





- planets with nearly circular
- Pluto is smaller than the major planets and has a more elliptical



Thought Question How does the Earth-Sun distance compare with the Sun's diameter?

- a) It's about 10 times larger.
- b) It's about 25 times larger.
- c) It's about 100 times larger.
- d) It's about 1000 times larger.

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Comparative Planetology

- We can learn more about a world like our Earth by studying it in context with other worlds in the solar system.
- Stay focused on *processes* common to multiple worlds instead of individual facts specific to a particular world.



provide insights understand our

What are the major features of the Sun and planets?















Jupiter

- Much farther from Sun than inner planets
- Mostly H/He; no solid surface
- 300 times more massive than Earth
- Many moons, rings ...



Jupiter's moons can be as interesting as planets themselves, especially Jupiter's four *Galilean moons*

- Io (shown here): Active volcanoes all over
- Europa: Possible subsurface ocean
- Ganymede: Largest moon in solar system
- Callisto: A large, cratered "ice ball"









- Similar to Uranus (except for axis
- (including Triton)



Two Main Planet Types • Terrestrial planets are to the Sun terrestrial • Jovian planets jovian planet are gaseous,

2. The first eight planets fall into two major categories: small, rocky terrestrial planets near the Sun and large, hydrogen-rich jovian planets farther out. The jovian planets have many moons and rings made of rock and ice.

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- rocky, relatively small, and close
- larger, and farther from Sun

Swarms of Smaller Bodies

Asteroids are concentrated in the asteroid belt, and comets populate the regions known as the Kuiper belt and the Oort cloud.

• Many rocky asteroids and icy comets populate the solar system

How do robotic spacecraft work?

Sample Return Missions

- Land on surface of another world
- Gather samples
- Spacecraft designed to blast off other world and return to Earth
- Apollo missions to Moon are only sample return missions to date

