

# *Chapter 2: The Solar System*



Observing the Solar System

# *Guide For Reading*



- How do the heliocentric and geocentric description of the solar system differ?
- What did Kepler discover about the orbits of the planets?
- What two factors keep the planets in their orbits?

# *Wandering Stars*



*The Greeks called the five points of light that seemed to move among the stars \_\_\_\_\_, meaning*

*" \_\_\_\_\_ " .*

- planets
- wanderers

*The ancient Romans later called these planets:*



- Mercury
- Venus
- Mars
- Jupiter
- Saturn


*Greek Ideas: Earth at the  
Center*



# *Describe the ancient Greek beliefs of the solar system.*

- The ancient Greeks thought Earth was a stationary object and the sun, moon, and planets were on a rotating celestial sphere

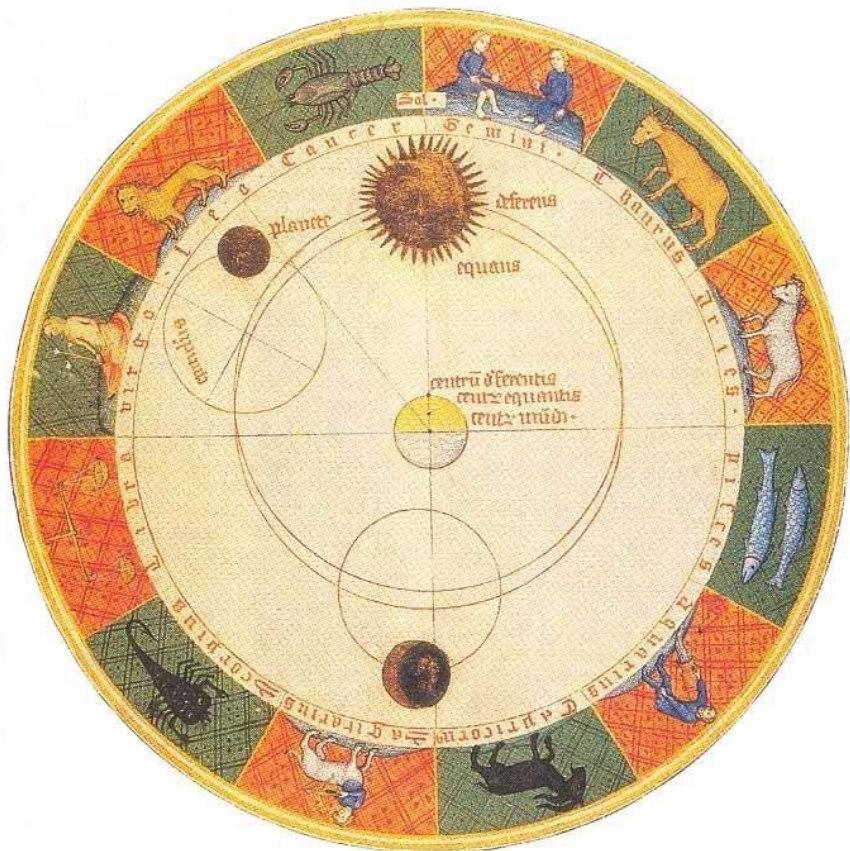
# *Checkpoint: What is a geocentric system?*



- A geocentric system is one in which Earth is at the center of a system of revolving planets.

# Figure 2: Interpreting Diagrams

## Where is Earth located in this illustration?



- The Earth is in the middle of the solar system
- The sun, moon, and a planet are orbiting Earth on a large circle, while moving on a smaller circle

# *How is Ptolemy's model of the solar system differ from the Greeks before him?*

- The Greeks before Ptolemy thought the universe was unchanging and the sun, moon, and planets moved together on a celestial sphere (like a carousel). Earth was stationary
- Ptolemy introduced the idea of the sun, moon and planets rotating on little circles which rotate on bigger circles

*Copernicus's Idea: Sun at the Center*




# Heliocentric



- A description of the solar system which all planets revolve around the sun

*Guide For Reading: How do the heliocentric and geocentric descriptions of the solar system differ?*



- In a geocentric system, Earth is at the center of the revolving planets.
- In a heliocentric system, Earth and the other planets revolve around the sun.

# *Galileo's Observations*



*Checkpoint: What two discoveries made by Galileo supported the heliocentric description of the solar system?*

- Jupiter's four moons revolve around the planet.
- Venus goes through phases similar to those of Earth's moon.


# *Brahe and Kepler*



*Brahe, a \_\_\_\_\_, made much more accurate observations by carefully observing the positions of the planets for almost \_\_\_\_\_ years.*

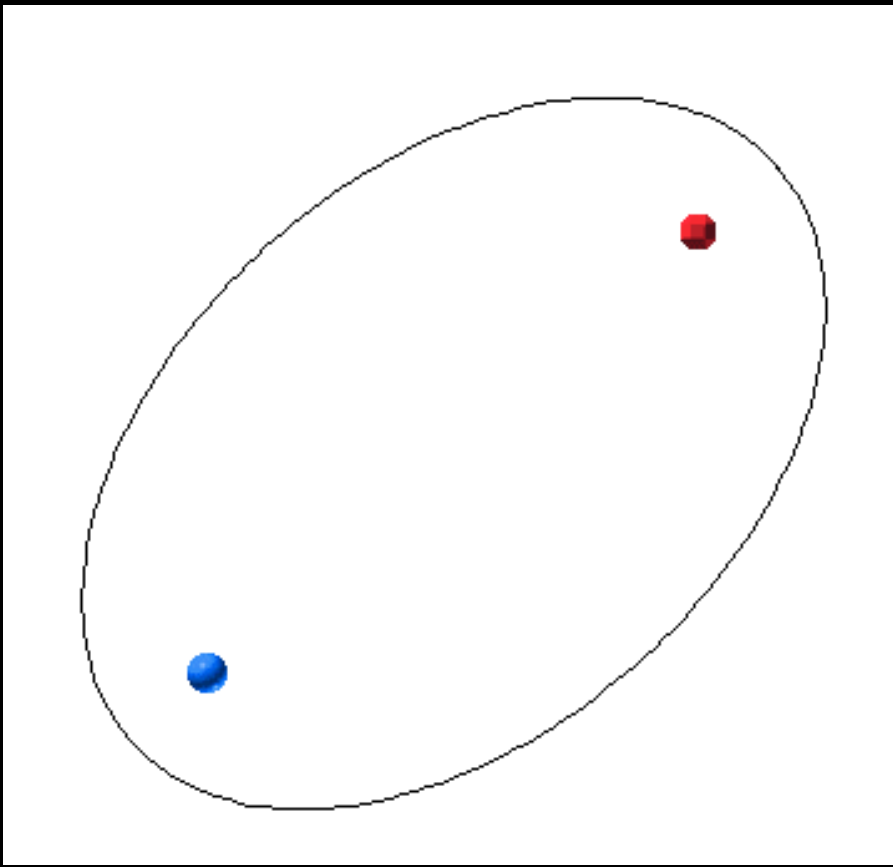
- Danish astronomer
- 20

# *Guide For Reading: What did Kepler discover about the orbits of the planets*



- Kepler had discovered that the orbit of each planet is an ellipse.
- Ellipse: an elongated circle or oval shape.

# *Ellipse*



- An elongated circle, or oval shape; the shape of the planets' orbit

*Which planet's orbit did Kepler calculate to discover that a planet's orbit is not a circle?*

- Mars

# *Inertia and Gravity*



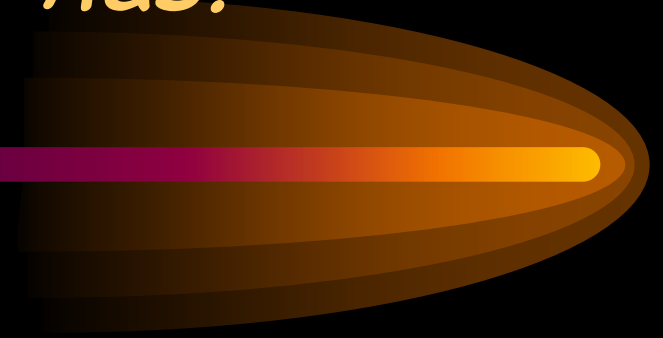
# *Inertia*



- Inertia: tendency of a moving object to continue in a straight line or a stationary object to remain in place.

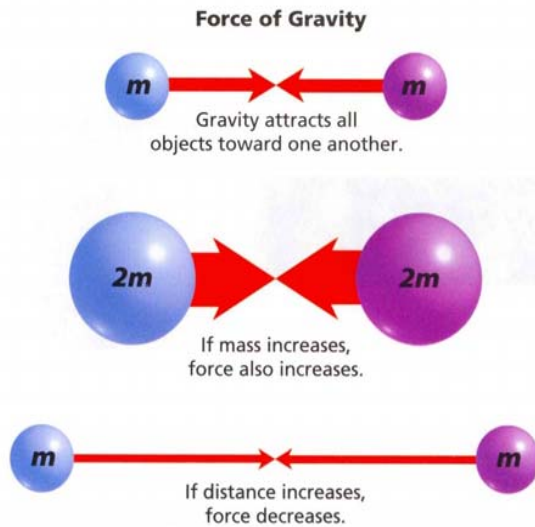
*The more \_\_\_\_\_ an object has,  
the more \_\_\_\_\_ it has.*

- mass
- inertia




# Gravity

## J5 The Force of Gravity



- Gravity: The attractive force between two objects; its magnitude depends on their masses and the distance between them.

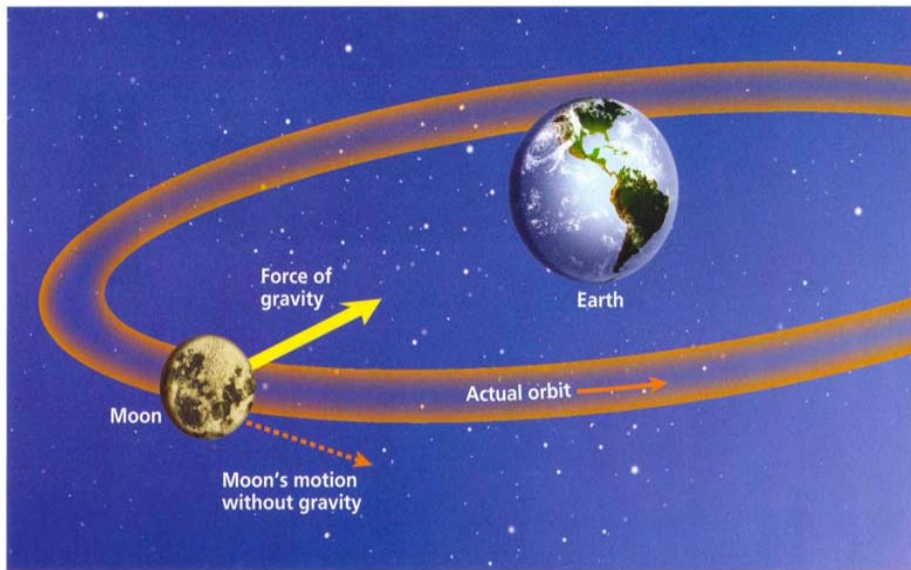
*The strength of gravity depends on the \_\_\_\_\_ of the objects and the \_\_\_\_\_ between them.*



- mass
- distance

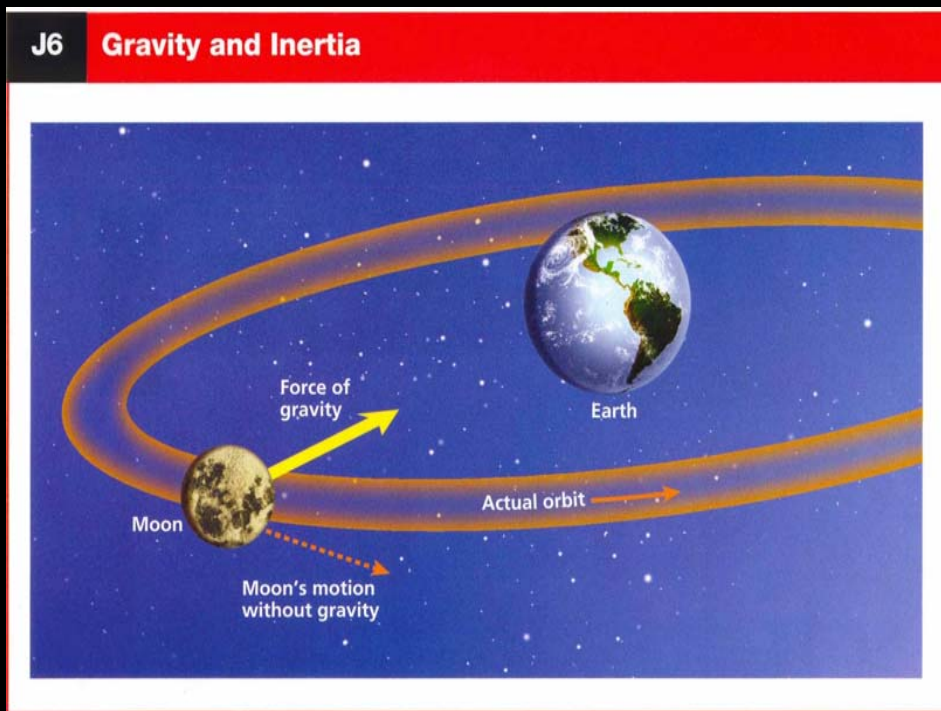
# Figure 5: Interpreting Diagrams - What would happen if a planet had no inertia?

## J6 Gravity and Inertia



- The planet would be pulled into the sun

# Figure 5: Interpreting Diagrams - What would happen if a planet had no gravity?



- The planet would continue to travel straight off into space

# *Guide For Reading: What two factors keep the planets in their orbits?*



- Newton concluded that two factors - inertia and gravity - combine to keep the planets in orbit.
- Inertia keeps the planets moving
- Gravity from the sun keeps the planets from traveling off in space