Name _____ Date _____

Gravity and the Solar System: Planet Distances, Orbit Times and Orbital Speeds from NASA

Directions: Read the passage and study the data table. In number questions, type only the number; the unit is shown next to the box.

The Planets and Gravity

Use the passage and the data table to answer these questions.

Gravity Holds the Solar System Together

Gravity is a pull between any two objects that have mass. The more mass the objects have, the stronger the pull, and the farther apart they are, the weaker it gets. The Sun holds about 99.8 percent of all the mass in the solar system, so its gravity is what keeps the eight planets moving in their orbits. Without that pull, each planet would move off in a straight line. Earth's gravity keeps the Moon in its orbit around Earth in the same way.

Gravity does not stop where the air ends. The International Space Station orbits about 400 kilometers above the ground, and gravity there is still about 90 percent as strong as it is on the ground. Astronauts float inside the station because they and the station are falling around Earth together. The station moves sideways so fast that as it falls, Earth's curved surface keeps dropping away beneath it.

Astronomers often measure distances in the solar system in astronomical units (AU). One AU is Earth's average distance from the Sun, about 150 million kilometers. Pluto was once called the ninth planet, but since 2006 astronomers have classified it as a dwarf planet, because it has not cleared other objects from the region around its orbit.

The eight planets. Source: NASA Planetary Fact Sheets (NASA Space Science Data Coordinated Archive), values as listed in 2026.

Planet	Average distance from the Sun (AU)	Time for one orbit (Earth years)	Average orbital speed (km/s)
Mercury	0.387	0.241	47.4
Venus	0.723	0.615	35.0
Earth	1	1	29.8
Mars	1.52	1.88	24.1
Jupiter	5.20	11.9	13.1
Saturn	9.57	29.4	9.7
Uranus	19.17	83.7	6.8
Neptune	30.18	163.7	5.4

1. What pattern does the table show as distance from the Sun increases?

A. Planets farther from the Sun take longer to orbit, even though they move faster.

B. Planets farther from the Sun move faster, so they finish their orbits sooner.

C. Planets farther from the Sun take longer to orbit and move more slowly along their orbits.

D. Every planet takes about the same time to orbit the Sun.

2. One AU is about 150 million kilometers. In this model, use exactly 150 million kilometers for 1 AU. Using the table, how far is Mars from the Sun, in millions of kilometers?

_____ million km

3. About how many times as long does Neptune take to orbit the Sun as Uranus? Divide Neptune's orbit time by Uranus's orbit time, then round to the nearest whole number.

_____ times

4. Neptune is farther from the Sun than Uranus, so its path around the Sun is longer. The table shows one more reason that Neptune takes longer to complete an orbit. What is that reason?

A. Neptune moves faster than Uranus, but it stops part of the way around.

B. The Sun's gravity is stronger at Neptune's distance, which holds Neptune back.

C. Neptune and Uranus move at the same speed, so only the path length matters.

D. Neptune moves more slowly along its orbit, because the Sun's gravity is weaker that far away.

5. Astronauts on the International Space Station float inside it. According to the passage, why?

A. The station is too high for Earth's gravity to reach it.

B. The air inside the station pushes them upward.

C. There is no gravity in space.

D. They and the station are falling around Earth together, even though gravity there is about 90 percent as strong as on the ground.

6. Imagine that the Sun's gravity suddenly stopped pulling on Earth, and ignore the pulls of the Moon and the other planets. According to the passage, what would Earth do?

A. Keep circling the Sun in the same orbit as before

B. Fall straight into the Sun

C. Move off in a straight line, in the direction it was moving at that moment

D. Stop moving and stay in one place

7. Which two statements about gravity are supported by the passage?

☐ A. The Sun pulls with the same strength on every planet, no matter how far away it is.

☐ B. Gravity stops at the top of Earth's atmosphere.

☐ C. Earth's gravity keeps the Moon in its orbit around Earth.

☐ D. The planets stay in orbit only because they are spinning.

☐ E. The Sun's gravity keeps the planets moving in their orbits.

8. Pluto does not appear in the table of planets. According to the passage, why?

A. Since 2006, astronomers have classified Pluto as a dwarf planet, because it has not cleared other objects from the region around its orbit.

B. Pluto broke apart in 2006, so it no longer exists.

C. Pluto is too far away for scientists to measure its orbit.

D. Pluto is a moon that orbits Neptune.