Mars

The most Earth-like planet?

Observation from Earth

- large brightness variation
- closest at opposition
- opposition to opposition = 26 months
- closest oppositions every 15 years

Mars Oppositions
Opposition of 2003

Size and Distance
- Diameter: 1/2 Earth
- "middle child"
- Location: next planet outward
- Outermost terrestrial planet
- 2nd nearest planet
2 Moonlets

- Phobos
- Deimos

Phobos entering Mars’s shadow.

Atmosphere

- CO₂ 95%
- N₂ 5%
- Pressure 7 millibars
- Below triple point of water
- No liquid water on surface today.

Global Dust Storms

June 26, 2001

September 8, 2001
Mars Spacecraft

- Mariner 4 (1965)
- Mariner 9 (1971)
- Vikings 1 & 2 (1976)
- Pathfinder (1997)
- Mars Global Surveyor (1997-)
- Mars Odyssey (2001-)
- Mars Express (2003-)
- Mars Reconnaissance Orbiter (2006)

Surface Geology

- Northern plains
- Southern Highlands
- Large elevation range – 30,000 m

Major Features

- Northern plains
- North Polar Cap
- Mt. Olympus
- Tharsis
- Mariner Valley
- Southern Highlands
- Hellas
Southern Highlands

- Heavily cratered
- 4 billion years old.
- 2 large impact basins
  - Hellas
  - Argyre

Hellas

- Hellas crater

Argyre

- Martian Valley
- Galli
- Dry river
Dry Riverbeds
- Rainfall or springs?
- Not found on plains.
- 4 billion yrs old

Flood Channels
- 10s km wide
- 100s km long
- younger than plains
- 3.5 billion yrs

Northern Hemisphere
- Plains
- Volcanic plateaus
  - Tharsis
  - Elysium
Tharsis and USA

Mars & Earth
- Length of day: 24 h 39 m
- Temperature: Antarctic-like
- Polar Ice Cap
- Seasons
- Surface gravity: 3/8 gee

Three Mysteries
- Was there life on Mars in the past?
- What happened to the water?
- Why did Mars start with such a thin atmosphere?