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Warm-Up | Gravity and Motion

Lesson Question

Lesson Goals

Learn about _____.

Identify factors that influence the force of gravity between objects.

Explain how Earth and the moon stay in orbit.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

force	a push or a pull that can change the _____, shape, or other features of an existing system or body
gravity	a force that pulls an object toward the _____ of any object that has mass
inertia	the tendency of an object to _____ change in motion
mass	the amount of _____ in an object

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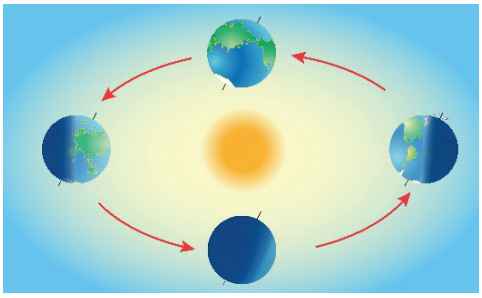
Words to Know

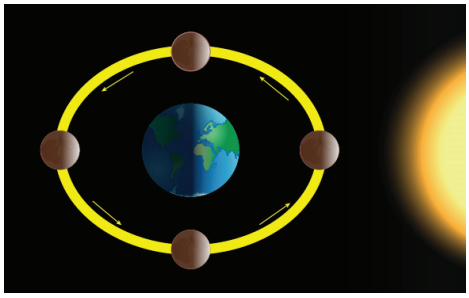
Newton's first law of motion	a law that states that an object at rest will stay at rest and that an object in motion will stay in motion until it is acted upon by an _____ force
Newton's law of universal gravitation	a law that states that every object in the universe _____ every other object
weight	the force of gravity _____ on an object

The Orbits of Earth and Its Moon

Earth revolves around the Sun, and the moon orbits Earth.



Earth's orbit around the _____ takes 365.25 days.



The _____ travels around Earth in 27.3 days.

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Sir Isaac Newton (1643–1727)

- Was a famed _____, astronomer, and physicist
- Was one of the most influential _____ in human history
- Developed laws of motion and helped develop a new type of math, _____
- Created the first reflecting _____ in 1668
- Concluded that _____ is a **force** that acts between Earth and the moon

Newton's Law of Universal Gravitation

Gravity is the force that governs _____ in the solar system.

- It is the force that creates stars and _____.
- It is the force that pulls an object toward the _____ of Earth.
- **Newton's law of universal gravitation** states that every object in the universe attracts every other object.
- Gravity is measured in newtons.

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Gravity and Mass

Mass affects the force of [ ].

- Mass is the amount of [ ] in an object.
  - The mass of an object does not change based on location.
- Objects with more mass have more gravity.
  - Earth has [ ] gravity than the moon.

Gravity and Weight

Weight is dependent on [ ] and gravity.

- Weight is the force of gravity [ ] on an object.
- An object's weight depends on its [ ] in the universe.
  - An object would weigh [ ] on the moon than on Earth.

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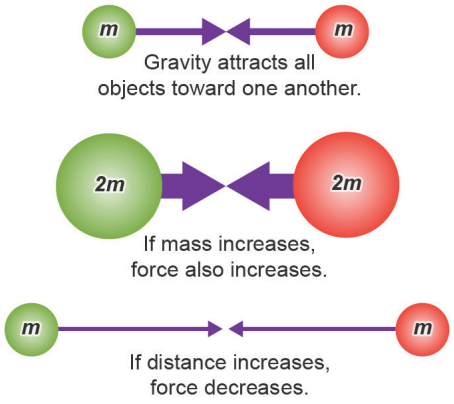
Slide 4

Mass, Distance, and Gravity

Mass and distance affect gravity.

- The strength of gravity between two masses _____ when mass increases.
- The strength of gravity between two masses _____ as distance between them increases.



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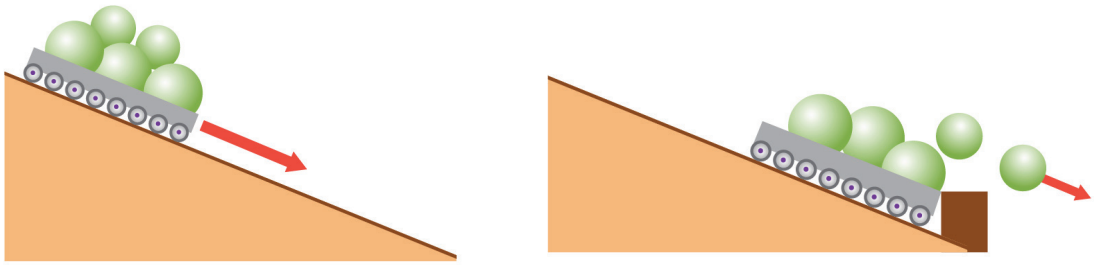
Inertia

Inertia is the tendency of an object to _____ change in motion.



Newton's law of universal gravitation states that every object in the universe _____ every other object. Earth attracts the moon, and the moon attracts Earth, which causes the _____. Similarly, the _____ and Earth are constantly pulling on each other, but Earth is not pulled into the Sun. This is due to inertia.

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Newton's First Law of Motion

Newton's first law of motion states that an object at rest will stay at rest and that an object in motion will stay in motion.

- This law is also known as the law of _____.
- It explains that objects in motion will have a constant _____ and direction until they are acted upon by a force.
- Objects with more _____ have more inertia.

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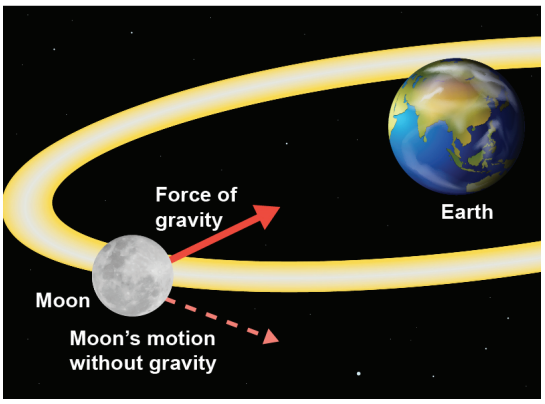
Effects of Gravity and Inertia on Orbital Motion

Both gravity and inertia keep the moon in orbit around _____.

- The moon's inertia prevents Earth's gravity from _____ the moon into Earth.
- Earth's gravity prevents the moon from going off in a _____ line.



The Sun's gravity combines with Earth's inertia to keep Earth in orbit.

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Summary | Gravity and Motion

Lesson Question

How does the force of gravity affect objects in the universe?

Answer

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Review: Key Concepts

Newton's law of universal gravitation: Objects with greater mass have greater pull on other objects.

- Every object in the universe attracts every other object.
- Objects with greater mass have greater [ ] on other objects.
- This pull is called [ ].

Newton's first law of motion states that:

- an object at rest will stay at rest.
- an object in motion will stay in motion with a constant speed and [ ] until it is acted on by a force.

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Slide 2

Review: Key Concepts

Mass and distance affect gravity.

Mass of object **increases.**	Strength of gravity **increases.**
Distance between two objects _____.	Strength of gravity **decreases.**

Review: Key Concepts

Gravity and inertia affect orbital motion.

_____	_____	_____
The pull of a larger body on a smaller body	The tendency of a body to keep moving in a straight line	Path taken by a body due to gravity pulling on it plus the forces of its own inertia

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Use this space to write any questions or thoughts about this lesson.

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