Mercury

The Innermost Planet

- Closest to the Sun
- 2nd smallest terrestrial planet
- The strongest solar tidal force

Transit of Mercury 1999

Mercury

The Ball Bearing Planet

- Highest uncompressed density
- 60% iron by mass
- 40% by volume
- Magnetic field
- Giant impact?
Known to the Ancients

The Twilight Planet

Mercury in the Telescope

- Size: between Moon & Mars
- Orbit: eccentric
- Period: 3 months
- Atmosphere: none
- Satellites: none
Rotation

- Rotation: Schiaparelli: 3 months?
- No! Radar (1965): 2 months
- Length of day = ?
- = 6 months!!
- 1 Mercurian day = 2 Mercurian years!

Tidal Force on Mercury

- When is the Sun's tidal force on Mercury the strongest?
  1. Perihelion
  2. Aphelion
  3. Always the same.

Mercury's Rotation

- Tidal force most important at perihelion.
- Tidal braking slowed the rotation till at perihelion bulges aligned with the Sun at perihelion.
Check Question

- Which is the longest on Mercury?
  1) Orbital period
  2) Rotation period (relative to the stars)
  3) Length of the day (noon to noon)

Mariner 10

- Only mission to Mercury
- Flyby mission 1974-1975

One Side Seen
A Moon-like landscape

double-ringed crater

Highlands and Lowlands

A Young Crater
Caloris Basin

Opposite side of the planet.

Not like the Moon

Double-ringed crater

Antipodes of Caloris

Discovery Scarp

Scarps

- Long cliffs or faults
- Result of shrinking of core.
Ice on Mercury?!
- Radar bright polar spots (1991)
- No axial tilt.
- Craters near poles in permanent shadow.
- Ice!
- Or sulfur?

On Mercury
- Air: none
- Sound: none
- Temperature: liquid air to liquid lead
- Gravity: 3/8 g
- Sun: variable size
- Perihelion: the Sun stops
- Special sight at night: Earth

Mercury Highlights
- Fastest planet
- Closest planet
- Eccentric orbit
- Longest day
- Double sunrises
- sunsets
- Large iron core
MESSENGER

- 2nd mission to Mercury
- 1st Mercury orbiter
- 8 scientific instruments

MESSENGER Trajectory

Mercury beckons!