

Amusement Park Motion

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Whiz! Bing! Thump! Ding ding ding ding ding!

When they're jumbled up together, the sounds at an amusement park can become a roar. At the arcade, there is booming music and the sound of quarters clinking into slots. Two girls jump in unison as they compete in a dance game. Underneath it all, there is the rustling of prize tickets being folded up and jammed into pockets.

At the amusement park, there is noise everywhere. And where there is noise, there is motion.

On a hot summer day, some children hide out from the sun inside the cool, dark bumper car arena. One grinning boy is behind the wheel of a bright blue car with a thick, black bumper. He's too young to drive a real car, but here, he can speed around the track.

The boy sets his sights on a long-haired girl in a green car. She's sitting still, caught in something of a bumper car traffic jam. Then he slams his car into hers. The collision stops his car in its tracks, but it sends her car sailing away from his. In the crash, his car's momentum shifts to her car. They both laugh.

Elsewhere on the track, two other cars careen toward each other. When they crash, both bumper cars reverse course. They bounce backward, away from the point of impact. One driver's head is knocked sideways, but these mini crashes are all fun. No one is hurt and no one is crying.

In the arcade nearby, something similar is happening at the pool table. One player slams her stick into the white cue ball. This sends the cue ball rolling quickly to the other end of the table, where it hits a striped ball. In an instant, the cue ball stops moving. The striped ball takes on its momentum and sails into the pocket.

Her opponent isn't having much luck at the pool table. He strikes the cue ball with the stick, but aims badly. The white ball bounces off three edges of the pool table until it finally slows and comes to a stop.

At the air hockey table, the action of the game is happening almost too quickly to follow. One player moves to protect her goal, but she's not holding onto her air hockey pusher tightly, and it goes flying out of her hand when the puck hits it.

In the next room two boys are playing ping pong. One boy is new to the game and is losing. Every time he hits the ball, he swings the paddle with too much force. The tiny ball has very little mass, but the boy's fast swing sends it off the table entirely. In this case, the boy is giving the ball too much momentum. Momentum, the quantity of motion in a moving object, is determined by an object's mass and its velocity.

Most of the time, it's against the rules to hit things. But at amusement parks, certain kinds of hitting are part of the fun. The boy losing at ping pong doesn't mind, because he's enjoying hitting the ball as hard as he can. At the batting cage, a girl wearing a helmet hits a baseball with so much force that it makes a loud "crack!"

In the arcade, a man has paid two quarters to see how many small plastic animals he can whack with a rubber mallet. When he hits them, their heads sink back inside the machine. His daughter

is sitting in front of another game. She's shooting small balls at stuffed monsters. If she hits one straight on, it falls over and she wins tickets.

At another game, players pay a dollar for the chance to hit some milk bottles with a ball. If they knock all the bottles over, they win a huge stuffed animal. This game is very hard to win even if players throw the ball with a lot of force, because some of the bottles are very heavy. Often, the heavy bottle wobbles but doesn't fall over.

One boy doesn't want to leave the amusement park, but he is exhausted. The batting cage, ping pong and the milk bottle game have left him with a very tired right arm. All the speed and crashes in the bumper car were fun, but they tired him out as well. There's only so much motion most people can enjoy in a day. Eventually, even the most energetic children run out of momentum. It's time for them to climb into bed and be still.

Name: _____ Date: _____

1. Where does this passage take place?

- A arcade at a shopping mall
- B sports center
- C amusement park
- D bumper car factory

2. The author provides a list of what?

- A amusement park concessions
- B ways momentum is used at an amusement park
- C amusement park rides
- D prizes won at an amusement park

3. When the boy crashes his bumper car into the girl's bumper car, the momentum from his car is transferred to hers. What evidence from the text supports this statement?

- A "She's sitting still, caught in something of a bumper car traffic jam."
- B "Then he slams his car into hers."
- C "The boy sets his sights on a long-haired girl in a green car."
- D "The collision stops his car in its tracks, but it sends her car sailing away from his."

4. Read the following sentences: "Her opponent isn't having much luck at the pool table. He strikes the cue ball with the stick, but aims badly. The white ball bounces off three edges of the pool table until it finally slows and comes to a stop."

What conclusion can you draw about the cue ball?

- A It gradually lost its momentum.
- B It hit three different balls.
- C It was very heavy.
- D It was moving slowly.

5. What is this passage mostly about?

- A different kinds of arcades
- B examples of motion and momentum
- C knocking over milk bottles
- D why bumper cars are fun

6. Why does the author explain momentum by using different examples at an amusement park?

- A to make the reader feel as though he or she is at an amusement park
- B to illustrate what momentum is in a confusing way that the reader cannot understand
- C to illustrate what momentum is with examples that are most likely familiar to the reader
- D to illustrate what momentum is with examples that are most likely unfamiliar to the reader

7. Choose the answer that best completes the sentence below.

_____ children are too young to drive real cars, they are allowed to drive bumper cars at amusement parks.

- A Therefore
- B Obviously
- C Initially
- D Although

8. How is the momentum of an object determined?

9. What happens every time one of the boys playing ping pong hits the ball?

10. How could the boy playing ping pong keep from hitting the ball off the table?
