Lesson 9 Analyzing Word Meanings

Part 5: Common Core Practice

Read the article. Then answer the questions that follow.

from “Prime Time for Cicadas”
by Emily Solor, Science News for Kids

1. If it hasn’t happened yet, it could occur any day now.
2. The first signs are little holes in the ground in yards, orchards, and fields. Then, one warm evening, big, red-eyed bugs start crawling out of the holes.
3. The next morning, thousands upon thousands of these black, winged insects, known as cicadas, cover sidewalks, mailboxes, tree branches, and roofs across certain areas of the United States. The loud throb of their alien-sounding, high-pitched screeches fills the air....
4. If you don’t like bugs, watch out. For anyone who lives in the invasion area, the cicadas are impossible to ignore, says David Marshall. He’s an evolutionary biologist and cicada expert....
5. And, if you’re caught by surprise, the experience can be pretty overwhelming. Some people find it downright creepy.

Puzzling cycles

6. Even if you don’t get to witness the great cicada awakening, it’s worth pondering the phenomenon. Despite years of research, the life cycles and habits of cicadas still present puzzles to modern science.
7. Researchers are especially interested in ... periodical cicadas; these insects live only in this part of the world, and they appear just once every 17 years, on the dot....
8. “This is a really special phenomenon that doesn’t happen anywhere else in the world,” Marshall says.
9. All cicada eggs hatch into juveniles underground, where they go through five stages of development before emerging as adults, mating, and starting the cycle all over again. Adult periodical cicadas are about 1.5 inches long. They can neither bite nor sting.

10. On average, a population of annual cicadas spends between 2 and 8 years underground before facing the light of day. Different populations stagger their maturation, though, so that a small number hatch each year. They usually appear in the summertime. You might see just a handful in your neighborhood every year......

Prime time

11. One big mystery is why periodical cicadas wait such a long time and a particular number of years before emerging. The answer, some scientists now suggest, appears to involve weather and mathematics.
12. Periodical cicadas belong to a genus called Magicicada, which first appeared sometime around 1.8 million years ago. Back then, glaciers covered the land, and the climate of eastern North America was unpredictable. Sometimes summers were warm. Sometimes they were cold.
13. Juvenile Magicicada won’t even crawl out of the earth until the soil reaches 64 degrees F, Marshall says. After that, they need consistently warm temperatures, usually above 66 degrees F, to survive.

14. By evolving to stay underground as long as possible, some experts say, cicadas reduced their chances of emerging during a particularly cold summer.
15. In one study, researchers from Tennessee and Arkansas looked at what would happen if there were one dangerously cold summer every 50 years for 1,500 years. Their mathematical model showed that cicadas with a life cycle of 7 years had only an 8-percent chance of surviving. With an 11-year cycle, survival jumped to 51 percent. At 17 years, cicadas had a 96-percent chance of living.
16. So, staying underground longer is better. In fact... cicadas live longer than almost any other insect.

Multiple breeding

17. Why do periodical cicadas live precisely 13 or 17 years?
18. Both 13 and 17 belong to a special class of numbers called primes. This means that the numbers can be evenly divided only by themselves or the number 1. The first few prime numbers are 2, 3, 5, 7, 11, 13, 17, 19.
19. Mathematicians spend a lot of time trying to understand prime numbers. Cicadas somehow understand primes instinctively. What's more, the insects seem to know how to count.
20. The fact that 17 and 13 are primes reduces the chances of interbreeding among different populations of 17- and 13-year cicadas, Marshall says.
21. Multiples of prime numbers are unlikely to overlap with multiples of other prime numbers. So, a cicada population that hatches every 2 or 5 or 7 years will hardly ever hatch at the same time as a population that hatches every 13 or 17 years. And the 13- and 17-year cicadas will emerge at the same time only once every 231 years.
22. If populations don't hatch at the same time, they can't mate with each other, so their genes remain distinct. That's important because genes help determine the length of the insect's life cycle. If a 5-year cicada were to mate with a 17-year cicada, for example, the length of the cycle would be different every generation......
23. If all of this puzzles you, you're not alone. Scientists have lots of questions, too. "It's so difficult to explain this kind of thing," Marshall says. "It's such a remarkably complex species."

Answer Form

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Number Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Part 5: Common Core Practice  Lesson 9

Read this sentence from paragraph 7.

Researchers are especially interested in ... periodical cicadas; these insects live only in this part of the world, and they appear just once every 17 years, on the dot.

Why has the author chosen to use the figurative phrase on the dot?
A. to describe the small holes made by cicadas as they hatch
B. to highlight their specific and extraordinary life cycles
C. to identify the precise location where they may be seen
D. to suggest the amazing regularity of when they will emerge

Why do you think the author chose to use the words prime time in the title?
A. to reveal her knowledge about prime numbers and cicada instincts
B. to focus on the importance of the insect's well-timed life cycle
C. to highlight how researchers solved a puzzling mystery about the insect
D. to emphasize that cicadas must emerge in the evening in order to survive

Describe the tone of the article and how the author's choice of words creates it. Cite at least two specific words and phrases chosen by the author to support your answer.

The tone is __________.

I know this because the author uses these words or phrases:

The use of these words/ phrases prove

Self Check: Go back and see what you can check off on the Self Check on page 85.