

# Astronomical Bodies in The Solar System



## The Terrestrial Planets

# Standards:



- ✓ SC.8.E.5.3 Distinguish the hierarchical relationships between planets and other astronomical bodies relative to the solar system, galaxy, and universe, including distance, size, and composition. High (EOC)
- ✓ SC.8.E.5.7 Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions. Moderate. (EOC)

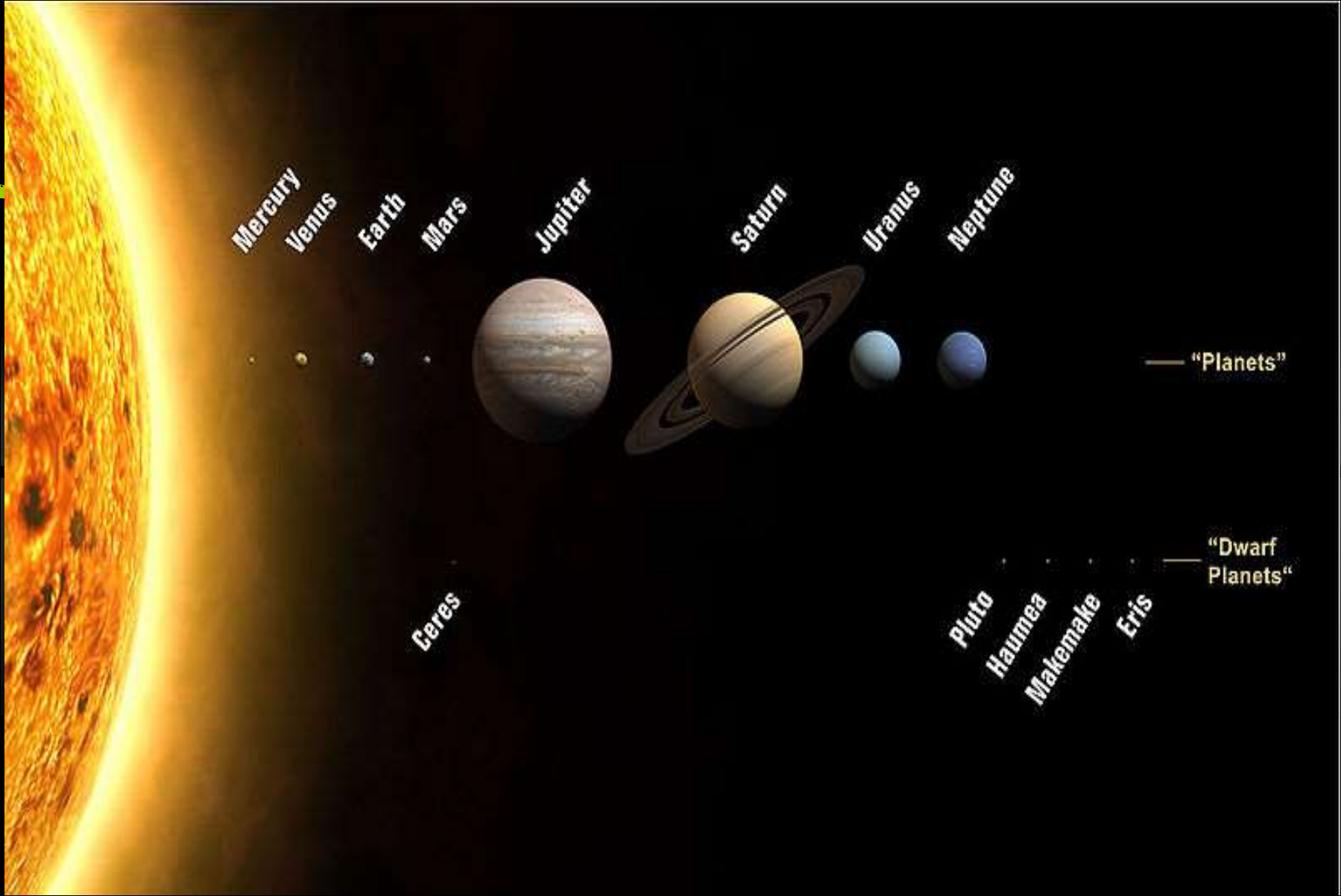
# Unpacking the Benchmark

✓ SC.8.E.5.7 Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions. Moderate. (EOC)

✓ **REWRITE**

✓ **KNOW:** The bodies in the Solar System & their gravity, speed, distance, movement, temp and atmo condition.

✓ **DO:** Compare/Contrast planets with EARTH



# Two Groups of Planets



- ✓ Inner planets (AKA Terrestrial Planet)

- Mercury, Venus, Earth, and Mars

- ✓ Outer planets (AKA Giant Gas Planets)

- ✓ Jupiter, Saturn, Uranus, and Neptune

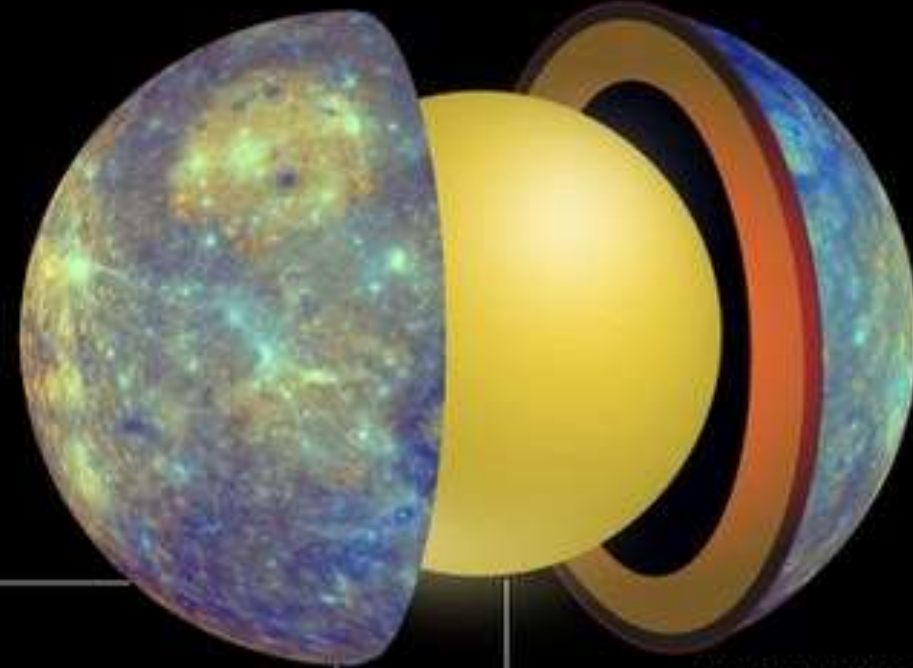
# Inner Planets



# Mercury

## Inside Planet MERCURY

The planet nearest the sun has a diameter of 3,032 miles (4,879 kilometers), about two-fifths of Earth's diameter. Mercury has a spin-orbit resonance, rotating three times for every two revolutions around the Sun. A day on Mercury lasts about 59 Earth days.



SPACE

**THIN ATMOSPHERE**  
Extremely small amount of helium, hydrogen, oxygen and sodium.

Note: Planet surface has been color enhanced



**SURFACE CONDITIONS**  
AIR PRESSURE: None  
TEMPERATURE: 840°F (450°C)  
WINDS: None

**METAL CORE** The planet's liquid iron core makes up about three-fourths of its radius.



The surface of Mercury photographed by the MESSENGER probe in 2008.



Mercury, 3,032 miles (4,879 km) in diameter, is slightly larger than the moon.

# Mercury Part 1 of 2

- ✓ Distance from Sun: 36 mill. mi
- ✓ Size: 3,032 mi. diameter
- ✓ Mass: 5.5% Earth
- ✓ Temperature: 840/-300°F
- ✓ Revolution: 88 Earth days
- ✓ Rotation: 59 Earth days
- ✓ Moons: None





# Mercury's Atmosphere

## Mercury Part 2 of 2

- ✓ Mercury is too hot for an atmosphere. PLUS
- ✓ It has so little mass that its tiny gravity cannot hold an atmosphere.
- ✓ Because it has no atmosphere, it allows asteroids and meteors to create many craters.



# Revolution Compared to Earth



# Mercury vs. Earth



# Venus

## Inside Planet VENUS

Venus is often visible to the naked eye in the morning and evening sky. It has often been called Earth's "twin" because of its similar size, but space probes have discovered that the environment there is actually quite inhospitable.

**THICK ATMOSPHERE**  
96.5% carbon dioxide,  
3.5% nitrogen plus  
trace gases



**SURFACE CONDITIONS**  
AIR PRESSURE: 90x Earth  
TEMPERATURE: 870°F (465°C)  
WINDS: up to 220 mph (100 m/s)



The surface of Venus photographed by a Russian probe in 1982

**METAL CORE** It is not known if Venus' core is solid. Unlike Earth, Venus' weak magnetic field is not produced by a dynamo in the core.



Venus, 7,520 mi (12,100 km) in diameter, is slightly smaller than Earth

# Venus

## Part 1 of 3

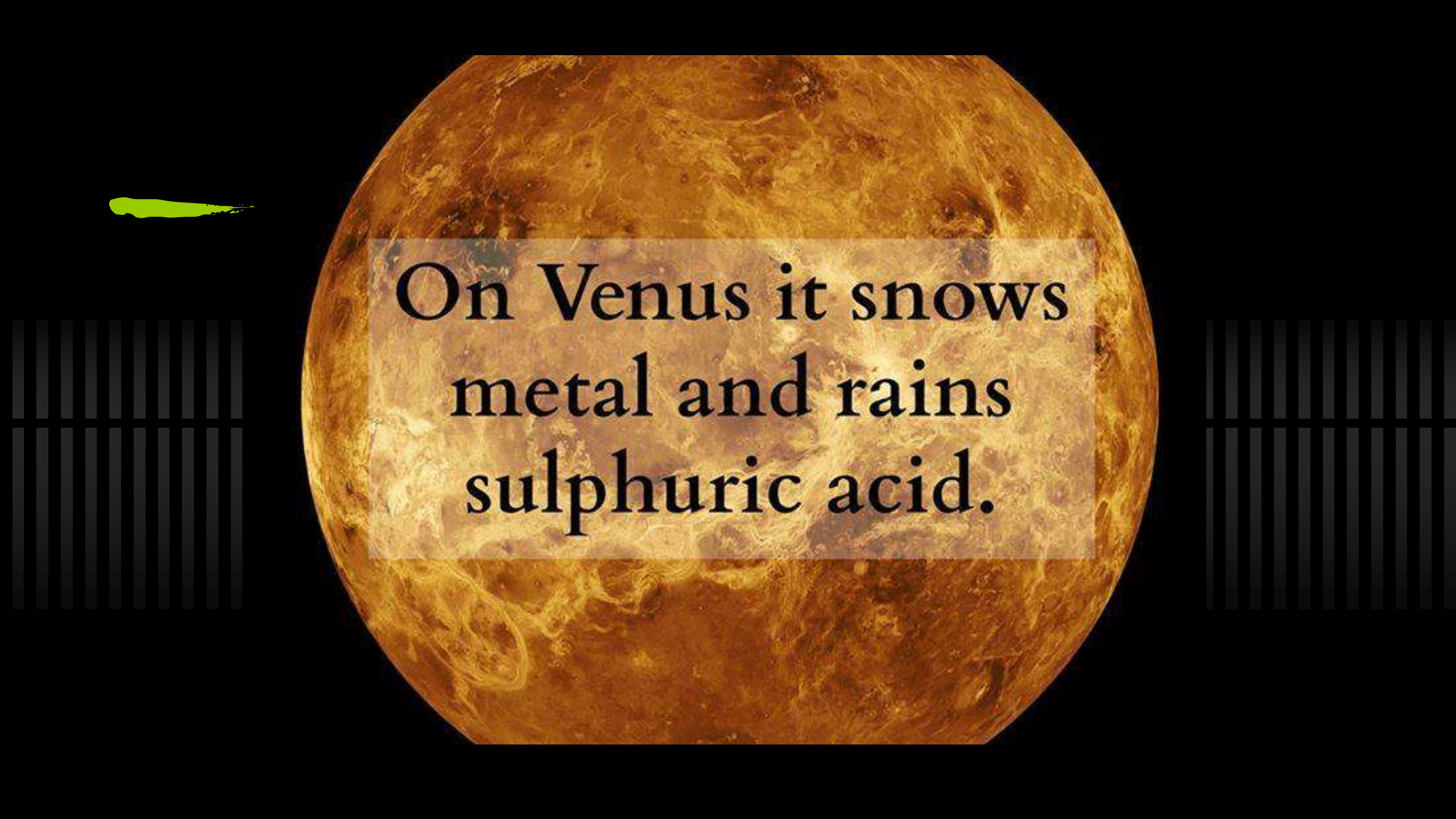
- ✓ Distance From Sun: 67 mill. mi.
- ✓ Size: 7514 mi. Diameter
- ✓ Mass: 81.5% Earth
- ✓ Temperature: 870°F
- ✓ Revolution: 225 Earth days
- ✓ Rotates **CLOCKWISE** “retrograde”
- ✓ Rotation: 243 Earth days
- ✓ Moons: None



# One Messed-Up Orbit!

## Part 2 of 3

- ✓ Venus rotates CLOCKWISE because scientists think that a planetary collision knocked it the opposite direction.
- ✓ As a result a day on Venus is longer than a year on Venus.



On Venus it snows  
metal and rains  
sulphuric acid.

# Atmosphere

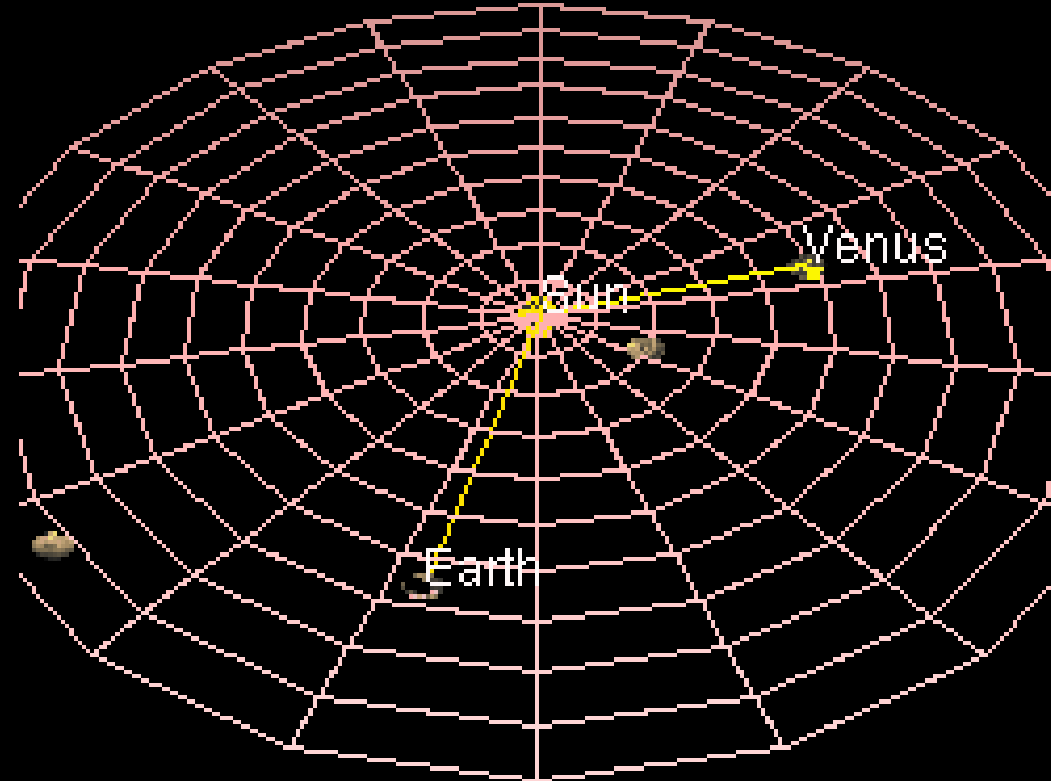
## Part 3 of 3



- ✓ Covered in dense clouds of CO<sub>2</sub> and sulfuric acid.
- ✓ **HOTTEST IN SOLAR SYSTEM!**
- ✓ Strong greenhouse effect
- ✓ Massive storms across its surface.
- ✓ 90x the air pressure



# Revolution Compared to Earth



# Venus vs. Earth: Sister Planets



# Earth

## Part 1 of 2

- ✓ Distance from Sun: 93 mil. mi
- ✓ Size: 7918 mi Diameter
- ✓ Mass: 100% Earth
- ✓ Average Temp: 57°F
- ✓ Revolution: 365 days
- ✓ Rotation: 24 hours
- ✓ ONLY planet with (known) life
- ✓ Moon: 1 (Luna)

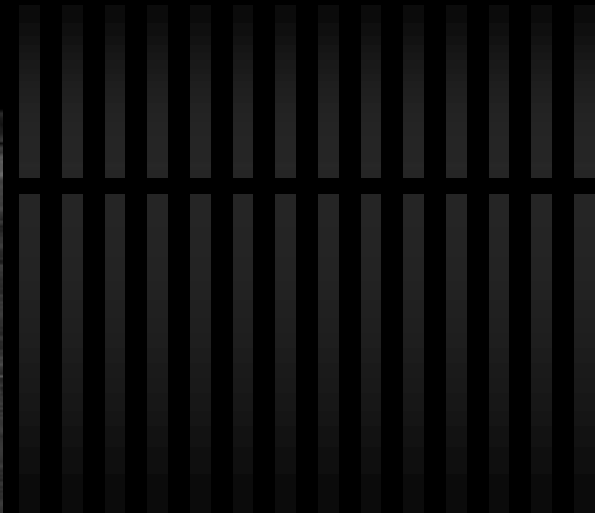
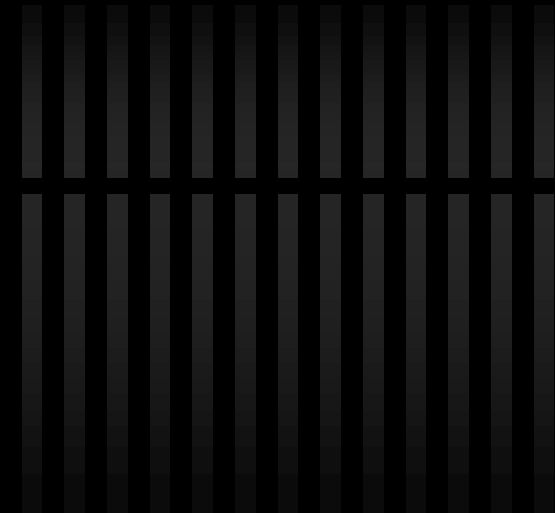


# Atmosphere

## Part 2 of 2



- ✓ Earth's magnetic field blocks out harmful solar rays.
- ✓ Earth's atmosphere filters out most harmful radiation.
- ✓ A thick atmosphere traps heat and makes it warm enough for us to live.



# Mars

## Inside Planet MARS

Often visible as a reddish light in Earth's sky, Mars captured the imaginations of those who dream of space travel. The planet's thin atmosphere is hostile to human life, but Mars has many interesting geological features similar to those on Earth, such as volcanoes and canyons.

**THIN ATMOSPHERE**  
95.32% carbon dioxide, 2.7% nitrogen, 1.6% argon, 0.13% oxygen, 0.08% carbon monoxide

**GRAVITY**  
0.38 OF EARTH

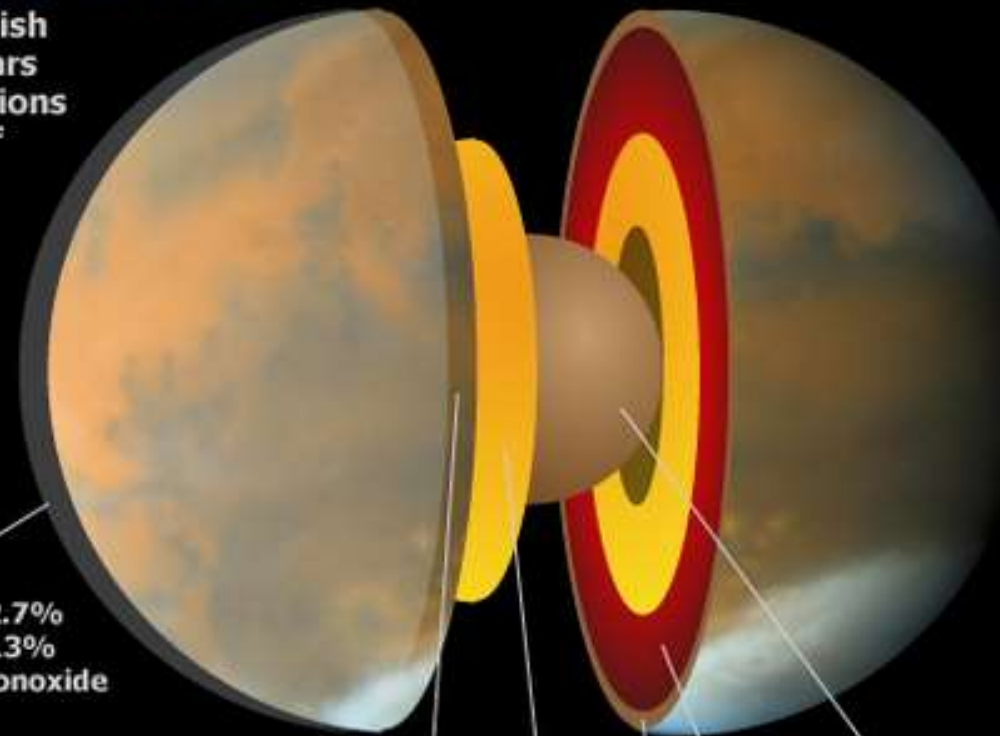


<b>EARTH</b>	<b>MARS</b>
10 ft dunk	26.3 ft dunk

**SURFACE CONDITIONS**  
AIR PRESSURE: 0.7% of Earth  
AVERAGE TEMPERATURE: -67° F (-55° C)



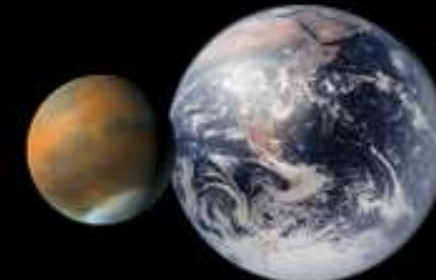
Martian sunset photographed by the Spirit rover at Gusev crater in 2005



**LIQUID IRON-SULPHUR CORE**

**MANTLE**  
**CRUST**

**POSSIBLE SOLID INNER CORE**



Mars, 4,222 mi (6,794 km) in diameter, is slightly over half the size of Earth

# Mars

## Part 1 of 2



- ✓ Distance from Sun: 230 mill. mi.
- ✓ Size: 4,222 mi Diameter
- ✓ Mass: 15.1% x Earths
- ✓ Avg Temp.: -81°F
- ✓ Revolution: 687 Earth days
- ✓ Rotation: 24 h 39 min
- ✓ Moons: 2 (Phobos and Deimos)

# Atmosphere

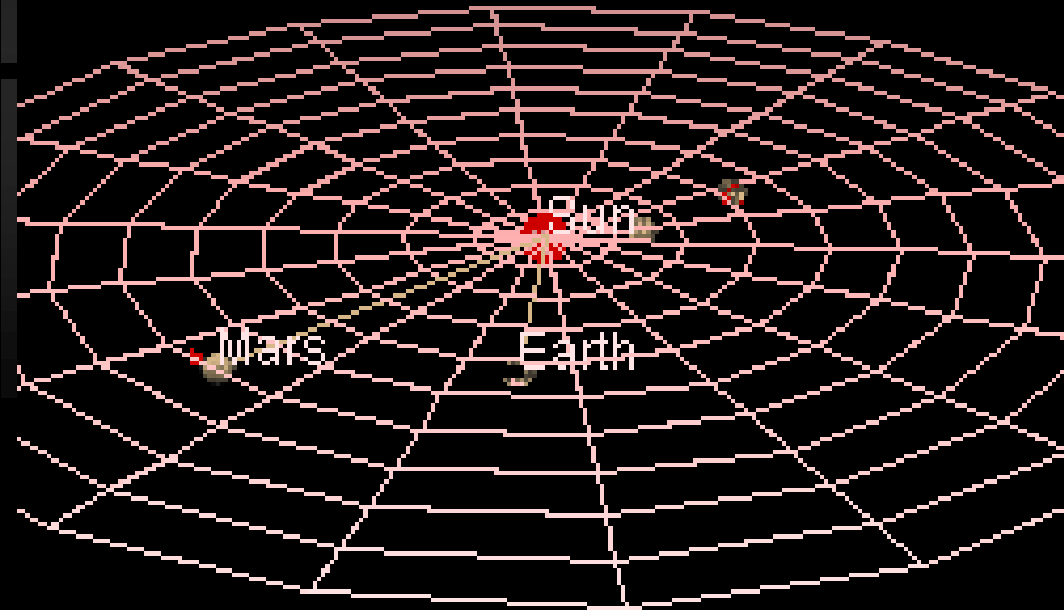
## Part 2 of 2



- ✓ No magnetic field.
- ✓ Very thin atmosphere (95% CO<sub>2</sub>)
- ✓ Craters=THIN atmosphere
- ✓ Surface is red due to rust.
- ✓ Polar caps - frozen carbon dioxide
  - ✓ “dry ice”



# Revolution Compared to Earth



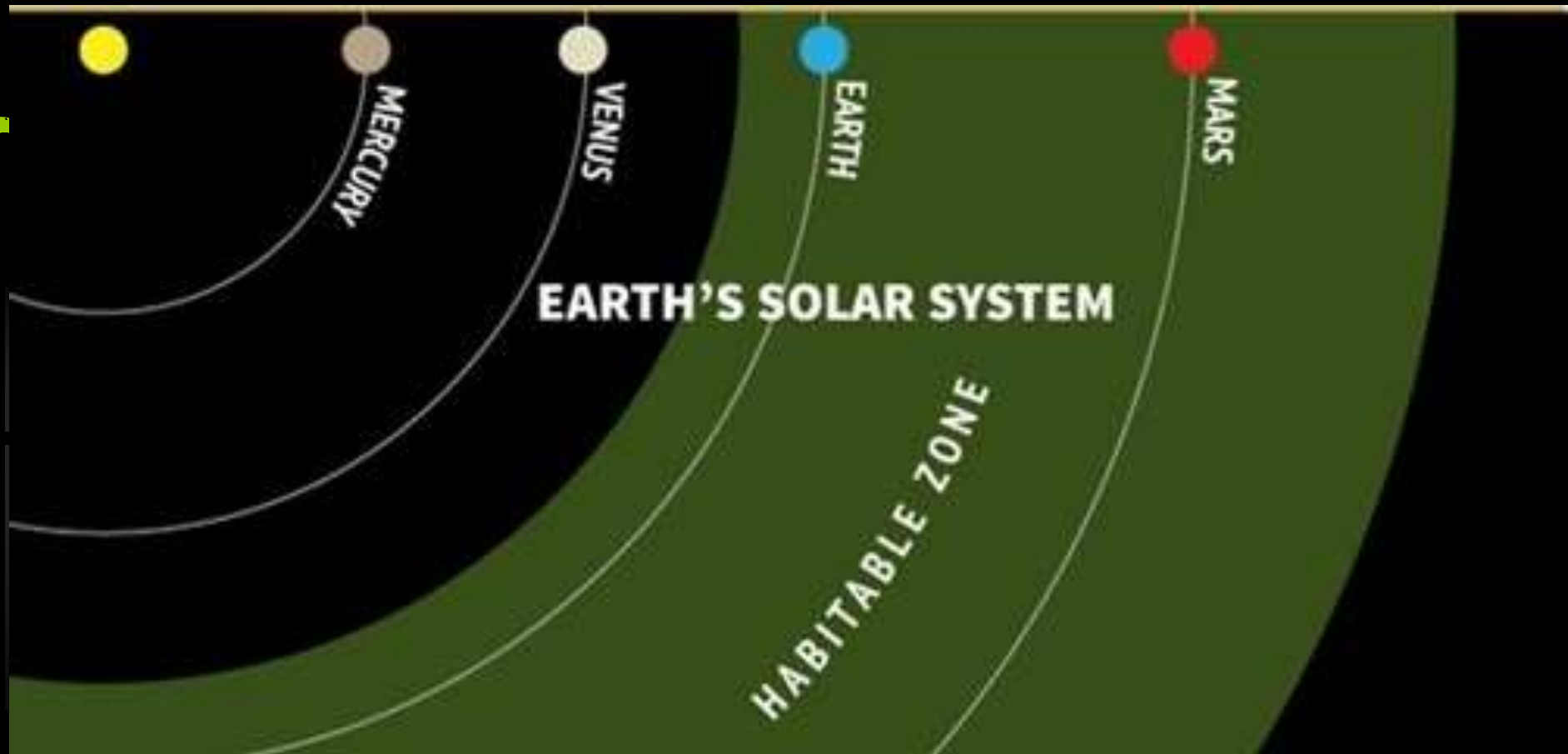
# Earth vs. Mars



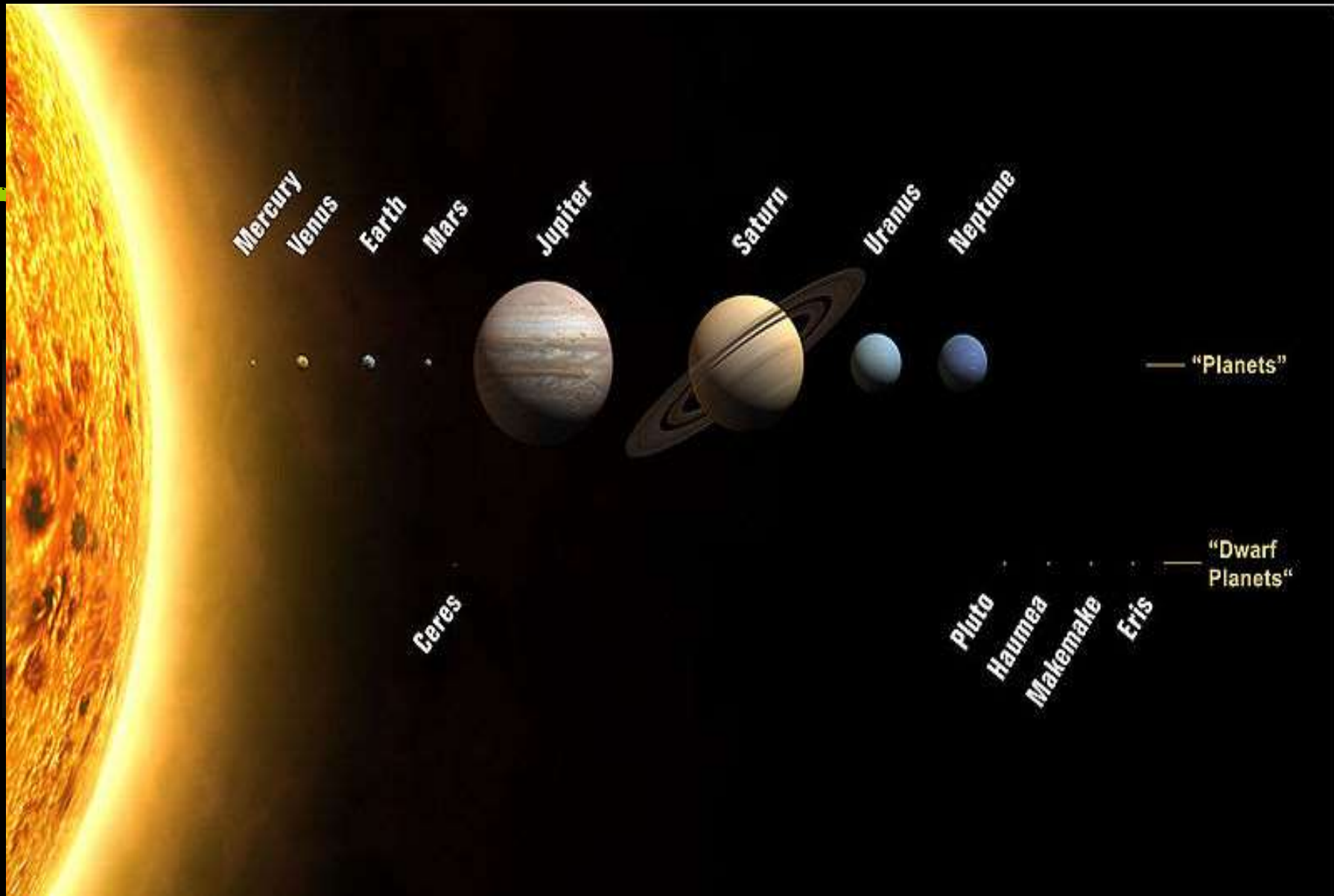
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# Goldilocks Zone



Not Too FAR from the Sun to be freezing.  
Not Too CLOSE to the Sun to be burning up.  
Juuuuuuuuuuuuuuust Right!



Handwritten green mark.