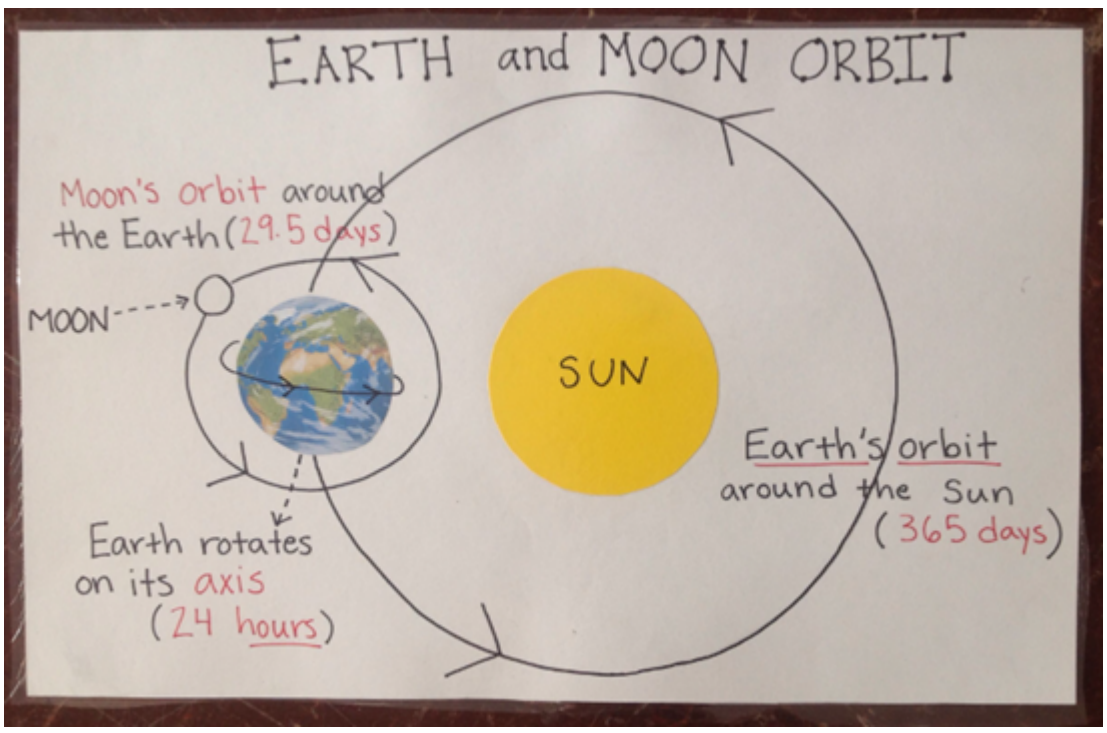
Form	BA - 1, Science, Grade 6, SY 24-25
Identifier	F-BO07WQ_C74908

Item	BA-1_Grade 6_1_Patterns of Lunar Phases, Eclipses, and Seasons in the Earth-Sun-Moon System
Identifier	I-SCI-F-S000026_C62836
Standards	SCI.6-8.MS-ESS1-1

Patterns of Lunar Phases, Eclipses, and Seasons in the Earth-Sun-Moon System

A student drew the following diagrammatic model of the Earth, Moon, and Sun System:



If the Earth's axis were tilted at 0° instead of approximately 23.5°, what impact would this have on seasonal variations on Earth?

A The Earth would experience more extreme seasonal variations.

B The Earth would have no seasons, with each region maintaining a constant climate year-round.

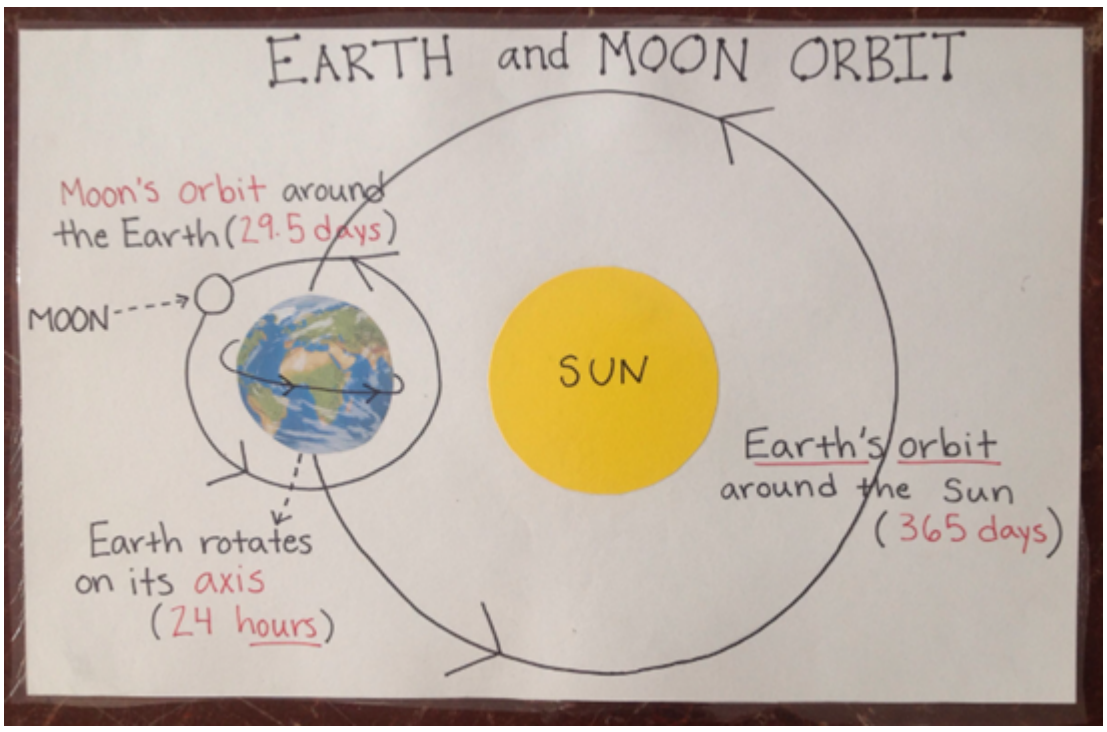
C The equator would experience more severe winters and summers.

D The seasons would be shorter but more intense.

Item	BA-1_Grade 6_2_Patterns of Lunar Phases, Eclipses, and Seasons in the Earth-Sun-Moon System
Identifier	I-SCI-F-S000026_C42561
Standards	SCI.6-8.MS-ESS1-1

Patterns of Lunar Phases, Eclipses, and Seasons in the Earth-Sun-Moon System

A student drew the following diagrammatic model of the Earth, Moon, and Sun System:



Which of the following describes the relationship between the Moon's phases and its position relative to the Earth and Sun?

A The phases of the Moon are caused by the Earth's shadow falling on different parts of the Moon.

B The phases of the Moon result from the Moon rotating on its axis as it orbits the Earth.

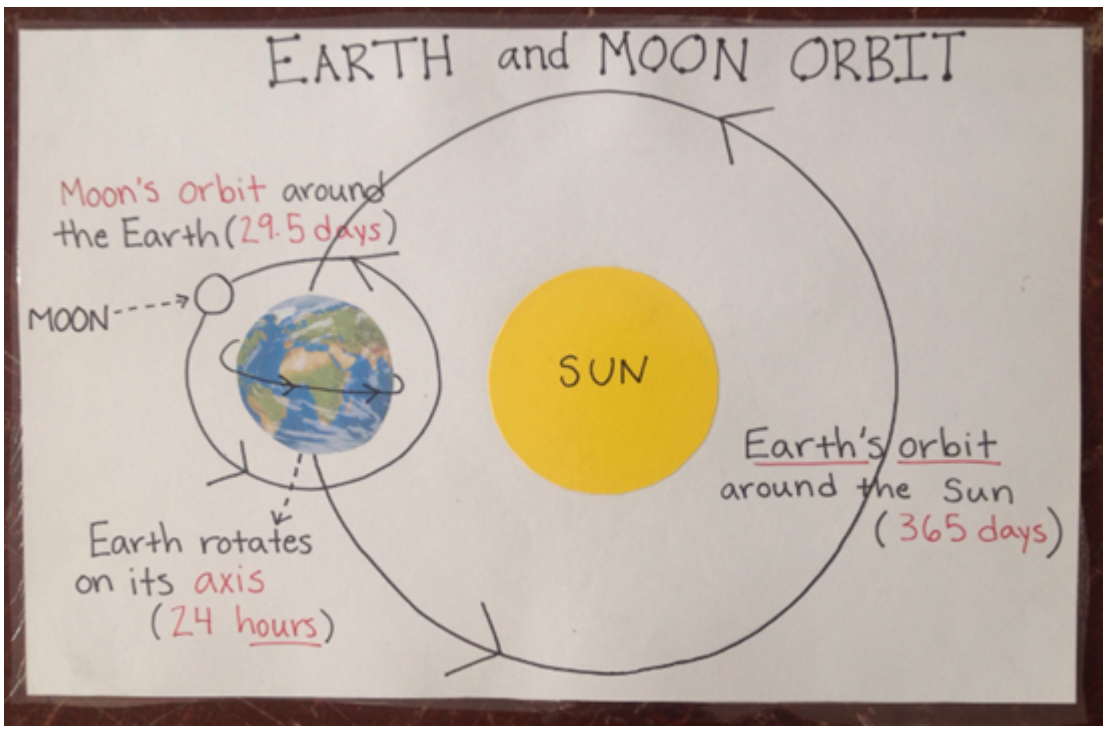
C The Moon's phases are caused by varying angles of sunlight striking the Moon's surface as it orbits Earth.

D The Moon's phases are determined by its distance from the Earth, with closer positions causing full moons.

Item	BA-1_Grade 6_3_Patterns of Lunar Phases, Eclipses, and Seasons in the Earth-Sun-Moon System
Identifier	I-SCI-F-S000026_C87555
Standards	SCI.6-8.MS-ESS1-1

Patterns of Lunar Phases, Eclipses, and Seasons in the Earth-Sun-Moon System

A student drew the following diagrammatic model of the Earth, Moon, and Sun System:



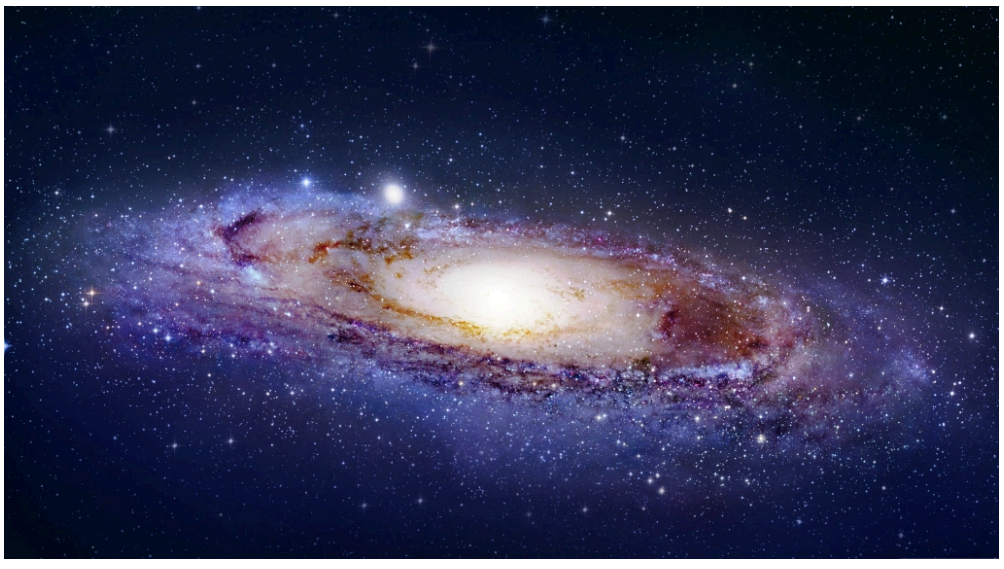
During a solar eclipse, an observer on Earth sees the Moon completely cover the Sun. Which of the following statements best explains why a solar eclipse can only occur during a new moon?

- A. The Moon is closest to the Earth during a new moon, making it large enough to cover the Sun.
- B. The Sun's rays are strongest during a new moon, making the eclipse more visible.
- C. The Earth's shadow falls on the Moon during a new moon, causing the eclipse.
- D. The Moon is between the Earth and the Sun during a new moon, allowing it to cast a shadow on Earth.

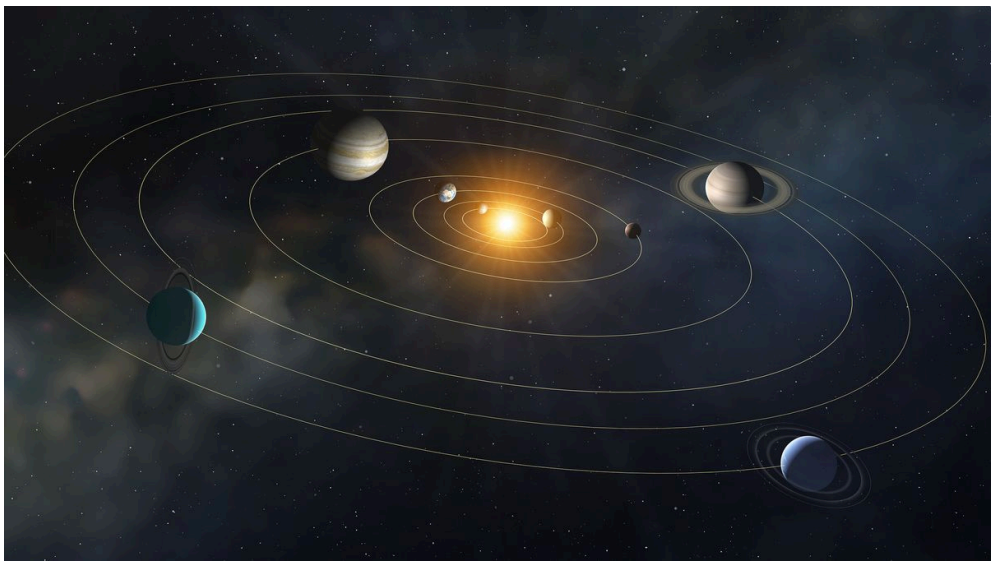
Item	BA-1_Grade 6_4_Gravity's Role in the Motions within Galaxies and the Solar System
Identifier	I-SCI-F-S000026_C95757
Standards	SCI.6-8.MS-ESS1-2

Gravity's Role in the Motions within Galaxies and the Solar System

Recent observations and studies have shown how important gravity is for the movement of objects in galaxies and our solar system. In galaxies like the Milky Way, gravity keeps stars, gas, and dust orbiting around the center. The strong pull from the central black hole and the combined mass of all the stars helps keep everything moving in stable paths.



In our solar system, gravity controls the movement of planets around the Sun. The Sun's gravity keeps planets like Earth, Mars, and Jupiter in their orbits. The planets also affect each other with their gravity, changing their positions and speeds as they move around the Sun. For example, Jupiter's gravity affects the asteroid belt between Mars and Jupiter, shaping where the asteroids are located.



Understanding how gravity works in these systems is important for making accurate models to describe and predict the movement of stars, planets, and other objects in space.

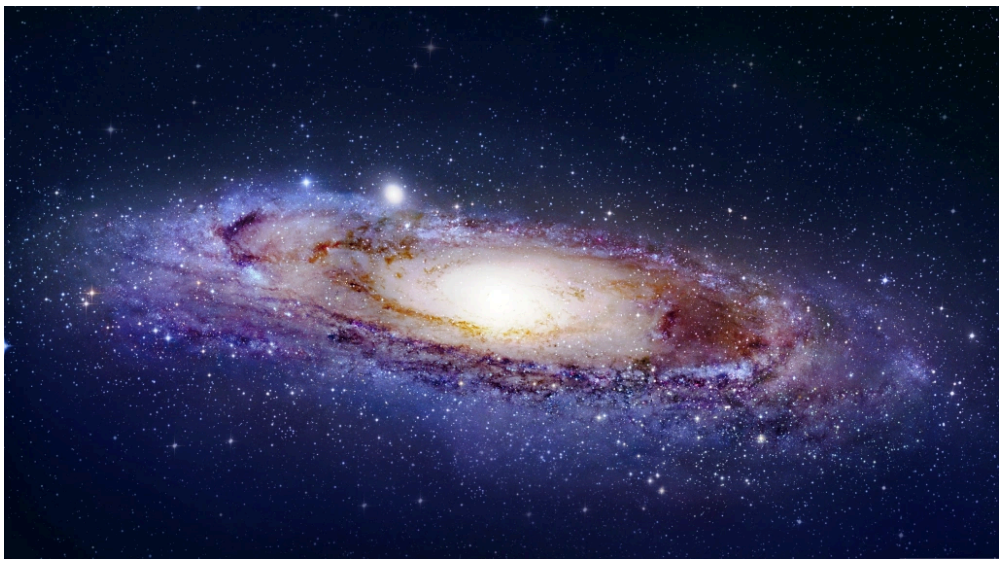
A student creates a model of the solar system using a basketball to represent the Sun and various smaller balls to represent the planets. If the basketball is placed at one end of a football field and Earth is represented by a marble placed 50 yards away, which of the following statements best describes the effect of gravity on Earth's orbit in this model?

- A. Gravity between the Sun and Earth is negligible because of the large distance in this model.
- B. Gravity is the force that keeps the Earth in its elliptical orbit around the Sun, even at this distance.
- C. Gravity only affects the planets closer to the Sun, such as Mercury and Venus.
- D. Gravity pulls the Earth directly towards the Sun, causing it to spiral inward.

Item	BA-1_Grade 6_5_Gravity's Role in the Motions within Galaxies and the Solar System
Identifier	I-SCI-F-S000026_C50792
Standards	SCI.6-8.MS-ESS1-2

Gravity's Role in the Motions within Galaxies and the Solar System

Recent observations and studies have shown how important gravity is for the movement of objects in galaxies and our solar system. In galaxies like the Milky Way, gravity keeps stars, gas, and dust orbiting around the center. The strong pull from the central black hole and the combined mass of all the stars helps keep everything moving in stable paths.



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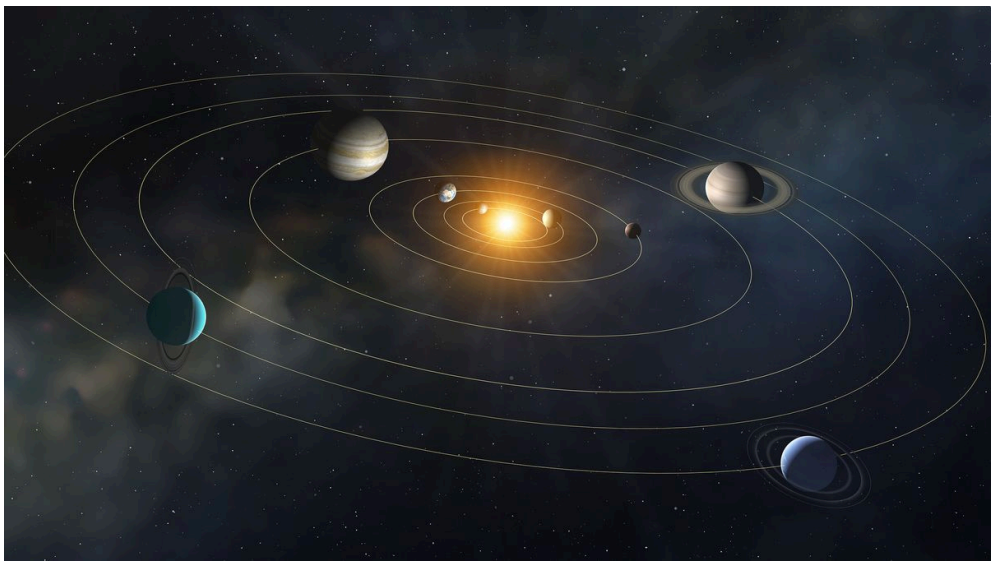


Understanding how gravity works in these systems is important for making accurate models to describe and predict the movement of stars, planets, and other objects in space.

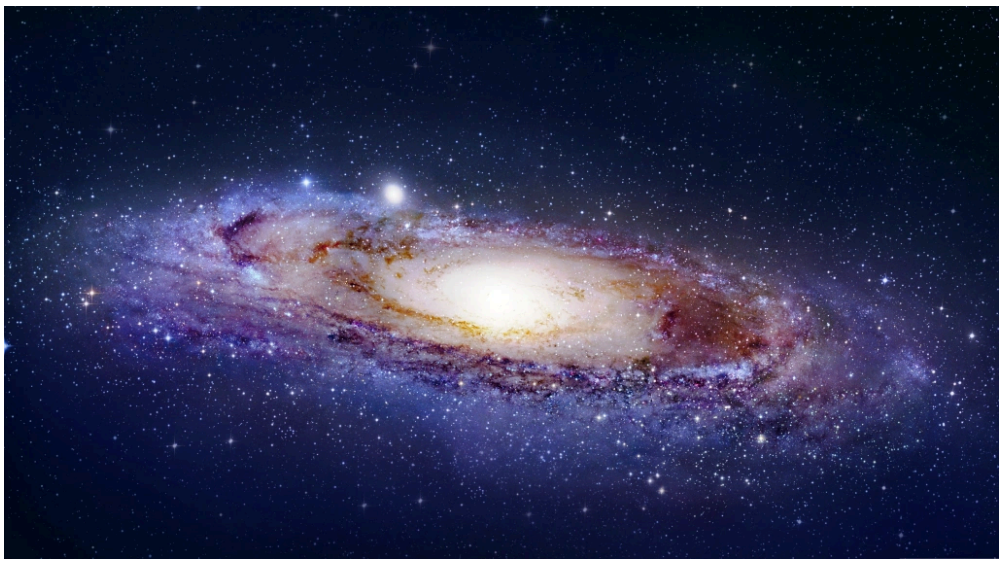
A group of students is analyzing data from a computer simulation of a solar system where the mass of the central star is doubled. They observe that the orbital period (the amount of time a planet takes to complete one orbit around the central star) of each planet changes. Which of the following best describes how the orbital period would change for a planet that originally had a stable orbit?

- A. The planet’s orbital period would decrease because the increased gravitational pull would speed up its orbit.
- B. The planet’s orbital period would remain the same because the gravitational force is uniform throughout the solar system.
- C. The planet’s orbital period would decrease because it would need to travel a greater distance to complete an orbit.
- D. The planet’s orbital period would increase because the stronger gravity pulls it closer, increasing its speed.

Item	BA-1_Grade 6_6_Gravity's Role in the Motions within Galaxies and the Solar System
Identifier	I-SCI-F-S000026_C46471
Standards	SCI.6-8.MS-ESS1-2

Gravity's Role in the Motions within Galaxies and the Solar System

Recent observations and studies have shown how important gravity is for the movement of objects in galaxies and our solar system. In galaxies like the Milky Way, gravity keeps stars, gas, and dust orbiting around the center. The strong pull from the central black hole and the combined mass of all the stars helps keep everything moving in stable paths.



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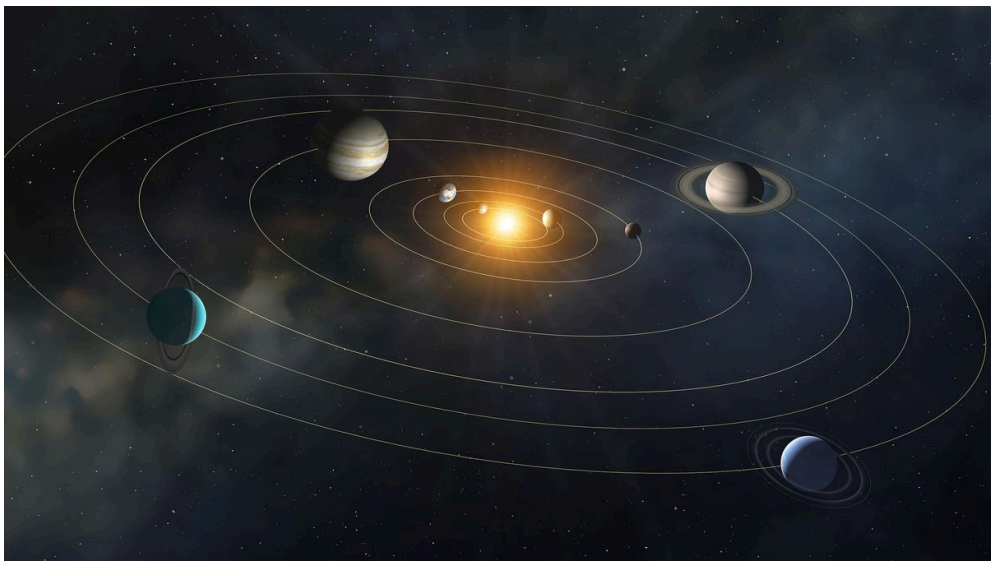


Understanding how gravity works in these systems is important for making accurate models to describe and predict the movement of stars, planets, and other objects in space.

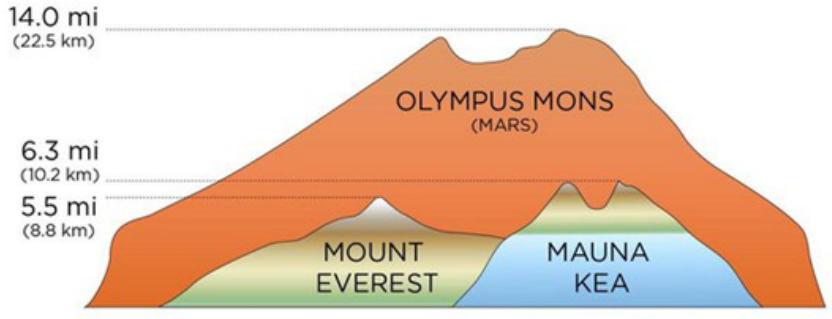
Imagine a simulation that shows the orbits of stars within a galaxy. If the mass of the galaxy's central black hole suddenly increased, how would the orbits of stars near the center of the galaxy likely change?

- A The stars would move away from the center as the gravitational pull weakens.
- B The stars would be ejected out of the galaxy due to the increased gravitational force.
- C The stars would move into closer, faster orbits around the center.
- D The stars' orbits would become more elliptical but remain at the same average distance.

Item	BA-1_Grade 6_7_Data Interpretation of Scale Properties in the Universe
Identifier	I-SCI-F-S000026_C97477
Standards	SCI.6-8.MS-ESS1-3

Data Interpretation of Scale Properties in the Universe

A group of students is analyzing images of surface features on Mars and Earth, including volcanoes and canyons. They notice that Olympus Mons on Mars is much larger than any volcano on Earth.



Which of the following conclusions can they most accurately draw based on this comparison?

- A The weaker gravity on Mars allows for the formation of much larger surface features.
- B Mars has more volcanic activity than Earth, leading to larger volcanoes.
- C The lack of atmosphere on Mars leads to the formation of larger volcanic structures.
- D Earth’s surface features are smaller because it has a thicker crust than Mars.

Item	BA-1_Grade 6_8_Data Interpretation of Scale Properties in the Universe
Identifier	I-SCI-F-S000026_C80448
Standards	SCI.6-8.MS-ESS1-3

Data Interpretation of Scale Properties in the Universe

A class is studying the surface features of moons in the solar system and compares the sizes of craters on Earth’s Moon and Jupiter’s moon Ganymede.

If data shows that Ganymede’s craters are generally larger, what can the students most likely infer about the impact events on Ganymede?

A Ganymede experienced more frequent impacts than Earth's Moon.

B The objects impacting Ganymede were likely larger or moving faster than those impacting Earth's Moon.

C Ganymede's surface is younger, allowing for larger craters to form.

D The craters on Earth's Moon have eroded over time, making them appear smaller.

Item	BA-1_Grade 6_9_Data Interpretation of Scale Properties in the Universe
Identifier	I-SCI-F-S000026_C56523
Standards	SCI.6-8.MS-ESS1-3

Data Interpretation of Scale Properties in the Universe

Students are provided with data showing the diameters and surface gravity of the planets in our solar system.

	MERCURY	VENUS	EARTH	MARS	JUPITER	SATURN	URANUS	NEPTUNE
Diameter (km)	4,879	12,104	12,756	6792	142,984	120,536	51,118	49,528
Gravity (m/s^2)	3.7	8.9	9.8	3.7	23.1	9.0	8.7	11.0

Which of the following analyses could **BEST** help them understand the relationship between a planet's size and its gravitational pull on the planet surface?

A Calculating the ratio of each planet's diameter to its surface gravity.

B Comparing the orbital speed of each planet with its diameter.

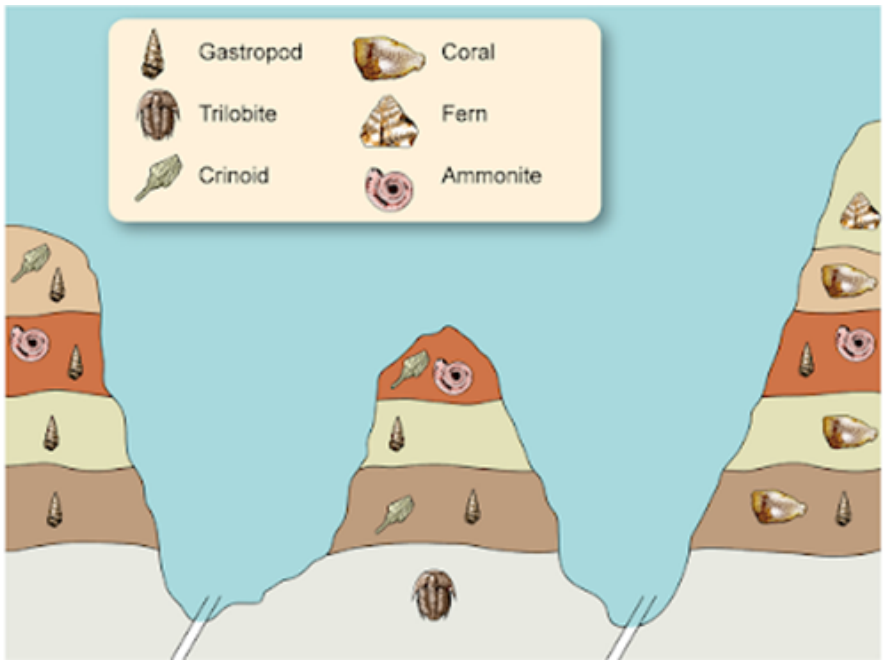
C Ranking the planets by diameter and surface gravity to find patterns.

D Plotting a graph of planet diameters against their surface gravity to see if there is a correlation.

Item	BA-1_Grade 6_10_Analyzing Rock Strata to Understand Earth's History
Identifier	I-SCI-F-S000026_C64173
Standards	SCI.6-8.MS-ESS1-4

Analyzing Rock Strata to Understand Earth's History

A student examines rock strata containing fossils of trilobites and ammonites.



Given that trilobites existed before ammonites, which of the following scientific explanations correctly describes the relative age of these rock layers?

- A. The rock layer with trilobite fossils is younger than the layer with ammonite fossils because trilobites evolved later.
- B. The rock layer with trilobite fossils is older than the layer with ammonite fossils because trilobites appeared earlier in Earth's history.
- C. The presence of trilobite fossils indicates a major volcanic eruption that created the rock layer after the ammonites appeared.
- D. Both rock layers are the same age because the fossils were deposited at different times.

Item	BA-1_Grade 6_11_Analyzing Rock Strata to Understand Earth's History
Identifier	I-SCI-F-S000026_C39503
Standards	SCI.6-8.MS-ESS1-4

Analyzing Rock Strata to Understand Earth's History

While studying a cross-section of rock strata, students discover that a layer containing marine (salt water) fossils is covered by a layer containing terrestrial (dry land) plant fossils.

What scientific explanation can they construct to describe the environmental change that occurred?

- A — A volcanic eruption caused the ocean to retreat, allowing plants to grow in the area.
- B — An earthquake uplifted the marine fossils above sea level, creating a new terrestrial environment
- C — A meteor impact caused the extinction of marine life, and the area was later colonized by plants.
- D — A drop in sea level likely exposed the area, transforming it from a marine environment to a terrestrial one.

Item	BA-1_Grade 6_12_Analyzing Rock Strata to Understand Earth's History
Identifier	I-SCI-F-S000026_C71689
Standards	SCI.6-8.MS-ESS1-4

Analyzing Rock Strata to Understand Earth's History

Students analyze rock strata (layers) containing fossils of early mammals and dinosaurs. The strata with dinosaur fossils lie below those containing early mammals.

Which of the following scientific explanations best describes the relative timing of the evolution of these organisms?

- A Dinosaurs evolved after early mammals because their fossils are found in the lower strata.
- B The presence of both types of fossils in different layers indicates that they coexisted for a time.
- C Early mammals evolved after dinosaurs because their fossils are found in higher strata, indicating that dinosaurs existed first.
- D The fossil record is unreliable, so no conclusions about the timing of evolution can be made.

Item	BA-1_Grade 6_13_Fossil Distribution Evidence of Plate Tectonics
Identifier	I-SCI-F-S000026_C74018
Standards	SCI.6-8.MS-ESS2-3

Fossil Distribution Evidence of Plate Tectonics

According to the theory of plate tectonics, the movement of Earth's lithosphere (which includes the crust and the uppermost part of the upper mantle) is responsible for the distribution of fossils and rocks we find today. Fossils of the same species have been discovered on continents that are now separated by oceans, providing evidence of past plate motions. For example, the fossilized remains of the Mesosaurus, an extinct freshwater reptile, have been found in both South America and Africa. This indicates that these continents fit together like puzzle pieces and later drifted apart.

What type of evidence can be used to analyze past plate motions?

- A Distribution of fossils and rocks
- B The number of years it took the Appalachian Mountains to erode
- C Examination of how many layers of sediment create a sedimentary rock formation
- D Each continent is a single tectonic plate therefore only the continents move.

Item	BA-1_Grade 6_14_Fossil Distribution Evidence of Plate Tectonics
Identifier	I-SCI-F-S000026_C66201
Standards	SCI.6-8.MS-ESS2-3

Fossil Distribution Evidence of Plate Tectonics

Which of the following provides evidence of past plate motions?

A Past episodes of rifting have divided families and has separated species from their food source.

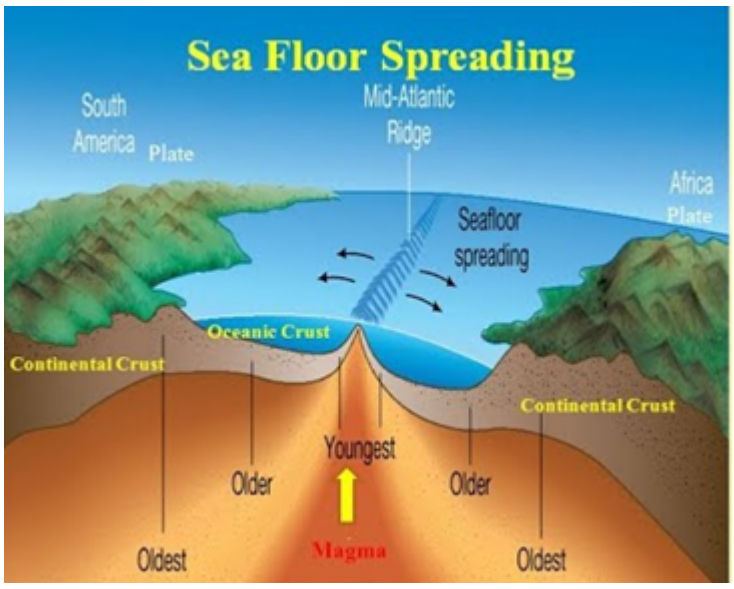
B That the mantle is liquid, and that it is always the direct source for volcano formation.

C Oceans create oceanic crust

D Analysis of continental shapes

Item	BA-1_Grade 6_15_Fossil Distribution Evidence of Plate Tectonics
Identifier	I-SCI-F-S000026_C44618
Standards	SCI.6-8.MS-ESS2-3

Fossil Distribution Evidence of Plate Tectonics



How does seafloor spreading contribute to the understanding of past plate motions?

- A By indicating the locations of ancient volcanoes
- B By providing clues about past climate conditions
- C By revealing the direction and speed of plate movements
- D By showing the locations of underwater caves