



Topic/Objective CHAPTER: 28  
 Mercury  
 WHO is the god of Swiftmess

NAME:  
 Pd: 1 2 4 5 other  
 DATE

**Essential Question**

Cue: Review:  
 Thoughts: Main Idea

NOTE Taking AREA:

Mercury is the 1st  
 Terrestrial planet  
 Size  
 Rev: ~3 months  
 Difficult to see  
 phases  
 Has phases

**God of swiftmess and the Son of Venus. Actually, this planet is named after the Roman deity Mercury: messenger to the gods**

**is the smallest (Size: 3031 miles diameter) and closest to the Sun (Distance:0.39 AU 36,000,000 miles) of the eight planets in the Solar System**

**Orbital period** (how long it takes to go around the Sun) **(of about 88 Earth days. (~3 months) (Rev: 87.97 earth days)**

**Seen from Earth, it appears to move around its orbit in about 116 days, which is much faster than any other planet in the Solar System.**

**Because Mercury orbits the Sun within Earth's orbit (as does Venus), it can appear in Earth's sky in the morning or the evening, but not in the middle of the night.**

**Although Mercury can appear as a bright object when viewed from Earth, its proximity to the Sun makes it more difficult to see than Venus. Only gets 28° from the sun Never far from the Sun. In fact, Mercury is low to the horizon before and after Sun set/rise**

**Also, like Venus and the Moon, it displays a complete range of phases as it moves around its orbit relative to Earth proving HELIOCENTRIC: orbits Sun not Earth. Looking at it through all the turbulence in our atmosphere phases are difficult to see**

**Mercury's axis has the smallest tilt of any of the Solar System's planets (about 1/30°),**

NOTES CONTINUE ON OTHER SIDE



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Very elliptical orbit

Gravitationally

locked

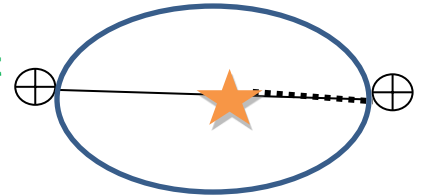
Rotation ~2 month

Revolution

3:2 Synchronous

but it has **highly elliptical orbit** or the largest orbital eccentricity.

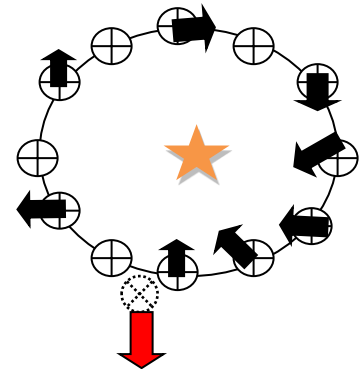
At **aphelion** (70 million Km), Mercury is about **1.5 times** as far from the Sun as it is at **perihelion** (46 million Km).



Before 1965 it was believed the same side faced the Sun, but we know now that it's Gravitationally locked and rotates in a way that is unique in the Solar System.

As seen relative to the fixed stars, it rotates on its axis exactly three times for every two revolutions it makes around the Sun.

As seen from the Sun, in a frame of reference that rotates with the orbital motion, it appears to rotate only once every two Mercurian years or  $2/3 = 0.6667045$ .



An observer on Mercury would therefore see only one day every two years. (Rotation: 58 days/15 min/28 sec (59 earth days [58.65 days]))

**3:2 Synchronous orbit is caused by: Close to the Sun, very eccentric orbit, High Density, & Tidal Torque (pull from Sun) Means the same side faces SUNWARD at perihelion**

Mercury's density is unusually high, 5.4 kg/liter

Most of the planet is a very large molten iron core (70%) covered by a thin silicate mantle (20%)

SUMMARY:



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Two spacecraft have visited Mercury: *Mariner 10* flew by in the 1970s; and *MESSENGER*, launched in 2004, orbited Mercury (in 2011) over 4,000 times in four years, before exhausting its fuel and crashing into the planet's surface on April 30, 2015.

spacecraft

Have an Atmo?

It has almost **NO** atmosphere to retain heat due to its Closeness to the Sun (Solar wind), Weak Magnetic field, & impact craters but...

Atmosphere

It does have an atmosphere; Mostly Sodium, Calcium, Magnesium (& with some Helium & Hydrogen)

Surface

Because knowledge of Mercury's geology has been based only on the *Mariner* flyby and terrestrial observations, it is the least understood of the terrestrial planets.

Similar to Luna

Surface is heavily cratered & similar in appearance to the Moon. But crater impact is more impressive because of its revolution around the Sun at a greater speed.

No geological activity

Geologically inactive for billions of years.

Hit by asteroid

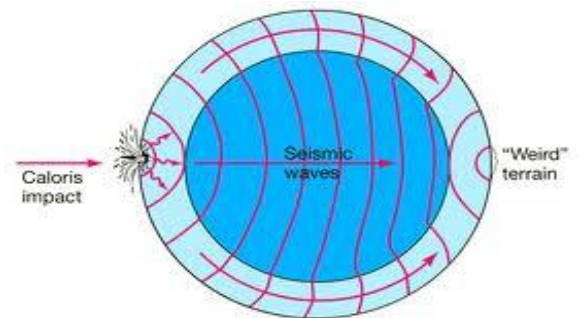
It has a Large Basin (crater) that almost split planet in two. Planet was hit with a 60 mile wide iron meteor or asteroid.

Largest crater

Leaving the 1600 Km  
**LARGEST CRATER IN THE S.S**

(812.5 miles across & about 1 mile high)

It is called: **CALORIS BASIN**



NOTES CONTINUE ON OTHER SIDE



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NOTE Taking AREA:

The impact was so great that shock waves traveled through the planet and shook up the terrain on the opposite side which is called: **WEIRD TERRAIN**

Craters on Mercury are named after Artist

Surface experiences the greatest temperature variation of the planet in the Solar System

Ranging from:  
100 K (-184 °C; -299.2 °F) at night to 700 K (465 °C; 869 °F) during the day at some equatorial regions. The poles are constantly below 180 K (-93 °C; -136 °F).  
Because of this WATER ICE has been located near the poles. This is often cold a **COLD TRAP**

Have discovered cracks from compression folds on the surface. (wrinkles on a dried-up apple). These are called: **RUPES**. be the cause by the slight shrinking of the planet as its iron core cools

This core may be the cause of the weak magnetic field (similar in shape to the Earth's, but much weaker)

It has **NO** known natural satellites

Weird terrain

Largest jump from

Day to night

Night temp

Day temp

Cold traps

Rupes

Like dried up fruit

Weak field

Moons?

SUMMARY: