Venus (Greek: Aphrodite; Babylonian: Ishtar) is the goddess of love and beauty. The planet is so named probably because it is the brightest of the planets known to the ancients. (With a few exceptions, the surface features on Venus are named for female figures.)

- **Orbit:** 108,200,000 km (0.72 AU) from Sun
- **Diameter:** 12,103.6 km

**Venus - Some Facts**

- Distance from Sun approx. 0.7 AU
- Radius approx. 0.95 R\text{Earth}
- Mass approx. 0.8 M\text{Earth}
- Thus approximate twin of Earth in size and density [about 5.3 gm/cm\(^2\)]
- Clouds prevent our viewing its surface from Earth with optical telescopes.
- Very bright - high reflectance of clouds
**Albedo**: The fraction of radiation reflected.

**Earth’s Sister Planet**

In some ways they are very similar:
- Venus is only slightly smaller than Earth (95% of Earth’s diameter, 80% of Earth’s mass).
- Few craters indicating relatively young surfaces.
- Densities and chemical compositions are similar.

- It was thought that below its dense clouds Venus might be very Earthlike and might even have life.
- Detailed studies of Venus reveal that in many important ways it is radically different from Earth.

**Geology of Venus**

- Sampled by Soviet Venera 7-10 series spacecraft
  - Lasted tens of minutes - hour
- Mapped by spacecraft-borne radar
  - Pioneer Venus, Magellan, Cassini
  - Lightning???
- Rolling terrain
- Two large “continents”
  - Ishtar: size of Australia
  - Aphrodite: size of South America
- Volcanically active; craters, thin crust, quite young
- Possible molten mantle and iron core like Earth’s

**Atmosphere of Venus**

- 96% CO₂
- 3.5% Nitrogen
- Clouds of sulfur dioxide and sulfuric acid droplets.
- Deep clouds; range from 30 – 60 km
- Atmospheric pressure over 100 times that on Earth; corrosive and eroding.
- Extreme greenhouse effect makes surface hotter (750 K) than even that of Mercury

**Diagram**

- Sunlight
- Cloud
- Venus
- Altitude (km)
- 96% CO₂
- <4% N₂
- <0.1% H₂O
- <1% O₂
**Rotation of Venus**

- Not known precisely until radar was used
- Slowest rotator in the Solar System: 243 days; orbital period 224.7 days
- Retrograde rotation; Sun rises in the west, sets in the east; 1 Venus Day = 117 Earth days
- Consequence of a collision OR of dynamics of tidal interaction with Sun and Earth???
- Weak or no magnetic field

**Magellan**

- Magellan has mapped 98% of the surface of Venus at better than 300 meter resolution.
- Magellan executed an 80-day aerobraking program to lower and circularize its orbit.

**Venus Radar View**

**3-D View of Eistla Regio on Venus**

**Radar Views of the Surface of Venus**

- Maat Mons volcano (Vertical scale exaggerated)
- Fractured plains in the Lakshmi region
- Approx. 37 km (about 23 miles)
- Approx. 50 km (about 31 miles)

**Venus Radar Map**