

Directions: Read each question carefully. Use your knowledge of Science to answer each question choice.

1. Part A

Observers from Earth see different phases of the Moon over time as the Moon orbits around the Earth.

Write the phases of the moon in the correct box to complete the model showing how the phases of the Moon look from Earth.

Phases:

Phase W



Phase X



Phase Y

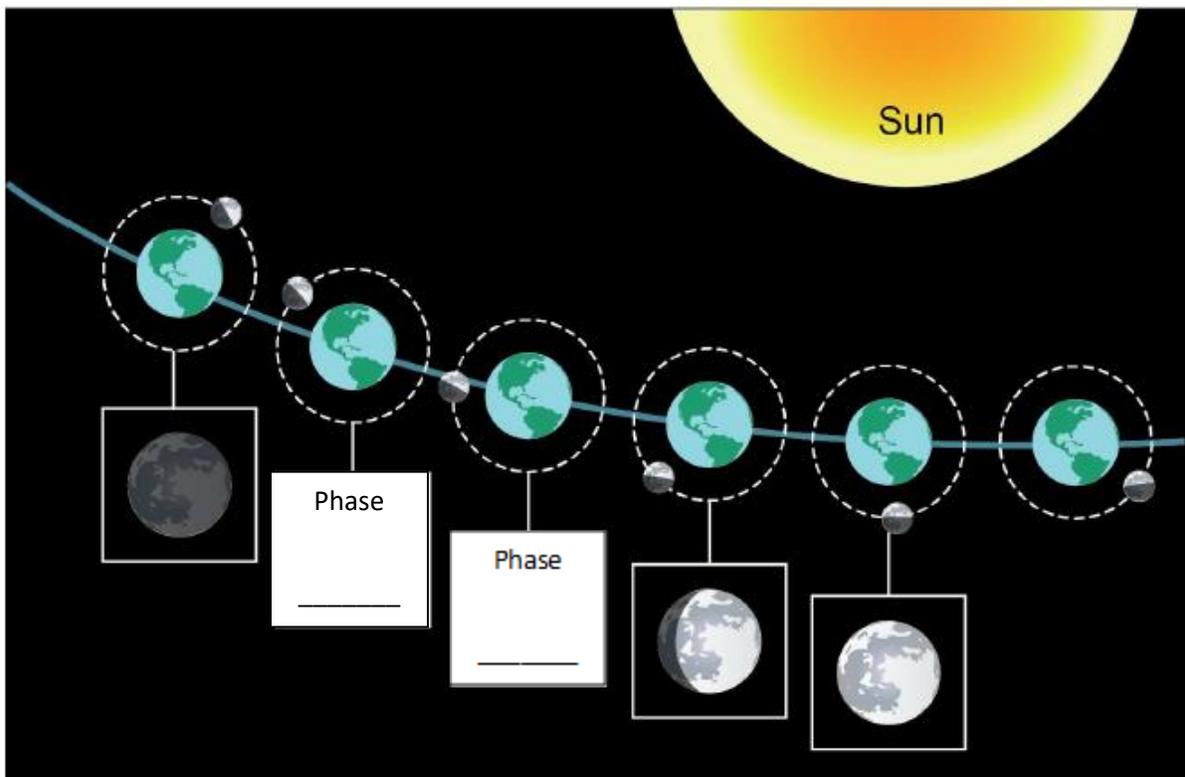


Phase Z



Moon Phases as Seen from Earth

Moon Phases as Seen from Earth



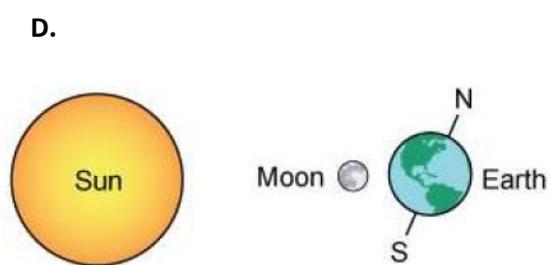
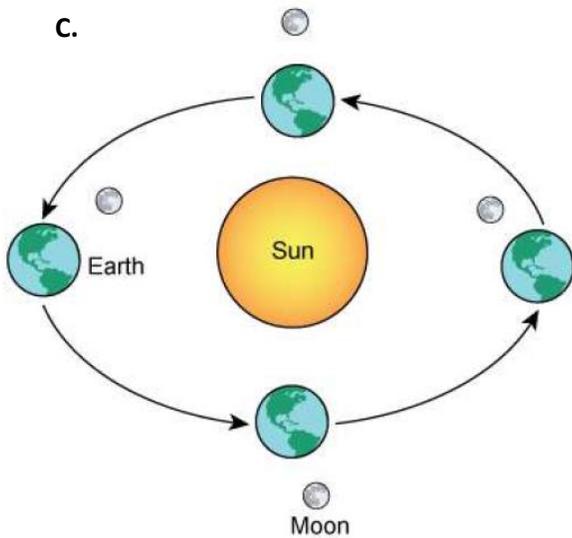
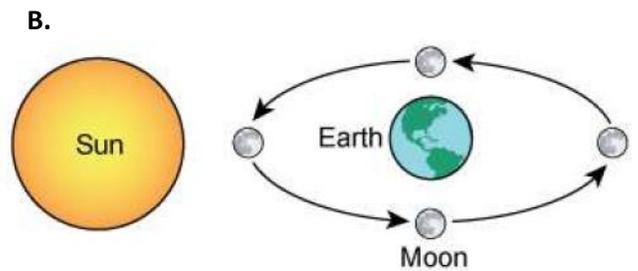
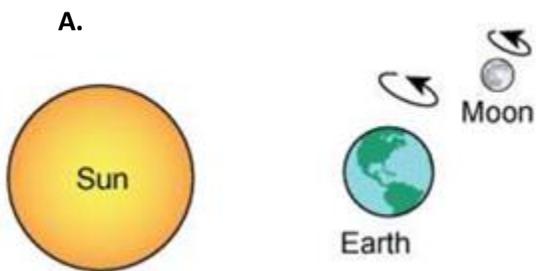
Note: Not to scale

1. Part B

Based on the information in the Moon Phase model, which statement best predicts how the phases of the Moon will look as the Moon continues its orbit around Earth in the model?

- A. The Moon will become brighter with no dark areas as the Moon moves closer to the Sun.
- B. The Moon will again appear completely dark and the dark area will decrease in size until the Moon is completely bright.
- C. A dark area will start to appear on the right side of the Moon and will slowly decrease in size until the Moon is completely dark.
- D. A dark area will start to appear on the left side of the Moon and will slowly increase in size until the Moon is completely dark.

2. Which model of the Sun, Earth, and Moon best supports why Earth has different seasons?

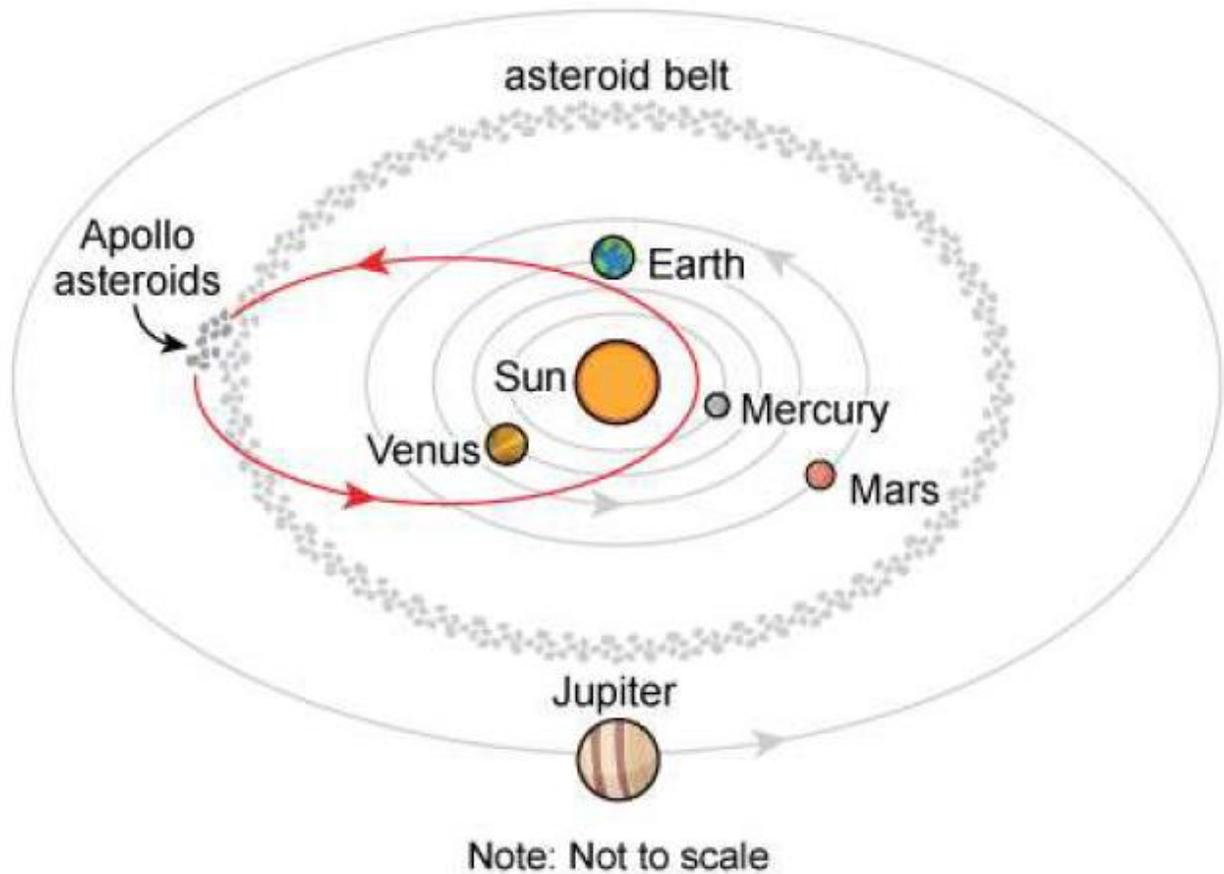


Use the information about asteroids in the solar system and your knowledge of science to answer the following questions.

Asteroids in the Solar System

Asteroids are rocky objects that orbit the Sun. They can be as small as a meter across or as big as a few hundred kilometers across. Most asteroids have orbits in the asteroid belt, a region located between Mars and Jupiter. Some asteroids, called Apollo asteroids, have orbits that actually cross Earth’s orbit. Figure 1 shows the orbits of some Apollo asteroids.

Figure 1. Apollo Asteroid Orbits



Scientists monitor Apollo asteroids to predict how close they will come to Earth. A collision of an Apollo asteroid with Earth is extremely unlikely. Nonetheless, the accuracy of these predictions is important because scientists need as much time as possible to plan for a potential asteroid collision. Predicting the exact path of an Apollo asteroid is difficult because nearby planets and other asteroids all have an effect on the asteroid.

Table 1 shows the masses of some of the largest objects in the solar system.

**Table 1. Solar System
Mass Data**

Object	Mass (x 10 ²⁴ kg)
Sun	1,988,500.00
Mercury	0.33
Venus	4.87
Earth	5.97
Mars	0.64
Jupiter	1,898.00

Source: NASA.

Scientists are also studying ways to change the path of an Apollo asteroid to avoid a collision with Earth. One method uses a spacecraft to gently push the asteroid. This can affect the orbital path of the asteroid. This spacecraft method must be used far in advance of a possible impact in order to be successful.

3. Which observation from Figure 1 can best be used as evidence to support the claim that the Sun has a gravitational pull on asteroids in the solar system?
- A. Most of the asteroids in the solar system are between Jupiter and the Sun.
 - B. All of the planets and asteroids in the solar system orbit around the Sun.
 - C. Apollo asteroids have orbits closer to the Sun than other asteroids in the solar system.
 - D. Only the planets with the largest masses in the solar system orbit around the Sun.

4. Based on Figure 1, circle the correct bolded answer in each bracket to complete the sentence.

As Apollo asteroids approach Earth, the [rotation; atmosphere; mass; shape] of Earth can affect the [shape; orbit; mass; gravity] of the asteroids.

5. Part A

Based on the evidence in Figure 1 and Table 1, which planet has the greatest effect on the orbit of most asteroids?

- A. Mercury
- B. Earth
- C. Mars
- D. Jupiter

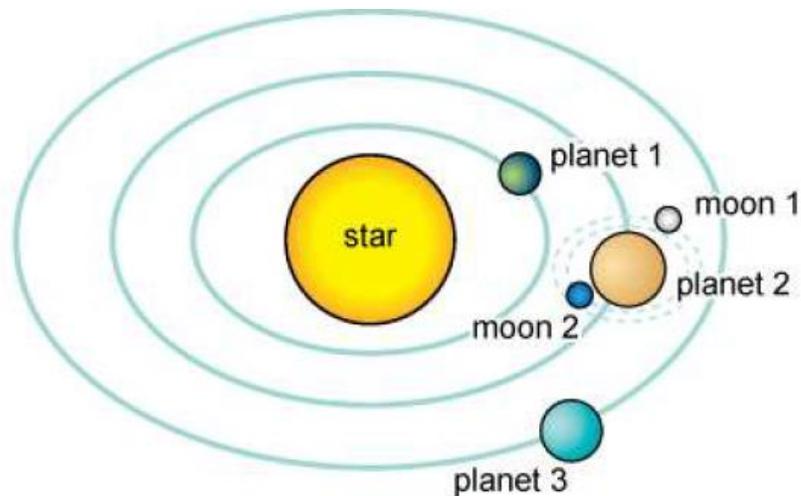
5. Part B

Which property of the planet identified in the answer to Part A has the greatest effect on an asteroid?

- A. the shape of the planet’s orbit
- B. the planet’s distance from the sun
- C. the mass of the planet
- D. the size of the planet’ orbit

6. Use the information and knowledge of science to answer the following question.

A scientist is designing a model for a system of planets outside the solar system. The model includes a star, three planets, and two moons, as shown in the figure.



Which property of the objects in the model has a larger effect on the motion of **moon 1**?

- A. the orbital paths of planet 1 and planet 3
- B. the rotational speed of moon 2
- C. the force of gravity from planet 2
- D. the force of gravity from planet 3