

# The Science of Fun!

Bello Nock recently raced up a thin wire on a motorcycle. He drove the motorcycle high over thousands of spectators' heads. He's a clown with the Ringling Bros. and Barnum & Bailey circus.

To the spectators below, Bello's stunt looked dangerous - and it was. But Bello knew a secret. He was using science to help keep himself safe.

## Circus Science

Bello began performing circus stunts when he was nine years old. He walked on a thin wire that was stretched nine feet off the ground.

To stay on a wire without falling, Bello needs to keep his center of gravity low. An object's center of gravity is usually located in the middle of the object. That is where the object's weight is centered.

By crouching and keeping low, Bello keeps his center of gravity low. The lower his center of gravity, the harder it is for Bello to fall.

Bello often carries a heavy metal stick when he performs. The stick bends downward, lowering his center of gravity.

## Moving On

Bello also uses Newton's first law of motion when he performs. That law is named for Isaac Newton. He was a scientist who lived about 275 years ago.

Newton's first law of motion says that a moving object will keep moving unless an outside force acts on it. (The law also says that an object at rest will stay that way unless an outside force acts on it.) Bello uses that law when he rides his *miniature*, or tiny, bike.

As Bello speeds along on his tiny bike, he sometimes has to stop before slamming into a wall. To stop, Bello uses the bike's brakes. The brakes create *friction* between the bike's tires and the ground. The friction is an outside force that slows the bike.

Friction also changes the bike's motion into heat energy. You could say that Bello's act is really hot!

To see how friction works, rub your hands together as fast as you can. When you rub your hands together, they should start to feel warm. Friction between your hands changes into heat energy.

Bello always puts on a high-energy show. "I always want to capture the attention of children," he said. He captures their attention with science.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. According to the passage, what does friction do with the motion of the bike?

- A Friction makes Bello less likely to fall off the bike.
- B Friction changes the motion into heat energy.
- C Friction helps keep the bike's center of gravity low.
- D Friction means that Bello can rub his hands together while he rides.

2. Which of the following does the author describe first in the passage?

- A The author describes Bello's high-energy show as a tightrope walker.
- B The author describes Bello's life as a clown in the circus.
- C The author describes Bello's decision to use Newton's first law of motion.
- D The author describes Bello's circus act of riding a motorcycle on a wire.

3. It can be inferred from the passage that

- A Bello will probably stop performing as a circus clown soon because it is too dangerous
- B Bello only knows how to ride a motorcycle, not a bicycle
- C Bello is a very inexperienced clown, and this inexperience shows in his act
- D the children in the audience at the circus may not understand the science behind Bello's act

4. Read the following sentence: "To the spectators below, Bello's stunt looked dangerous."

In this sentence **stunt** means

- A trick
- B motorcycle
- C secret
- D motion

5. This passage is mostly about

- A how a clown got his start as a circus performer
- B how a clown enjoys his life performing in the circus
- C how a clown uses science to stay safe as he does stunts
- D how a clown puts on a high-energy show

6. Why does Bello often carry a heavy metal stick when he performs?

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7. What word would the author most likely use to describe Bello Nock?

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8. The question below is an incomplete sentence. Choose the word that best completes the sentence.

Bello Nock keeps his center of gravity low, \_\_\_\_\_ he can stay on the high wire without falling.

- A so
- B but
- C although
- D however

9. Answer the following questions based on the sentence below.

Bello Nock drove a motorcycle on a high wire at the Ringling Brothers and Barnum & Bailey Circus.

Who? Bello Nock

(did) What? \_\_\_\_\_

Where? \_\_\_\_\_

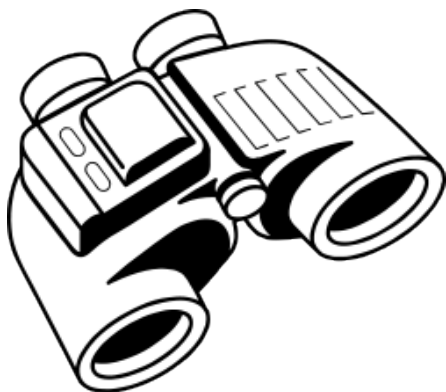
**10.** Read the vocabulary word and definition below, and complete questions 10a, 10b, and 11.

**Vocabulary Word:** spectator (spec · ta · tor): a person who watches something, usually as part of a group.

**10a.** Read the sentences below and underline the word **spectator**.

1. The actors were very happy to have so many spectators at their play.
2. Most professional sports teams have a lot of spectators at every game.
3. I am on the team, but I was only a spectator at the soccer game because I couldn't play with a sprained ankle.
4. The circus tent has space for 500 spectators to see the show.
5. It was so rainy that many spectators did not come to see the parade.

**10b.** Which item would probably be more helpful to a spectator?



**11.** If you listen to the radio in the car, is that an example of being a spectator? Why or why not?

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## Teacher Guide &amp; Answers

**Passage Reading Level:** Lexile 760

**Featured Text Structure:** Descriptive – the writer explains, defines, or illustrates a concept or topic

**Passage Summary:** This passage is about Bello Nock, a circus clown who uses science to stay safe during his act. He does risky stunts such as driving a motorcycle on the high wire and riding a miniature bike extremely fast, and is able to stay safe thanks to understanding scientific concepts.

1. According to the passage, what does friction do with the motion of the bike?
  - A Friction makes Bello less likely to fall off the bike.
  - B Friction changes the motion into heat energy.**
  - C Friction helps keep the bike's center of gravity low.
  - D Friction means that Bello can rub his hands together while he rides.
2. Which of the following does the author describe first in the passage?
  - A The author describes Bello's high-energy show as a tightrope walker.
  - B The author describes Bello's life as a clown in the circus.
  - C The author describes Bello's decision to use Newton's first law of motion.
  - D The author describes Bello's circus act of riding a motorcycle on a wire.**
3. It can be inferred from the passage that
  - A Bello will probably stop performing as a circus clown soon because it is too dangerous
  - B Bello only knows how to ride a motorcycle, not a bicycle
  - C Bello is a very inexperienced clown, and this inexperience shows in his act
  - D the children in the audience at the circus may not understand the science behind Bello's act**
4. Read the following sentence: "To the spectators below, Bello's stunt looked dangerous."

In this sentence **stunt** means

  - A trick**
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5. This passage is mostly about
  - A how a clown got his start as a circus performer
  - B how a clown enjoys his life performing in the circus
  - C how a clown uses science to stay safe as he does stunts**
  - D how a clown puts on a high-energy show
6. Why does Bello often carry a heavy metal stick when he performs?

**Suggested answer:** Bello often carries a heavy metal stick when he performs to lower his center of gravity. The lower his center of gravity, the less likely he will fall. [paragraph #2]

7. What word would the author most likely use to describe Bello Nock?

**Suggested answer:** Answers will vary. The author might describe Bello Nock as creative. Nock is able to perform high-energy and high-risk stunts using science to keep himself safe. [paragraphs #2, 4, 8, 10]

8. The question below is an incomplete sentence. Choose the word that best completes the sentence.

Bello Nock keeps his center of gravity low, \_\_\_\_\_ he can stay on the high wire without falling.

- A so
- B but
- C although
- D however

9. Answer the following questions based on the sentence below.

Bello Nock drove a motorcycle on a high wire at the Ringling Brothers and Barnum & Bailey Circus.

Who? Bello Nock

(did) What? **drove a motorcycle**

Where? **on a high wire at the Ringling Brothers and Barnum & Bailey Circus**

10. ReadWorks recommends that you teach this vocabulary word to the whole class out loud using the four steps listed below.

**Vocabulary Word:** spectator

**Step 1:** Introduce the word

- a. Teacher writes the word on the board and divides it into syllables: (spec · ta · tor)
- b. Teacher says: "This word is spectator. What is the word?" [All students reply together out loud: "spectator."]

**Step 2:** Provide a child-friendly definition

- a. Teacher says: "A spectator is a person who watches something, usually as part of a group."
- b. Teacher says: "In the text, the author describes Bello Nock as racing his motorcycle over the heads of thousands of spectators. This means that there were thousands of people watching as he drove his motorcycle. A spectator is someone who watches something, usually as part of a group, and usually it is an event of some kind, like a circus or a sports game."
- c. Teacher says: "What is the word?" [All students reply together out loud: "spectator."]

**Step 3:** Practice the word

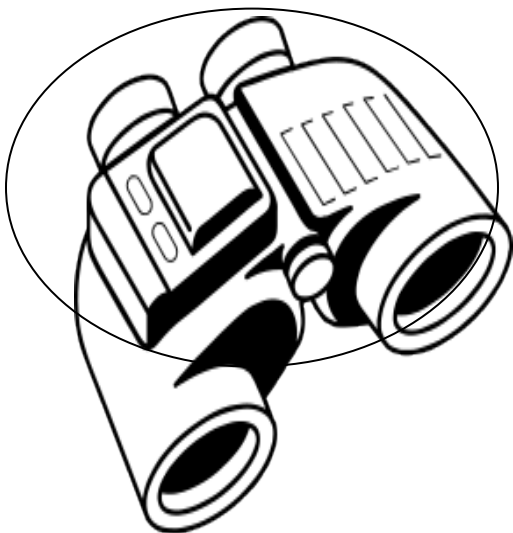
Teacher provides examples and additional opportunities to repeat the word. Read the first sentence out loud to your students. Begin reading it again and when you come to the vocabulary word, prompt students to say the vocabulary word out loud. Then, finish reading the sentence out loud to your students.

- 10a.**
1. The actors were very happy to have so many spectators at their play.
  2. Most professional sports teams have a lot of spectators at every game.
  3. I am on the team, but I was only a spectator at the soccer game because I couldn't play with a sprained ankle.
  4. The circus tent has space for 500 spectators to see the show.
  5. It was so rainy that many spectators did not come to see the parade.

**Step 4:** Check for student understanding

This step can be completed as a whole class activity or as an independent practice.

- 10b.** Which item would probably be more helpful to a spectator?



- 11.** If you listen to the radio in the car, is that an example of being a spectator? Why or why not?

**Suggested answer:** No, because you are not watching, only listening.

*Suggested Additional Vocabulary:* perform, miniature, tiny, energy