

Unit 3: Forces in Action

An Introduction to Gravity & Support Forces

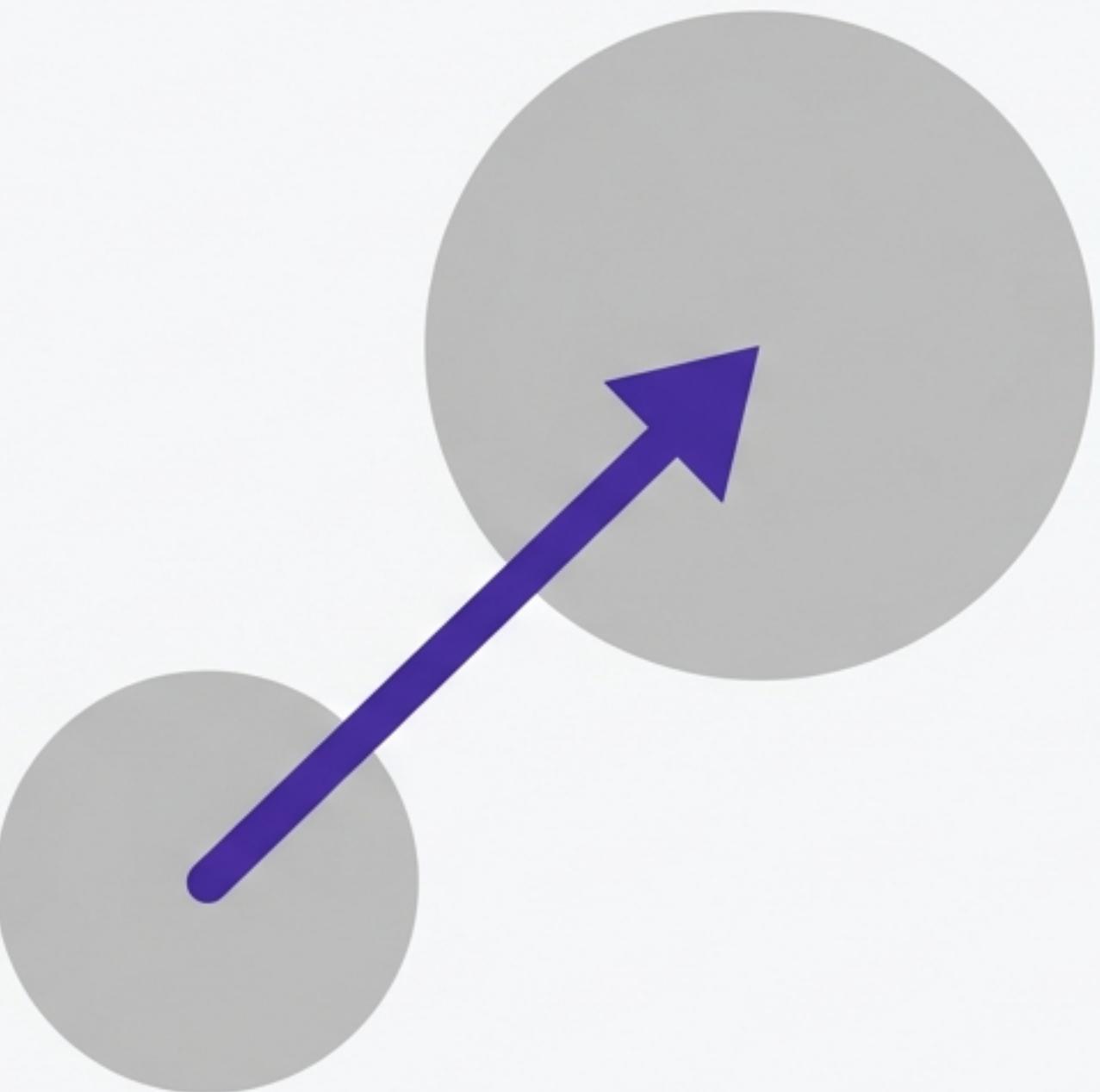


Gravity

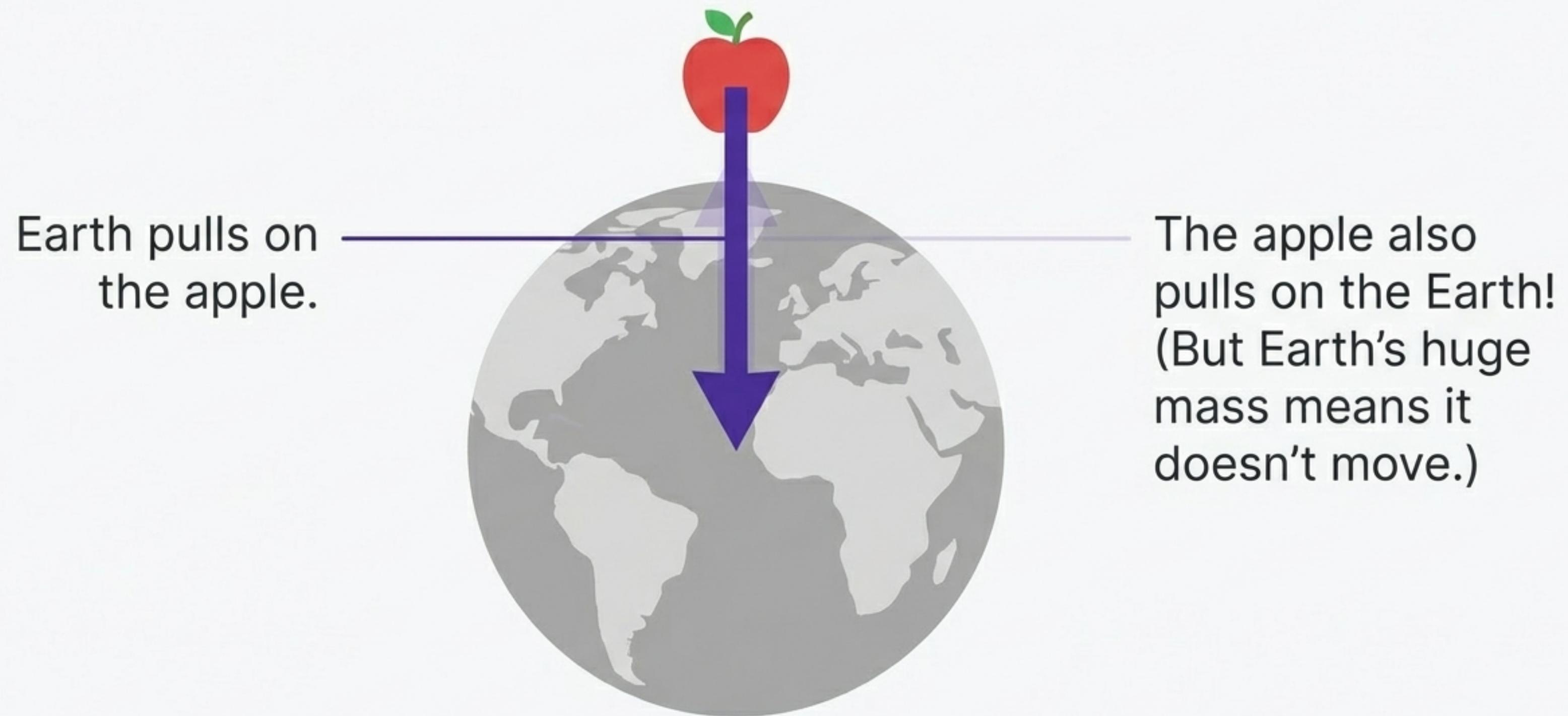
Definition:

The fundamental force of attraction between any two objects with mass.

- The more mass an object has, the stronger its gravitational pull.
- The farther apart the objects are, the weaker the pull.

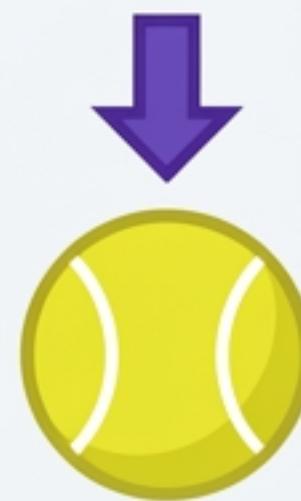


Earth's Gravitational Field



Quick Check

In a vacuum (no air resistance), which object hits the ground first when dropped from the same height?

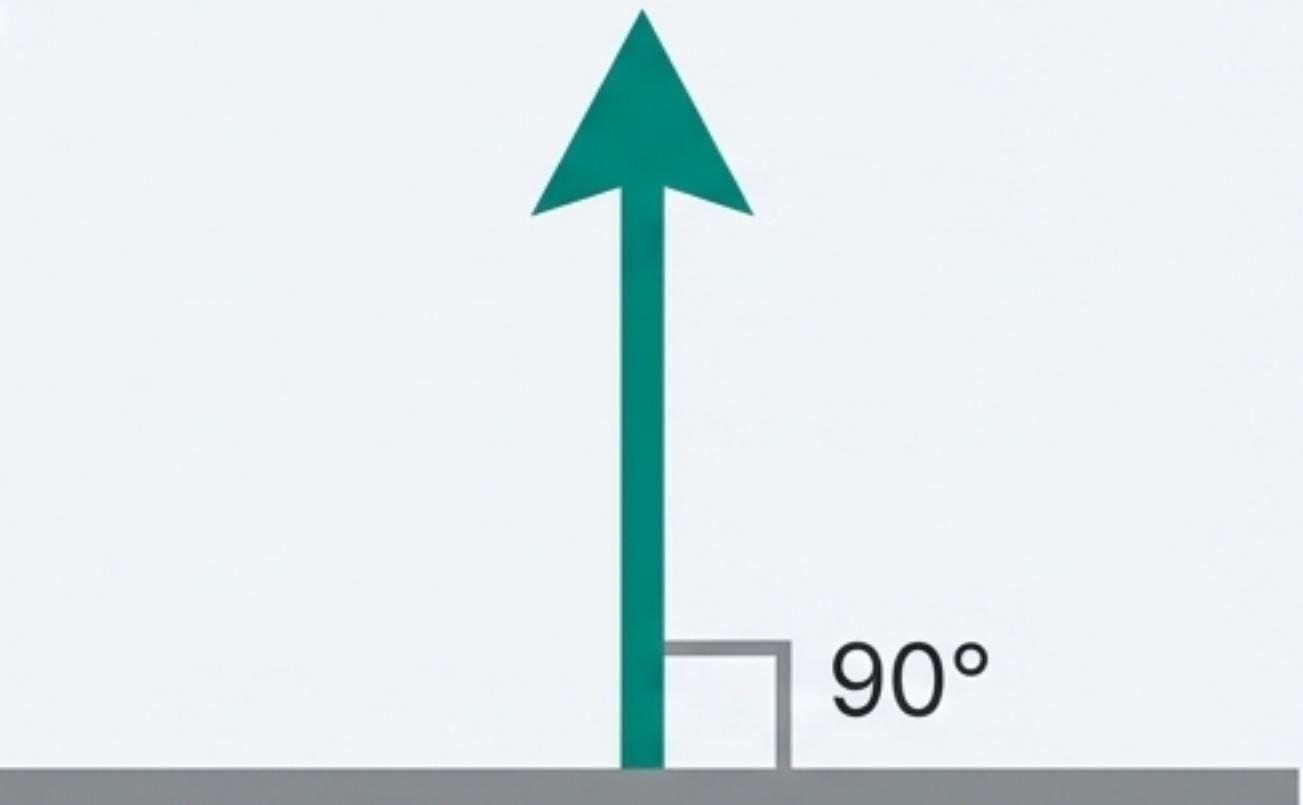


- (A) The heavier bowling ball
- (B) The lighter tennis ball
- (C) They hit at the same time**

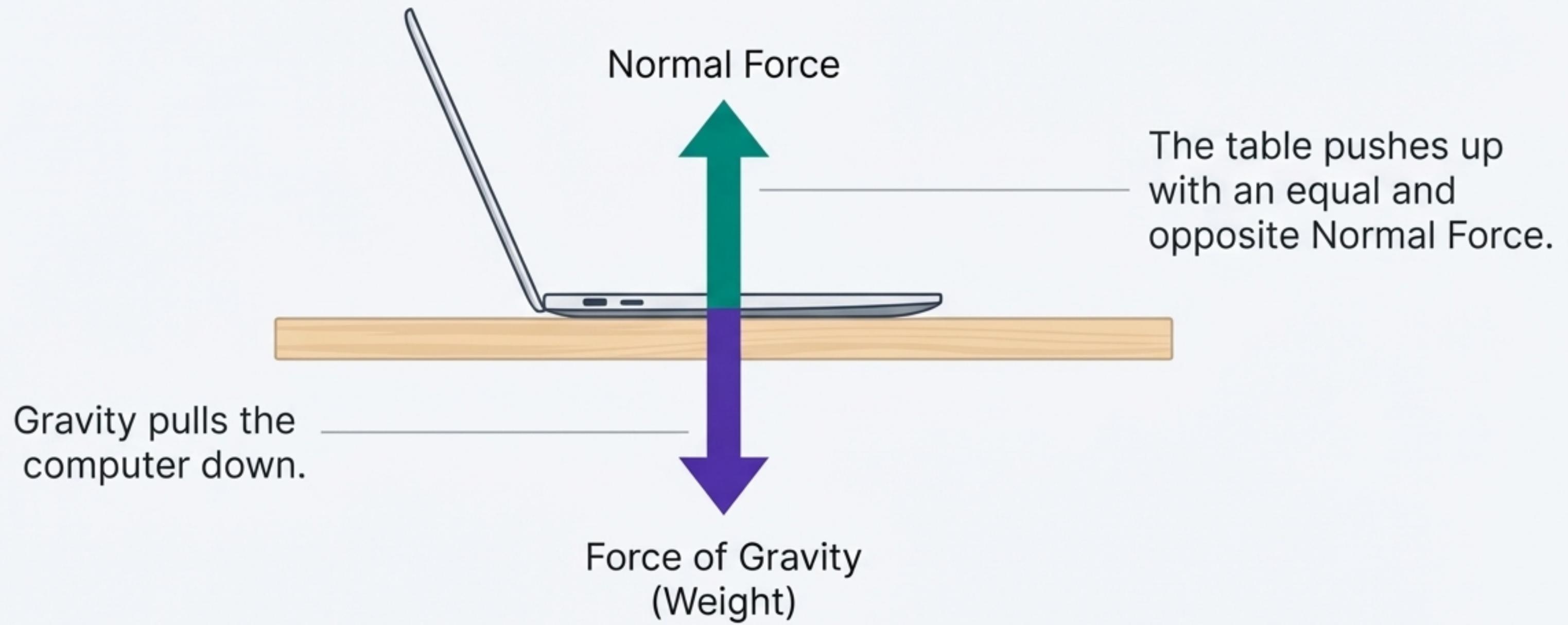
The Normal Force

Definition: The support force exerted by a surface to prevent an object from falling through it.

Key Idea: “Normal” in physics means “perpendicular.” This force always acts at a 90° angle to the surface. It’s the reason a book stays on a table.



Gravity vs. Normal Force



Conclusion: The forces are balanced, so the object does not move.

Quick Check

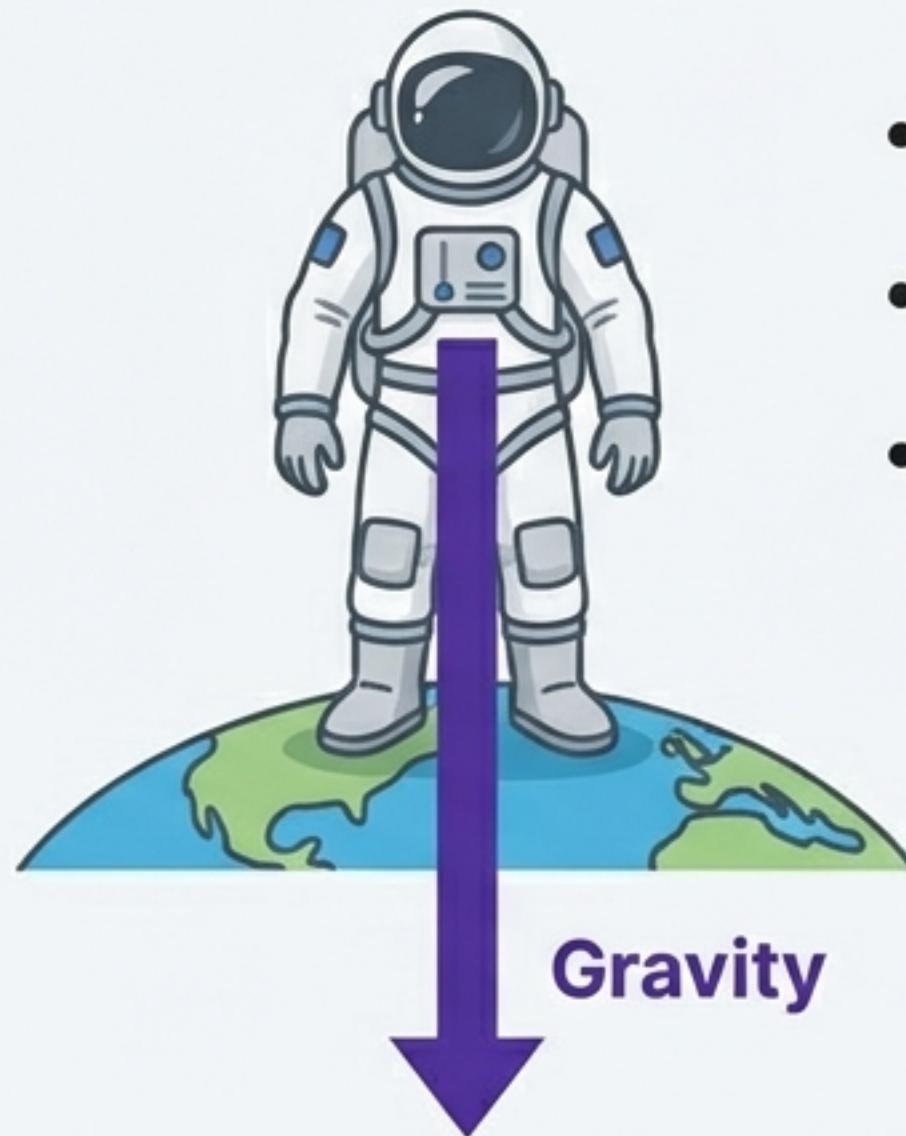
An astronaut stands on the Moon, where gravity is weaker. How does the Normal Force from the ground on her boots compare to the Normal Force on Earth?



- (A) It is greater on the Moon.
- (B) It is less on the Moon.**
- (C) It is the same.

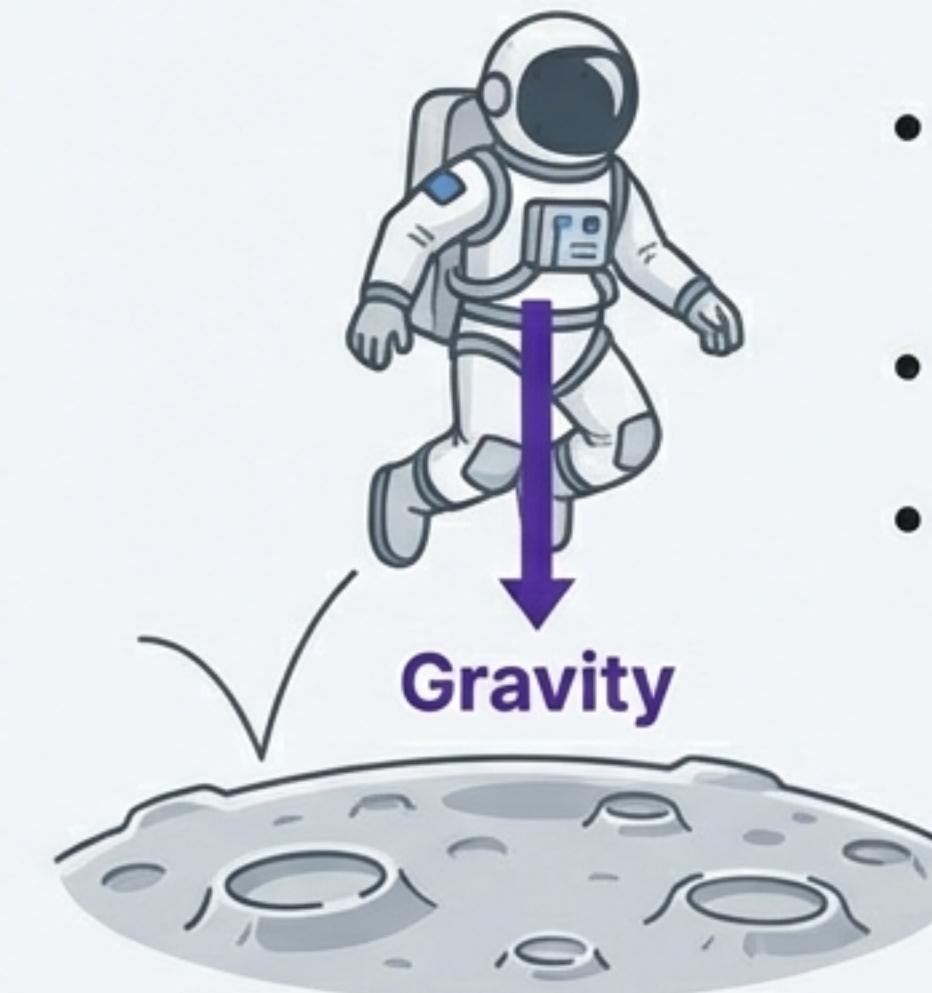
A Tale of Two Worlds

Earth



- Stronger Gravity
- Heavier Weight
- Faster Fall

The Moon

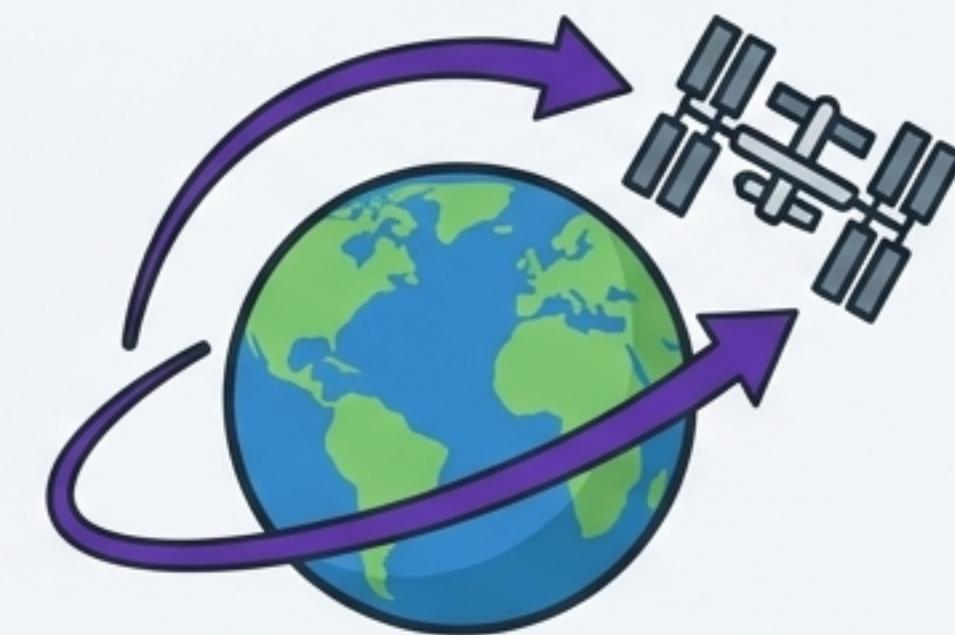


- Weaker Gravity (~1/6th of Earth's)
- Lighter Weight
- Slower Fall (The "bouncing" effect)

Busting Physics Myths

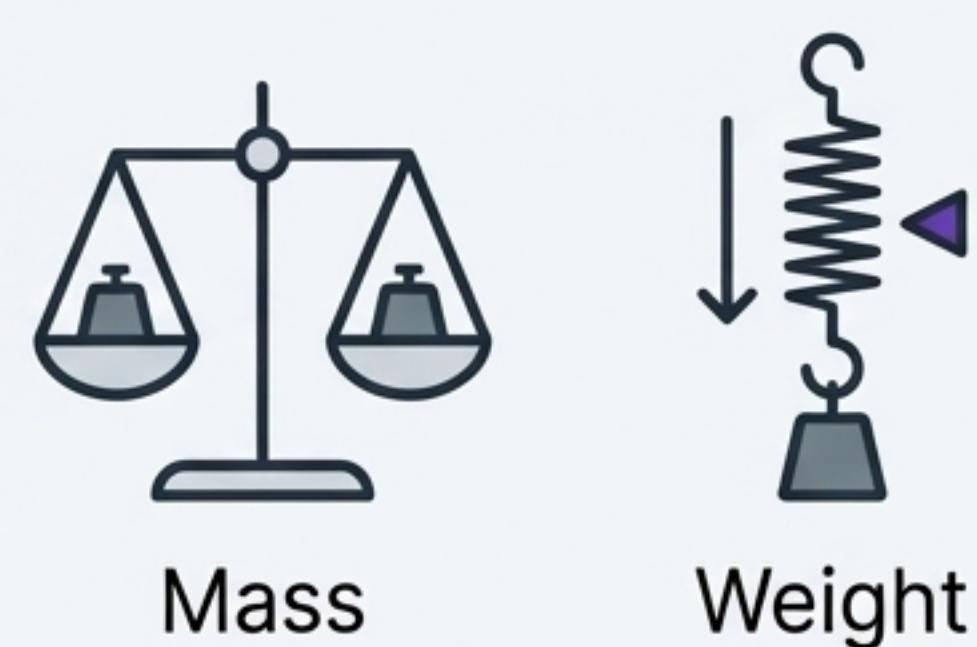
MYTH: “There is zero gravity in space.”

FACT: Gravity is everywhere. Astronauts feel “weightless” because they are in a constant state of free-fall, orbiting the Earth at high speed.



MYTH: “Mass and Weight are the same thing.”

FACT: Mass is the amount of “stuff” in an object (it never changes). Weight is the force of gravity on that mass (it changes depending on where you are!).

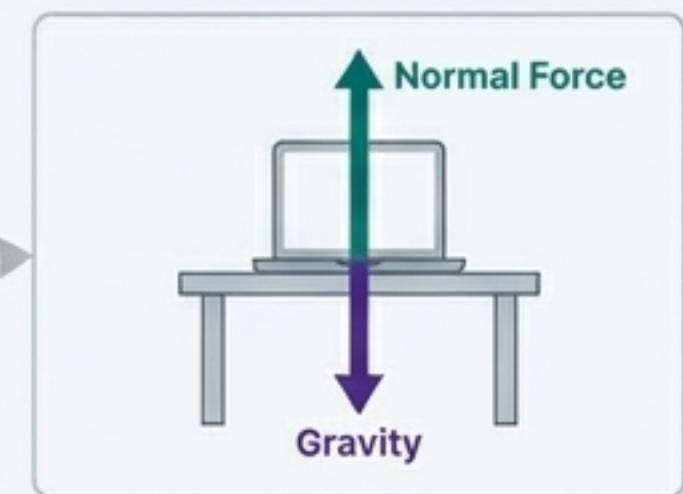


Connecting the Concepts

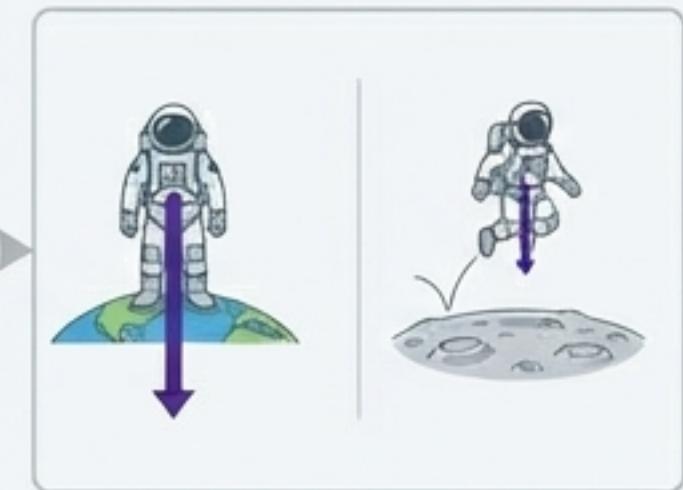
How these slides and visuals help you master the textbook chapter.



Making Forces Visible: The textbook describes forces. Diagrams like the "Gravity vs. Normal Force" slide show them, making abstract concepts concrete and easier to analyze.



Testing Understanding: Examples like the "Earth vs. Moon" comparison take the book's principles and apply them to new situations, proving you understand the 'why', not just the 'what'.



Next Concepts to Explore

The following key ideas from this unit will be produced as short video clips:



- Mass vs. Weight: A Deeper Dive



- Friction: The Force of Resistance



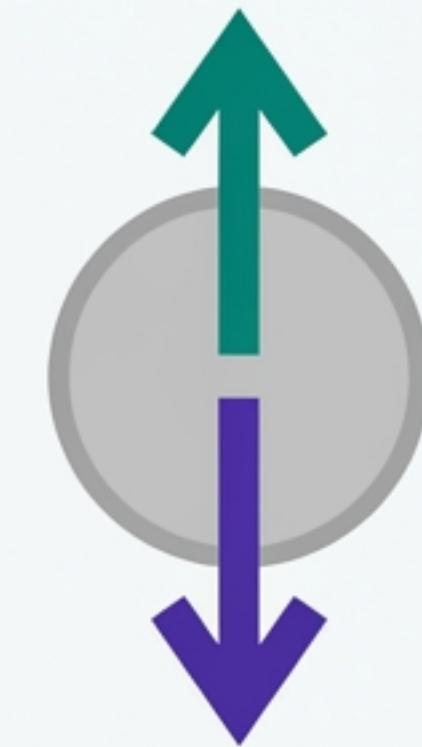
- Understanding Air Resistance & Terminal Velocity



- Introduction to Newton's First Law (Inertia)

Unit 3: Forces in Action

You have completed the introduction to Gravity & Support Forces.



Proceed to the next section in your textbook.