

Name _____

Why Do Objects of Different Masses Fall at the Same Rate in a Vacuum?

Short Answer Key

1. Gravity is the force of attraction that pulls objects with mass toward one another. It's responsible for making objects fall towards the Earth or any massive body. All objects experience the same gravitational acceleration due to gravity's universal nature.
2. Galileo Galilei dropped two objects of different masses, a cannonball and a musket ball, from the Leaning Tower of Pisa to demonstrate that objects of different masses fall at the same rate in the absence of air resistance. This experiment provided evidence for the universality of gravitational acceleration.
3. Heavier objects experience a greater gravitational force because the force of gravity is directly proportional to their mass. However, in a vacuum, all objects fall at the same rate due to the universal nature of gravitational acceleration, regardless of their mass.
4. Air resistance opposes the motion of falling objects on Earth, slowing them down. This resistance is not present in a vacuum, which is why objects fall at the same rate in a vacuum.
5. Newton's second law of motion describes the relationship between force (F), mass (m), and acceleration (a). It relates to the concept of gravity by explaining that the force of gravity acting on an object is equal to the object's mass multiplied by its acceleration due to gravity ($F = mg$).

