

Gravity Pulls Everywhere

Read for the two factors that change gravitational force.

SC.6.P.13.2 "Explore the Law of Gravity by recognizing that every object exerts gravitational force on every other object and that the force depends on how much mass the objects have and how far apart they are."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each sentence that tells how mass changes gravity. Circle each sentence that tells how distance changes gravity.

The Pull Between Objects

- ① Gravity is a force of attraction between objects with mass. You feel Earth's gravity because Earth has a huge amount of mass, and you are close to it. At the same time, you pull on Earth with the same gravitational force. Earth moves an amount too tiny to notice because its mass is so much greater than yours. This shared pull is not limited to planets. A backpack, a tree, and a marble each attract every other object. Usually, these pulls are too weak to notice.
- ② Scientists describe gravity as stronger when the objects have more mass. Imagine two identical metal balls resting near each other. If one ball is replaced with a ball that has much more mass, the gravitational attraction between the pair becomes stronger, as long as the distance stays the same. Mass is not the same as size. A small object made of dense material can have more mass than a larger object made of a less dense material. Gravity depends on mass, not appearance.
- ③ Distance also changes the strength of gravity. When two objects move farther apart, their gravitational attraction becomes weaker. When they move closer together, it becomes stronger. This is why the Moon remains in orbit around Earth, while a book on a desk is not pulled noticeably toward a book across the room. The books do attract each other, but their small masses and their separation make the force far too weak to move them. Every pair of objects has gravity, even when its effects are hard to observe.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Would two paper clips exert gravitational force on each other? Explain your answer using the passage.

2 A cargo ship and a bicycle are the same distance from a metal ball. The ship has more mass. Which one has the stronger gravitational attraction to the ball? Why?

3 Two objects have the same masses. They move closer together. What happens to the gravitational force between them?

4 Pair A has objects with greater masses than Pair B, and the objects in Pair A are closer together. Which pair has stronger gravitational force? Give two reasons.

3 YOUR TURN _____ Your own words

Invent two pairs of objects. Make Pair A have a stronger gravitational force than Pair B by changing mass, distance, or both. Write exactly 3 sentences that name both pairs and explain why Pair A has the stronger force.

PART 1 • READ AND MARK

Underline each sentence that tells how mass changes gravity. Circle each sentence that tells how distance changes gravity. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Would two paper clips exert gravitational force on each other? Explain your answer using the passage.	Yes. Every pair of objects has gravity, but the force between two paper clips would be very weak.
2	A cargo ship and a bicycle are the same distance from a metal ball. The ship has more mass. Which one has the stronger gravitational attraction to the ball? Why?	The cargo ship has the stronger attraction because objects with more mass have stronger gravity when distance stays the same.
3	Two objects have the same masses. They move closer together. What happens to the gravitational force between them?	The gravitational force becomes stronger.
4	Pair A has objects with greater masses than Pair B, and the objects in Pair A are closer together. Which pair has stronger gravitational force? Give two reasons.	Pair A has stronger gravitational force because its objects have more mass and are closer together.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Pair A has two bowling balls close together. Pair B has two tennis balls far apart. Pair A has a stronger gravitational force because its objects have more mass and are closer together.

Accept any realistic objects and explanations that correctly connect greater mass and/or less distance with stronger gravitational force. For Question 1, accept that the paper clips attract each other even if the student notes that the force is too weak to observe.