



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Group: \_\_\_\_\_

# READING SCIENCE

## Gravity (Lexile 840L)

1 What happens when you throw a basketball up toward the hoop? If you are lucky, the ball sinks into the net, scoring two points before dropping back down to the ground. The basketball isn't that heavy. Why doesn't it stay up in the air when you throw it? Have you ever heard the saying, "What goes up must come down"? This saying helps explain what happens to the basketball. It is being acted on by an invisible force called gravity. Gravity is the basic force in the universe that attracts all objects to each other.



- 2 Gravity has existed since the beginning of the universe. It is hard to understand how or why it works. We know it is always there because it holds everything in the universe in place. First, you need to understand that there is a gravitational attraction between you and Earth, between Earth and the Moon, and between Earth and the Sun. You can't feel the gravitational attraction between you and Earth. However, it is what keeps your feet planted firmly on the ground. Imagine spinning around and around on a merry-go-round. As long as you are holding on, you will stay on the merry-go-round. If you ever let go, you will fly off and land on the ground. This analogy helps us visualize the gravitational attraction between Earth and you. Earth is spinning on its axis. Thanks to gravity, you are held to your position on Earth rather than flying out into space.
- 3 Focus next on the gravitational attraction between Earth and the Moon. The Moon and Earth are attracted to each other by the same force of attraction between you and Earth. This attraction keeps the Moon traveling in a nearly circular orbit around Earth. Also consider the effect of the Moon's gravitational force on Earth's oceans. The gravitational pull of the Moon causes the ocean tides to rise and fall.
- 4 There is attraction between you and Earth and between the Moon and Earth. The Sun also has a gravitational pull on Earth. This attraction results in Earth orbiting the Sun. The Sun's attraction is so strong that all objects in the solar system orbit around this medium-sized star. What would happen if the Sun's gravitational attraction suddenly disappeared? The comets, asteroids, and all the planets, including Earth, would fly off into space just like you would if you let go of a merry-go-round.

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- 5 All objects are attracted to each other, so why are some attractions stronger than others? For example, Earth's gravity has a more powerful effect on you than the Sun's gravity. With the Sun's gravitational attraction holding all of the objects in the solar system, how could this be possible? The force of gravity between two objects depends on two things. It depends on the mass of the two objects and the distance between them. The greater the mass of the objects, the greater the gravitational force between them. In other words, the bigger an object is, the more gravity it has. But, when analyzing the effects of gravity, distance also matters. The closer objects are to each other, the greater their gravitational force of attraction. As they get farther apart, the force between them becomes weaker. Even though the Sun is much more massive than Earth, the distance between you and Earth is less. The gravitational pull of the Sun has little effect on you because the distance is so great.
- 6 Gravity is the invisible force that attracts all objects, no matter their size or mass. The Sun has the strongest gravitational force of any object in the solar system. It attracts all astronomical objects into orbit around itself. Without this force, everything would fly off in all directions through the universe.

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- 1** Which of the following summaries expresses the main points of the passage best?
- A** I believe gravity is the most important aspect of our universe. Without it we would all be floating off into the universe. There wouldn't be any orbits; instead, all planetary bodies would simply float around, running into each other when they crossed paths and just wandering forever.
  - B** There is a gravitational force between all objects in the universe. Gravitational force is what keeps all components of our solar system in orbit around the Sun, as well as moons in orbit around planets. The force of gravity affects Earth's tides and holds us on Earth's surface. The force of gravity between objects depends on their masses and the distance between them.
  - C** Gravity is hard to understand and scientists have little to no understanding of how it works. We know that gravity is out there, but the specifics are often lost on us. Plants, animals, and humans are all able to grow tall due to the pull on Earth from the Sun. Without the Sun we would all just stretch out along Earth's surface.
  - D** None of the above
- 2** Upon what does the force of gravity between two objects depend?
- A** The amount of attraction between the two objects
  - B** How much each object weighs
  - C** How close the objects are to each other
  - D** The mass of the two objects and the distance between them

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- 3** Which best describes why gravity on Earth has a stronger attraction with you than the Sun has with you?
- A** Earth has more mass than the Sun, allowing a stronger attraction to form.
  - B** The Sun has more mass than Earth.
  - C** Earth has a smaller mass than the Sun, but it is much closer to you than the Sun, allowing for a stronger attraction.
  - D** Earth has more magnetism than does the Sun.
- 4** The Sun is to a planet as -
- A** Earth is to the Moon.
  - B** the tides are to the Sun.
  - C** a moth is to a flame.
  - D** the seasons are to the Moon.
- 5** Halley's comet is a comet that passes close to Earth every 75 years. Based on this passage, which gravitational attraction has the most influence on the movement of this astronomical object?
- A** Attraction between the comet and Jupiter
  - B** Attraction between the comet and the Moon
  - C** Attraction between the comet and Earth
  - D** Attraction between the comet and the Sun