports the answer to Part A?
   A. "not-so-smart decisions"
   B. "allure of rewards"
   C. "even small ones"
   D. "more than they do adults"
5. Analyze the claim the author makes about distracted teenage behaviors and evaluate whether the evidence used to support this claim is sufficient.
Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. Are you surprised by the findings of this study? Why or why not?

2. In paragraph 11, one scientist makes the claim that the results of the study, which suggest that teens are more easily distracted by potential rewards, help prove why teens are more likely to engage in irresponsible behavior. In your opinion, is this a strong argument? What might be some other reasons teenagers make poor choices?

3. In the context of this article, how can science define the identity of a teenager? Where does it fall short?
"The Distracted Teenage Brain"
CSET

Select one Discussion Question from page 5 of "The Distracted Teenage Brain," and write a CSET based response.

Include:

C: Make a claim. Answer the questions above in a complete sentence or two.
S: Set up your evidence with the source or speaker information.
E: Evidence- Provide details from the text to support your claim.
T: Tie in: Explain what your evidence means and how it helps to answer the question.
Angela Lee Duckworth is a psychologist and author who studies grit and self-control at the University of Pennsylvania. In this TED Talk, Duckworth discusses the role that grit plays in success. As you read, take notes on what grit is and how it impacts an individual's ability to overcome obstacles.

[1] When I was 27 years old, I left a very demanding job in management consulting for a job that was even more demanding: teaching. I went to teach seventh graders math in the New York City public schools. And like any teacher, I made quizzes and tests. I gave out homework assignments. When the work came back, I calculated grades.

What struck me was that IQ was not the only difference between my best and my worst students. Some of my strongest performers did not have stratospheric IQ scores. Some of my smartest kids weren't doing so well. And that got me thinking. The kinds of things you need to learn in seventh grade math, sure, they're hard: ratios, decimals, the area of a parallelogram. But these concepts are not impossible, and I was firmly convinced that every one of my students could learn the material if they worked hard and long enough.

After several more years of teaching, I came to the conclusion that what we need in education is a much better understanding of students and learning from a motivational perspective, from a psychological perspective. In education, the one thing we know how to measure best is IQ. But what if doing well in school and in life depends on much more than your ability to learn quickly and easily?

So I left the classroom, and I went to graduate school to become a psychologist. I started studying kids and adults in all kinds of super challenging settings, and in every study my question was, who is successful here and why? My research team and I went to West Point Military Academy. We tried to predict which cadets would stay in military training and which would drop out. We went to the National Spelling Bee and tried to predict which children would advance farthest in competition. We studied rookie teachers working in really tough neighborhoods, asking which teachers are still going to be here in teaching by the end of the school year, and of those, who will be the most effective at improving learning outcomes for their students? We partnered with private companies, asking, which of these salespeople is going to keep their jobs? And who's going to earn the most money? In all those very different contexts, one characteristic emerged as a significant predictor of success. And it wasn't social intelligence. It wasn't good looks, physical health, and it wasn't IQ. It was grit.

1. extremely high
2. a person being trained for the armed services
Grit is passion and perseverance for very long-term goals. Grit is having stamina. Grit is sticking with your future, day in, day out, not just for the week, not just for the month, but for years, and working really hard to make that future a reality. Grit is living life like it's a marathon, not a sprint.

A few years ago, I started studying grit in the Chicago public schools. I asked thousands of high school juniors to take grit questionnaires, and then waited around more than a year to see who would graduate. Turns out that grittier kids were significantly more likely to graduate, even when I matched them on every characteristic I could measure, things like family income, standardized achievement test scores, even how safe kids felt when they were at school. So it's not just at West Point or the National Spelling Bee that grit matters. It's also in school, especially for kids at risk for dropping out.

To me, the most shocking thing about grit is how little we know, how little science knows, about building it. Every day, parents and teachers ask me, "How do I build grit in kids? What do I do to teach kids a solid work ethic? How do I keep them motivated for the long run?" The honest answer is, I don't know. (Laughter)

What I do know is that talent doesn't make you gritty. Our data show very clearly that there are many talented individuals who simply do not follow through on their commitments. In fact, in our data, grit is usually unrelated or even inversely related to measures of talent.

So far, the best idea I've heard about building grit in kids is something called "growth mindset." This is an idea developed at Stanford University by Carol Dweck, and it is the belief that the ability to learn is not fixed, that it can change with your effort. Dr. Dweck has shown that when kids read and learn about the brain and how it changes and grows in response to challenge, they're much more likely to persevere when they fail, because they don't believe that failure is a permanent condition.

So growth mindset is a great idea for building grit. But we need more. And that's where I'm going to end my remarks, because that's where we are. That's the work that stands before us. We need to take our best ideas, our strongest intuitions, and we need to test them. We need to measure whether we've been successful, and we have to be willing to fail, to be wrong, to start over again with lessons learned.

In other words, we need to be gritty about getting our kids grittier. Thank you. (Applause)

"Grit: The Power of Passion and Perseverance" from TED Talks Education by Angela Lee Duckworth. Copyright © 2013 by TED. This text is licensed under CC BY-NC-ND 4.0.
Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which of the following best identifies Duckworth’s claim in the speech? [RI.2]
   A. A common trait that successful people possess is grit, as it pushes them to persevere despite obstacles.
   B. Teachers are unable to help students succeed if they don’t understand what drives them.
   C. Grit is not a trait that is easily developed, rather, it something that people are usually born with.
   D. People who lack talent are more likely to have grit, as they have to work harder for their success.

2. PART B: Which detail from the text best supports the answer to Part A? [RI.1]
   A. “I came to the conclusion that what we need in education is a much better understanding of students and learning from a motivational perspective,” (Paragraph 3)
   B. “Grit is sticking with your future, day in, day out, not just for the week, not just for the month, but for years, and working really hard to make that future a reality.” (Paragraph 5)
   C. “How do I build grit in kids? What do I do to teach kids a solid work ethic? How do I keep them motivated for the long run? The honest answer is, I don’t know.” (Paragraph 7)
   D. “What I do know is that talent doesn’t make you gritty. Our data show very clearly that there are many talented individuals who simply do not follow through on their commitments.” (Paragraph 8)

3. What connection does the speaker draw between “growth mindset” and “grit”? [RI.3]
   A. Both growth mindset and grit are necessary for students to succeed.
   B. Students show grit when they understand and develop a growth mindset.
   C. Students can see the effects of growth mindset once they’ve practiced grit.
   D. Students can’t develop grit without understanding growth mindset.

4. How did Duckworth’s experiences as a teacher contribute to the text? [RI.5]
Discussion Questions

Directions: Brainstorm your answers to the following questions in the space provided. Be prepared to share your original ideas in a class discussion.

1. Do you agree with Duckworth's findings on grit? Why or why not?

2. In the context of the text, what should be the goal of education? How do you think Duckworth's findings can be used to promote greater academic success in students? Cite examples from the text, your own experience, and other literature, art, or history in your answer.

3. In the context of the text, what does it take to succeed? Do you think that grit is a necessary trait in all forms of success? Why or why not?

4. Do you think grit is an important part of an individual's identity? Why or why not? Do you think it matters whether or not you are born with grit or develop grit? Cite examples from the text, your own experience, and other literature, art, or history in your answer.
"Grit: The Power of Passion and Perseverance"
CSET

Select one Discussion Question from page 4 of “Grit: The Power of Passion and Perseverance,” and write a CSET based response.

Include:
C: Make a claim. Answer the questions above in a complete sentence or two.
S: Set up your evidence with the source or speaker information.
E: Evidence- Provide details from the text to support your claim.
T: Tie in: Explain what your evidence means and how it helps to answer the question.
CSD School-to-Home Packet
Grade 8 – Mathematics
1. James used a calculator to complete each computation. But he forgot to write the decimal point in each answer. Write the correct answer for each computation.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Answer without decimal point</th>
<th>Correct answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5.7 + 6.09 + 4.2)</td>
<td>1599</td>
<td></td>
</tr>
<tr>
<td>(3.007 - 2.9 + 35.054)</td>
<td>35161</td>
<td></td>
</tr>
<tr>
<td>(14.5 - 8.07 - 6.2)</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

2. Ted has a coupon for 50¢ off a jar of Sticky peanut butter. If a jar of peanut butter is priced at $1.59, what is the percent of the cost will Ted save by using the coupon?

3. Ms. Sze is grading math tests. A student's work on a problem is given below:
   
   \[13.23 + 2.07 = 0.04761\]
   
   Is the student correct? Explain.

4. What percent of 75 is 40? Explain your reasoning.

5. Solve each of the computation problems below.

   a. \(-15 - 7 = ____\)

   b. \(15 + (-7) = ____\)

   c. \(-1.5 + (-8.5) = ____\)

   d. \(11 - 23 = ____\)
6. Arrange the following numbers on a number line.

\[ \sqrt{3}, \frac{15}{7}, \sqrt{17}, \sqrt{36}, \sqrt{5}, 1.5, \sqrt{11} \]

7. A 14-foot piece of wire is strung between a building and the ground, making a 30-60-90 triangle as shown.

a. How far straight out from the base of the building is the wire attached to the ground?

b. How far up the side of the building is the wire attached?
8. The Frederick Douglass Middle School chorus always has a party after their first concert. The cost per person for this party depends on the number of chorus members who attend. The following table shows some sample \((\text{number attending, cost per person})\) values.

<table>
<thead>
<tr>
<th>Number Attending</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per Person</td>
<td>$24</td>
<td>$12</td>
<td>$8</td>
<td>$6</td>
<td>$4.80</td>
<td>$4</td>
</tr>
</tbody>
</table>

Which of the following graphs best shows the relationship between number attending and cost per person? How do you know?

9. Toothpicks were used to make the pattern below.

\[
\begin{array}{cccc}
\square & \square & \square & \square \\
\text{1st} & \text{2nd} & \text{3rd} & \text{4th}
\end{array}
\]

a. How many toothpicks will be in the 5th figure? In the 6th figure?

b. Write an equation for the number of toothpicks \(t\) needed to make the \(n\)th figure.

c. Identify and describe the figure in this pattern that can be made with exactly 100 toothpicks.

d. Make a graph of the data.

e. Is the pattern linear or not linear? How do you know?
10. Square tiles were used to make the pattern below.

1st

2nd

3rd

4th

a. How many tiles will be in the 5th figure? In the 6th figure?

b. Write an equation for the number of tiles \( t \) needed to make the \( n \)th figure.

c. Identify and describe the figure in this pattern that can be made with exactly 420 tiles.

d. Is the pattern linear or not linear? How do you know?

11. The squash plant that Glenda planted started producing squash on the 15th day. The graph below shows the relationship between the number of days after planting and the total number of squash produced.

- a. Complete this table:

<table>
<thead>
<tr>
<th>Day</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Squash</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
b. If the pattern continues, what is the total number of squash that would be produced by day 22? By day 26?

c. Describe the pattern in words. What can you say about the number of squash produced each day?

d. Describe the pattern with an equation. What does the coefficient of \( x \) mean in this situation?

12. Write an equation for the line shown. Identify the slope and the \( y \)-intercept.

\[
\begin{align*}
\text{slope} & \quad \text{y-intercept} \\
\text{Equation} & \\
\end{align*}
\]

13. Write an equation for the line shown. Identify the slope and the \( y \)-intercept.

\[
\begin{align*}
\text{slope} & \quad \text{y-intercept} \\
\text{Equation} & \\
\end{align*}
\]
14. How high is a stack of cups? Susan measured the heights of 1, 2, 3, and 4 stacked cups. Here are her data:

<table>
<thead>
<tr>
<th>Number of Cups</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of the Stack (cm)</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

a. Predict how high a stack of 10 cups would be.

b. Describe the pattern in words.

c. Describe the pattern with an equation.

d. What does the coefficient of $x$ mean in this context? Does it have a unit of measure? Explain.

e. What does the constant term mean in this context? Does it have a unit of measure? Explain.

15. Below are the graphs of three lines.

![Graph of three lines](image)

a. Match each line with its rule.
   
   - $y = x + 4$
   - $y = 2x + 3$
   - $y = 3x + 2$

b. What are the $y$-values when $x = 3$? When $x = 4$?
16. Three of the following expressions are equivalent. Choose the expression that is not equivalent to the others and explain how you can tell, without using a calculator, that it is not equivalent.

A. $8x - 12x + 4$  
B. $12x - 16x + 4$  
C. $4 - 4x$  
D. $4(1 - 4x)$

17. Explain how you can tell, without using a calculator, that these expressions are not equivalent.

$5 - 4x^2$  
$4x^2 - 5$  
$4x(x - 5)$

For Number 18 and 19, determine whether the expression has been evaluated correctly for $D = 33$. If an error has been made, explain the error and give the correct answer.

18. $2023 - 23D = 2000 \quad \square 33 = 66,000$

19. $20 + \frac{33}{D} = 20 + 1 = 21$

20. Use the Distributive and Commutative properties to determine whether the following statements are equal for all values of $x$.

a. $3(x + 1) + x$ and $4x + 1$

b. $6x$ and $(12x - 4x) - 2x$

c. $6x$ and $12x - (4x - 2x)$

d. $7x + 5x + 1$ and $12x + 1$
21. Find the solution(s) for the following number sentences.
   a. \((5 + -3) \times 4 - 2\)
   b. \(3^2 \times -7 + 2\)
   c. \(4 - 4 \times 2 + 2 \times -1\)
   d. \(2 \times (3 + -10) - 2^2\)
   e. \(10 - (50 - (-2 \times 25) + 7) \times 2^2\)

22. Three of the following expressions are equivalent. Choose the expression that is not equivalent to the others and explain how you can tell, without using a calculator, that it is not equivalent.
   A. \(8x - 12x + 4\)  
   B. \(12x - 16x + 4\)  
   C. \(4 - 4x\)  
   D. \(4(1 - 4x)\)

23. a. Which of the following tables represent linear relationships?

   |   |   |   |
   ---|---|---|
   x  | y  | x  | y  | x  | y  |
   0  | 5  | 0  | 0  | 0  | 10 |
   1  | 10 | 1  | 10 | 1  | 8  |
   2  | 12 | 2  | 20 | 2  | 6  |
   3  | 16 | 3  | 30 | 3  | 4  |
   4  | 20 | 4  | 40 | 4  | 2  |

   b. Write an equation for each table of linear relationships in part a.

24. Solve each equation to find the value of \(x\).
   a. \(4x + 10 = 22\)
   b. \(3x + 9 = 6x\)
   c. \(2(x + 3) = 18\)
   d. \(2x + 15 = 27 - 4x\)
25. Given one of the representations below, find the other two.

<table>
<thead>
<tr>
<th>Table</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Graph</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y = \frac{1}{3}x + 1$</td>
</tr>
</tbody>
</table>

a. Find the y-intercept for each representation above.

b. Find the slope for each representation above.

26. Find the slopes of all the line segments on the grid.

Slope of line a: Slope of line b:

Slope of line c: Slope of line d:
27. Each set of \((x, y)\) coordinates below is generated by a linear rule. For each set of coordinates, write an equation to describe the rule.

a. \((-1, -7), (0, -3), (1, 1), (2, 5), (4, 13), (5, 17)\)

b. \((-2, 19), (-1, 14), (0, 9), (2, -1), (4, -11), (6, -21)\)

c. \((-2, -1), (0, 3), (1, 5), (3, 9), (5, 13), (6, 15)\)

28. The diagram below shows a rectangular plot of land cut into squares of \(2.65\) acres each.

![Diagram of a rectangular plot of land cut into squares]

a. What is the acreage of the shaded region?

b. What is the acreage of the unshaded region?

c. In this area, land sells for \$2475\ per acre.
   i. What would the price of the shaded region be?

   ii. What would the price of the unshaded region be?

d. In this area, owners pay property taxes of \$13.50\ per thousand dollars of property value. What is the total annual property tax for the shaded and unshaded regions combined? Explain your reasoning.
29. Find the area of the polygon. Show all work you do.
As solid as the earth may seem, there are always parts of its crust that are moving at an incredibly slow rate. Since the 1940s and 1950s, steady advancement in technology has allowed geologists to better understand the movement of the earth's plates and how these plates work.

The surface of the earth is made up of several crustal plates. Think of a massive puzzle. Instead of little cardboard cutouts, the puzzle pieces are gigantic slabs of rock that cover the earth. This "puzzle" sits right on top of the mantle's fluid and extremely hot layer, which is made up of several elements, the most prevalent being oxygen, silicon, and magnesium. The crust is divided into two types: oceanic crust and continental crust. As you can guess, the oceanic crust is composed of the pieces that cover the ocean floor, and the continental crust forms our continents.

**Oceanic Crust**

You may think that the ocean floor is stationary, meaning it doesn't move. However, that's not the case at all. The ocean floor is always moving, though at a very slow rate. In the past, geologists have mapped the ocean floor. By doing so, they discovered a large mountain range that lies underwater in between continents. This mountain range is called the mid-oceanic ridge.

As we learned before, the mantle is found directly underneath crustal plates. Since the mantle is made of very hot material, we find "convection currents" within this layer of the earth. Hot material at the deepest part of the mantle rises, then cools once it reaches the surface, then sinks back into the mantle, only to be reheated and rise again, repeating the cycle. Convection currents in the mantle cause the oceanic ridges to rise and form mountains. This is where many scientists say new crust is being generated. The hot magma from the mantle rises up between tectonic plates and spreads outward. So, as this happens, the earth's crust moves very slowly, carrying the continents with it. How slowly? Scientists measure the "spreading rate" in units of millimeters per year, with the faster rates measuring about 80 to 120 millimeters per year.
boundary

**Definition**

noun

1. something that marks the edge or limit.

*The fence is the boundary of our neighbor's property.*

**Advanced Definition**

noun

1. a line, real or imaginary, that indicates the limits of something.

*The river forms part of the southern boundary of our country.*

*We planted trees along the boundary of our property.*

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**These are some examples of how the word or forms of the word are used:**

1. Although there are no physical **boundaries** separating one ocean from the other, five oceans have been demarcated and named.

2. The location where these tectonic plates meet is called a plate **boundary**. Wherever you find plate boundaries, events like earthquakes can occur, and features like mountains, volcanoes, and ocean trenches are common.

3. Remarkably, biodiversity is not necessarily dependent upon the size of the ecosystem; some of the richest ecosystems in the world exist within narrow **boundaries** (sections of the Amazon rainforest, for example, and the Galapagos Islands).

4. Some sixth grade students crave order, stability, and the confines that allow them to still be carefree students. Others want to be less safe, more interesting. They want to escape **boundaries**, have adventures, and test limits.

5. "Kids can ... communicate with each other using the Internet. ... National **boundaries** are no barrier." A barrier is something that blocks something else. Takahashi says there are some kids who have mixed feelings about the Internet.

6. Today the many different countries on the South American map remind us of the divisions within Latin America. All of the different **boundaries** were established through wars for independence, except for the case of Brazil. Brazil stayed intact as one country, just as it had been one territory.

7. Just as ridges form when you push two sides of a piece of cloth together, they also form when continental plates push against each other, or when a plate feels pressure from both sides. This means that large mountain chains form inside a continent-for example, the Rocky...
generate

Advanced Definition
transitive verb
1. to cause to be brought into being.

   The human body generates heat.
   The farm uses a windmill to generate its own electricity.
   The news generated a great deal of excitement.
   Establishment of the factory will generate more jobs in the area.
   The lottery generates significant revenue for the state.

2. to beget (offspring).

   Laboratory mice exposed to the chemicals were no longer capable of generating offspring.

Spanish cognate
generar: The Spanish word generar means generate.

These are some examples of how the word or forms of the word are used:

1. The fishing industry generates $80 billion a year.

2. Solar power is energy from the sun that can be used to generate electricity.

3. It’s possible the flamingos were sensing some primary waves that the earthquake generated before the stronger waves that were felt by people.

4. A parachute, which slows the skydivers fall by creating air resistance, is required to reduce the kinetic energy the skydiver generates as he falls.

5. As India develops, it will require more electricity to power homes and businesses. Today, many cities in India suffer frequent blackouts, because the country doesn’t generate enough electricity.

6. Another form of renewable energy is wind energy. Like an extremely large pinwheel, wind turbines have blades that rotate when the wind blows, and this movement generates electricity.
1. What are the two types of crust on the earth's surface?
   A. continental and silicon
   B. transform and oceanic
   C. oceanic and continental
   D. divergent and convergent

2. What does the author compare the earth's surface to?
   A. dinner plates
   B. a massive puzzle
   C. the ocean
   D. an earthquake

3. Crustal movements can be dangerous to humans.

   What evidence from the text supports this conclusion?
   A. Plate movement at transform boundaries can sometimes cause earthquakes, some quite large and devastating.
   B. Plate movement at convergent boundaries can result in the formation of mountain ranges like the Himalayas.
   C. The spreading rate of some continents can reach 120 millimeters per year.
   D. As solid as the earth may seem, there are always parts of its crust moving at incredibly slow rates.

4. Crustal movements in one location can affect locations far away.

   What evidence from the text supports this conclusion?
   A. Steady advancement in technology has allowed geologists to better understand plate tectonics.
   B. The mantle is made up of elements like oxygen, silicon, and magnesium.
   C. Geologists mapped the ocean floor and discovered the mid-oceanic ridge.
   D. Divergent boundaries in the ocean create a chain reaction that pulls plates apart on land.
How do convection currents help form underwater mountains?

Explain two ways in which changes on the earth's surface are connected to changes below the earth's surface.

Support your answer with evidence from the text.