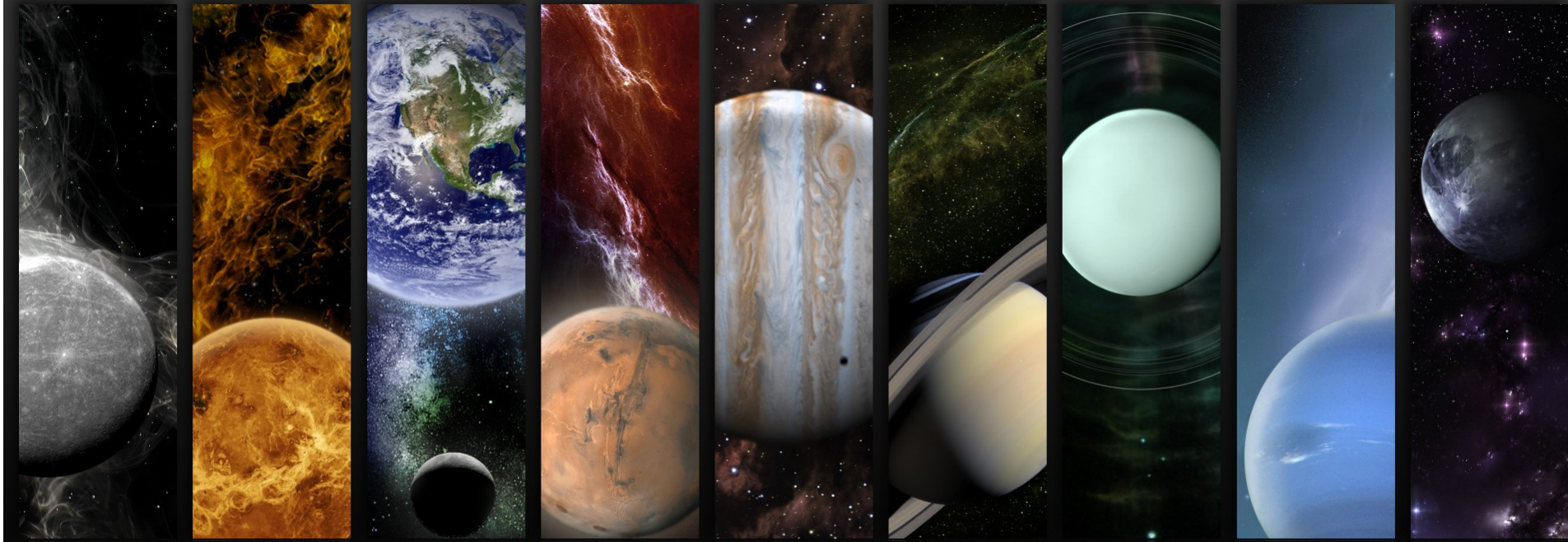
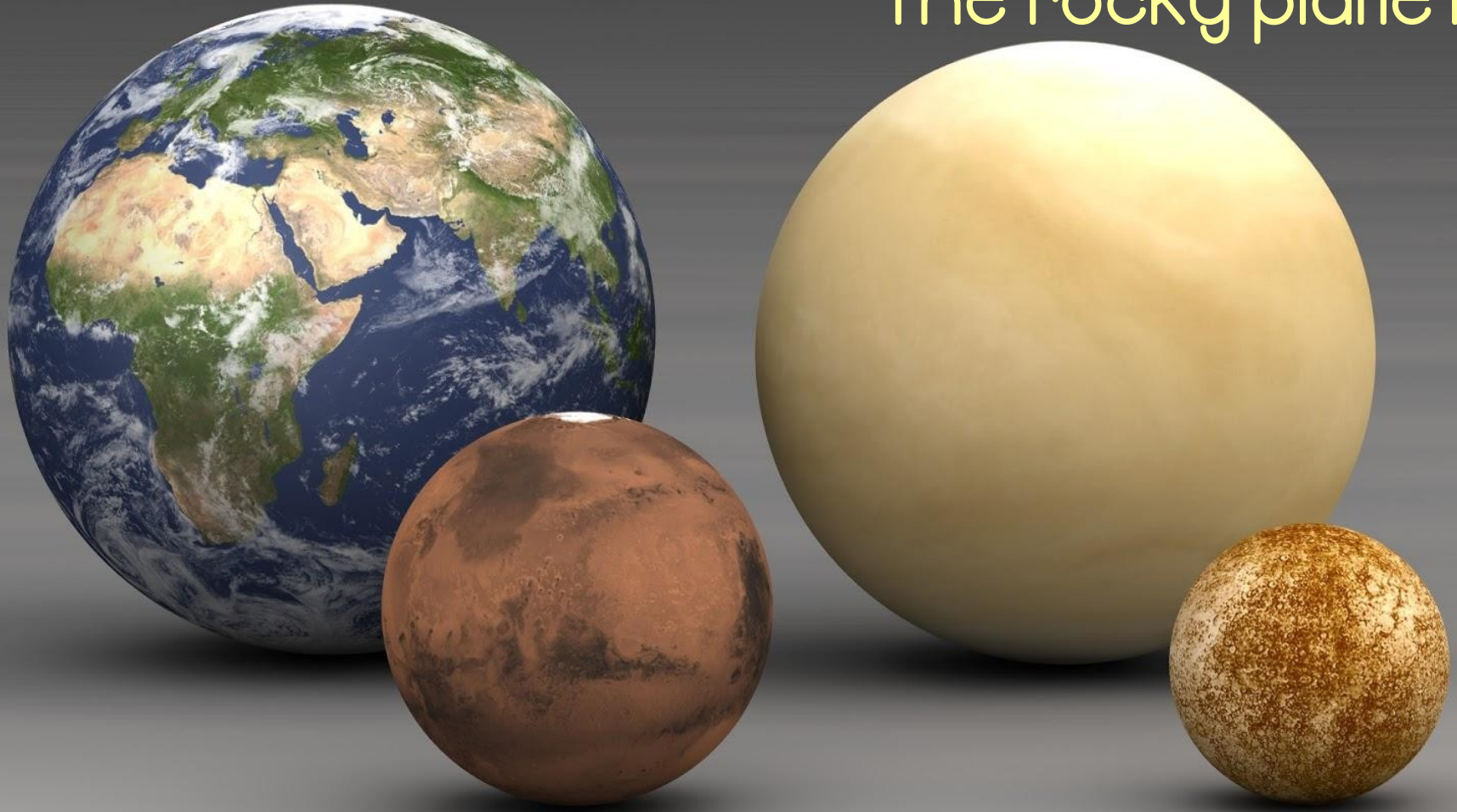


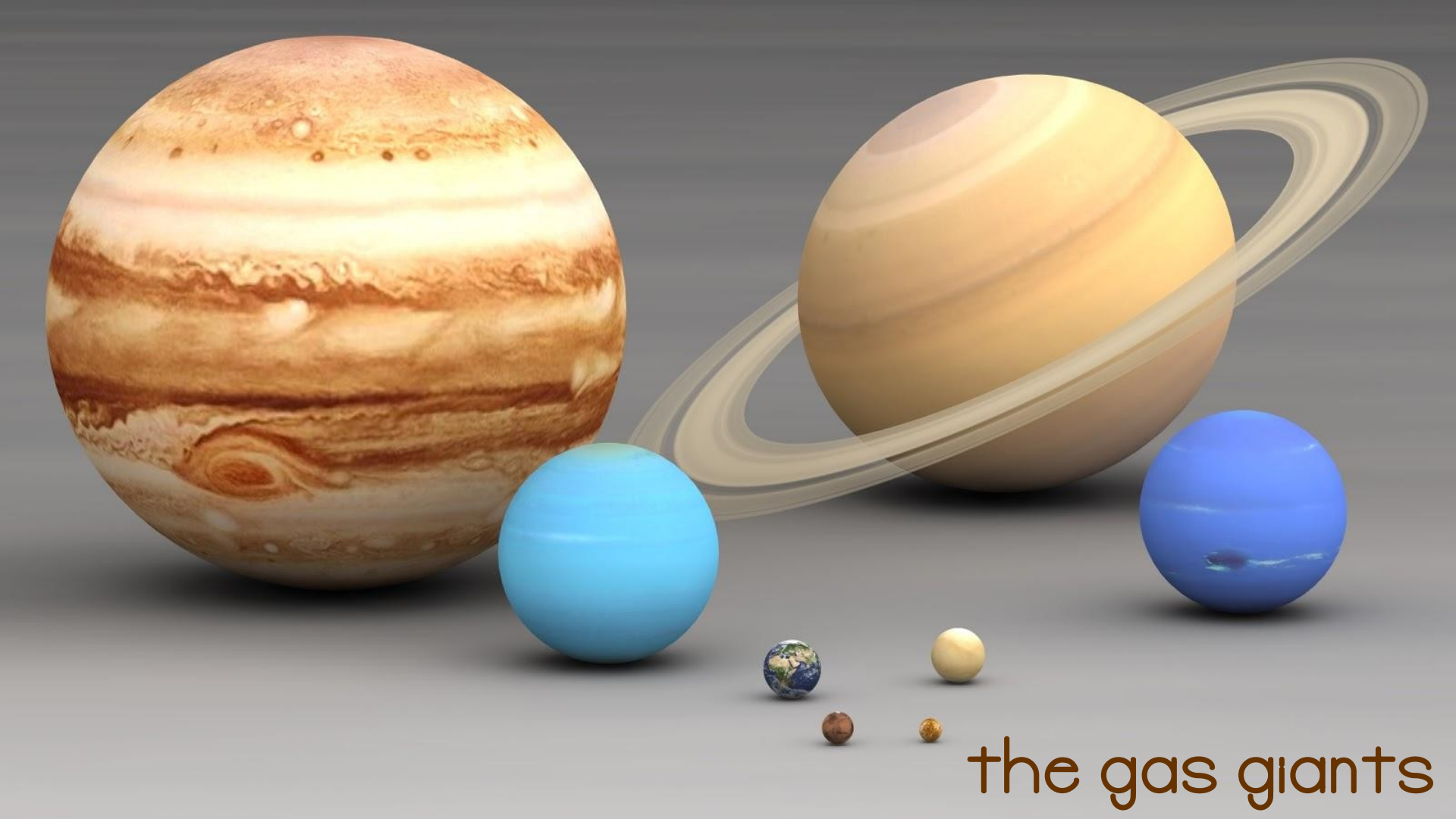
# Planets

## in our Solar System


Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
PLANETS
DWARF PLANETS
Ceres
Pluto
Haumea
Makemake
Eris
our Solar System is full of planets

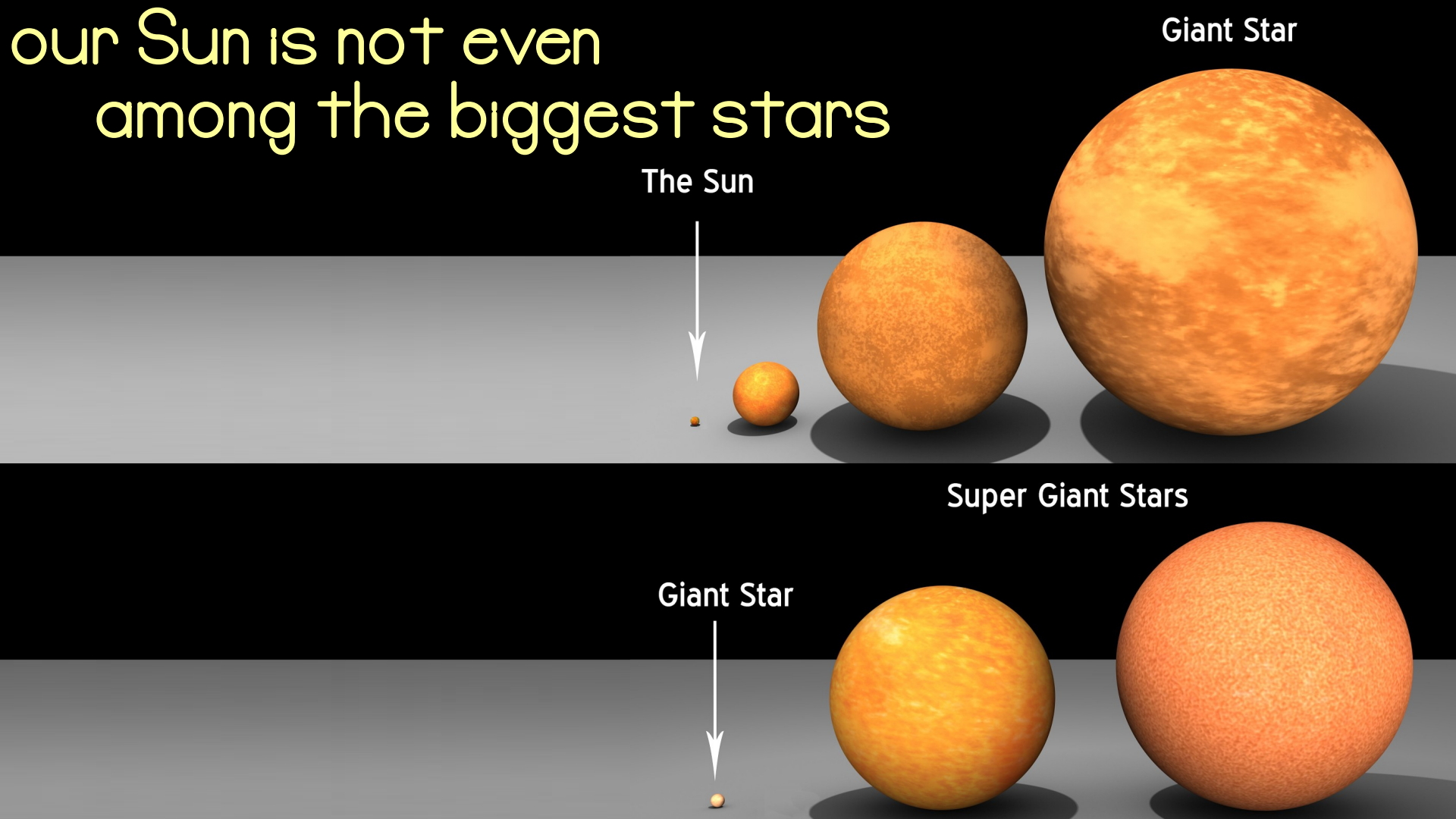
# the rocky planets



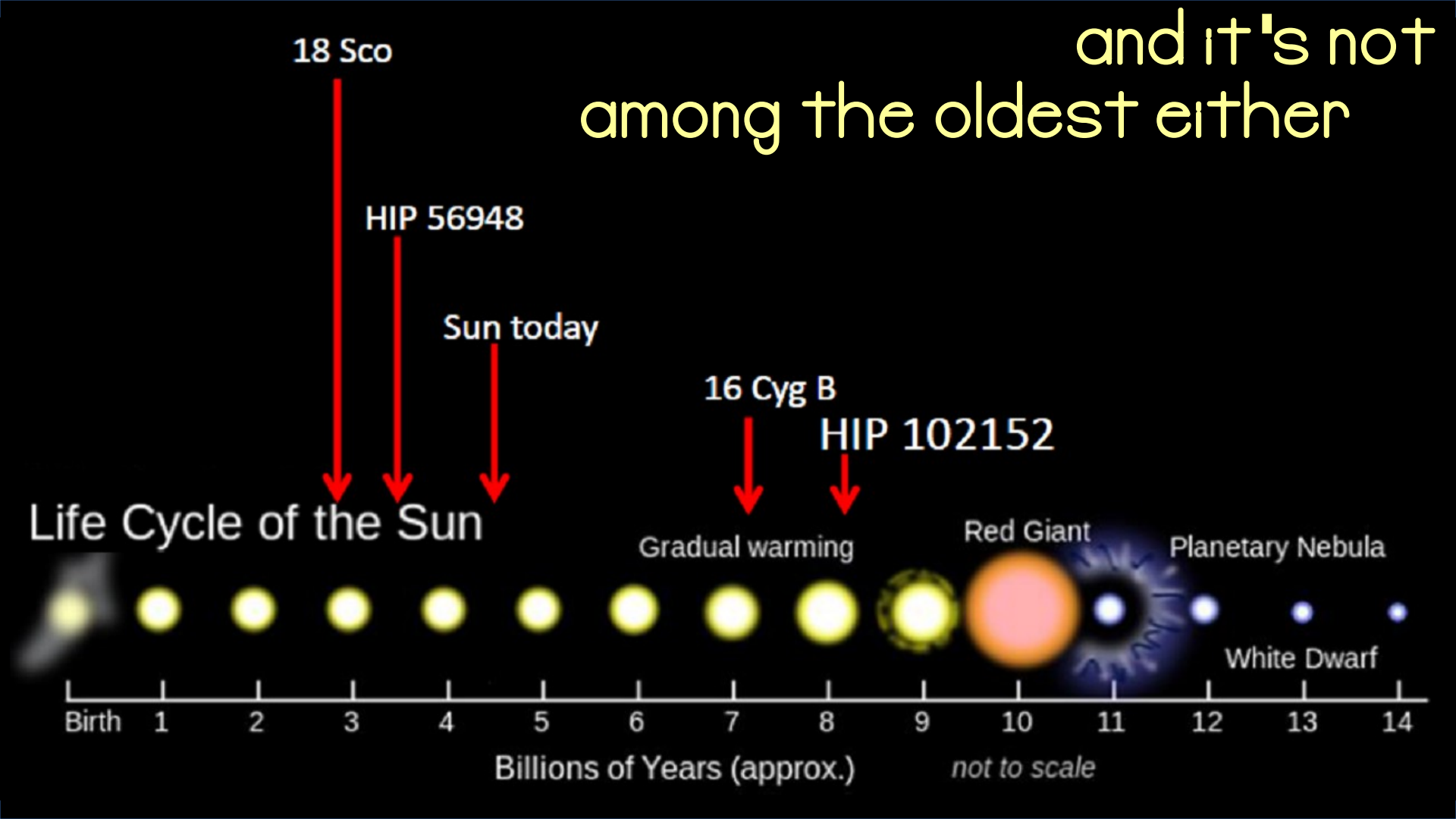

the gas giants

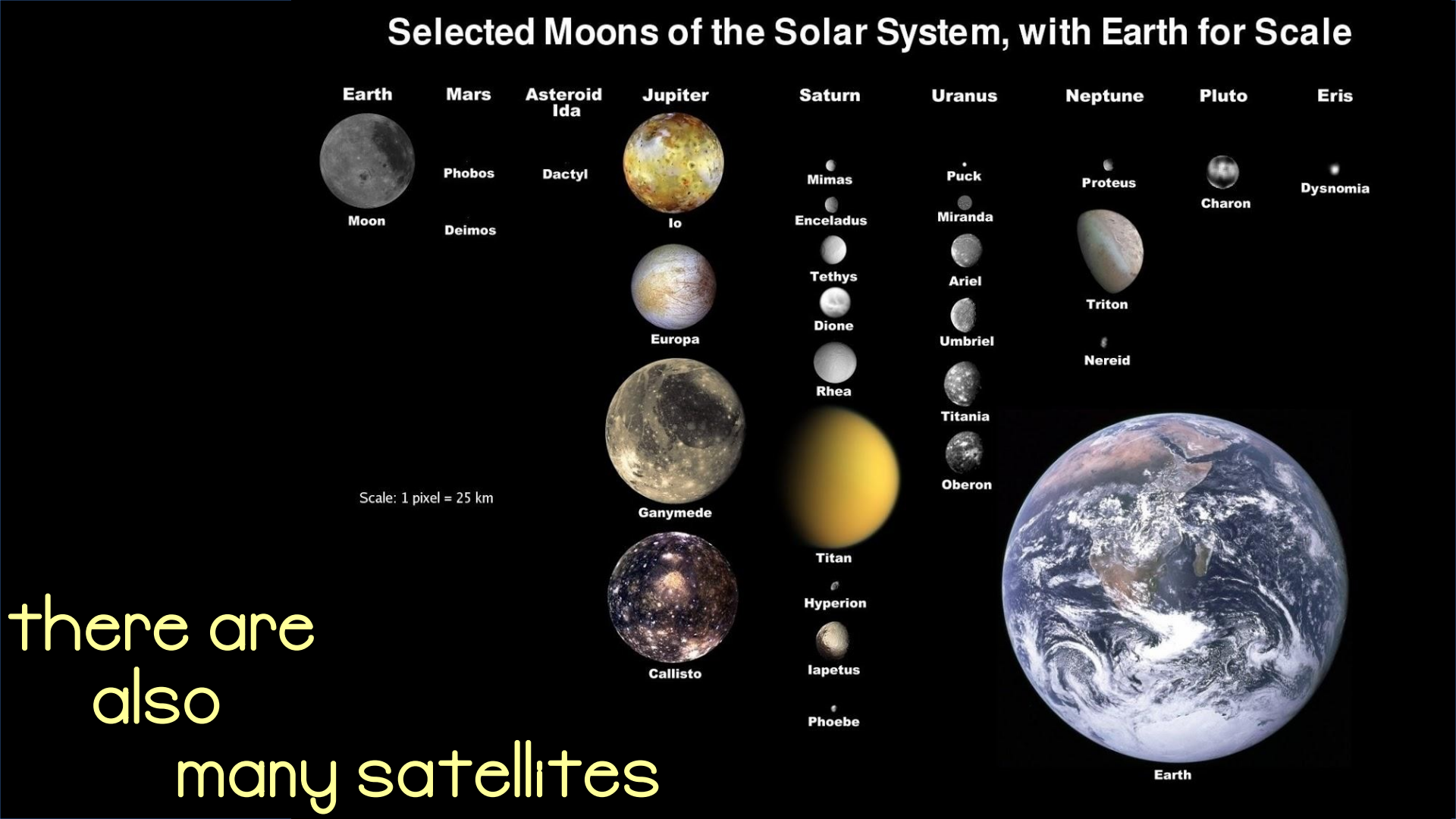
and our Sun

# our Sun is not even among the biggest stars



and it's not among the oldest either

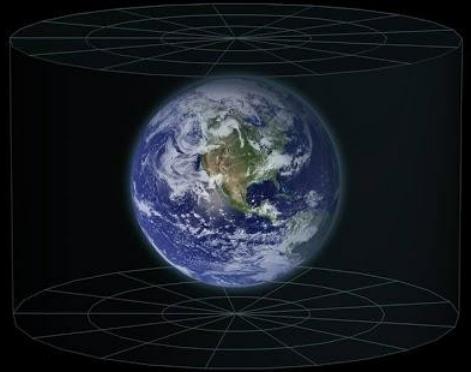



Selected Moons of the Solar System, with Earth for Scale
Earth
Mars
Asteroid Ida
Jupiter
Saturn
Uranus
Neptune
Pluto
Eris
Moon
Phobos
Deimos
Dactyl
Io
Europa
Ganymede
Callisto
Mimas
Enceladus
Tethys
Dione
Rhea
Titan
Hyperion
Iapetus
Phoebe
Puck
Miranda
Ariel
Umbriel
Titania
Oberon
Proteus
Triton
Nereid
Charon
Dysnomia
Scale: 1 pixel = 25 km
Earth
there are also many satellites

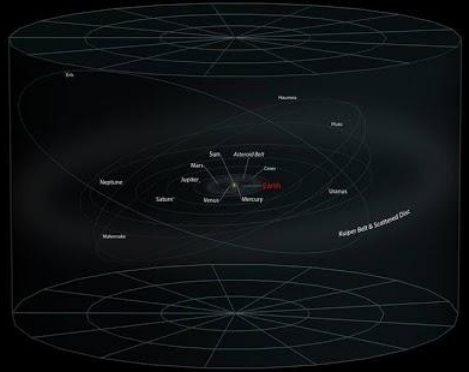

Makemake
Dysnomia
Eris
Luna
Charon
Ceres
Earth
Pluto
and
a few
dwarf
stars

# we are just a small point in the Universe

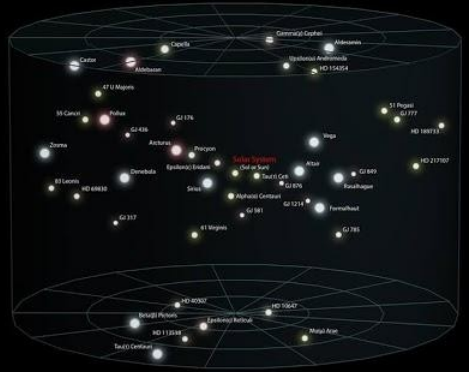
Earth



Solar System

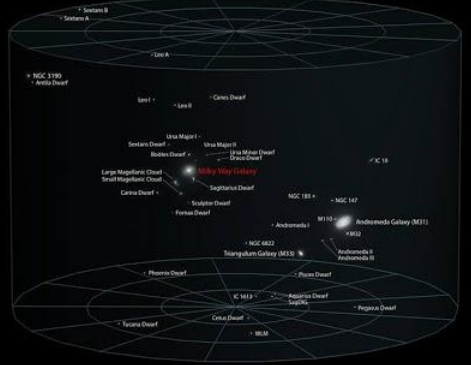



Solar Interstellar Neighborhood

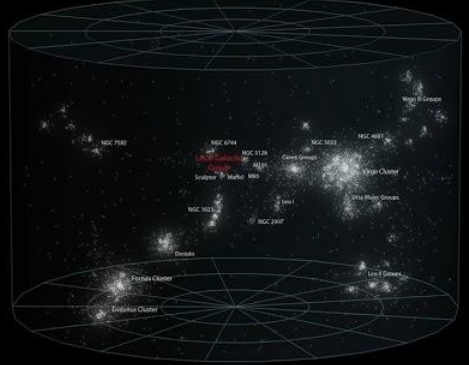



Milky Way Galaxy

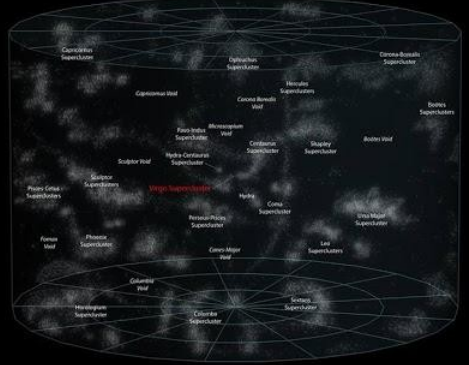
Local Galactic Group



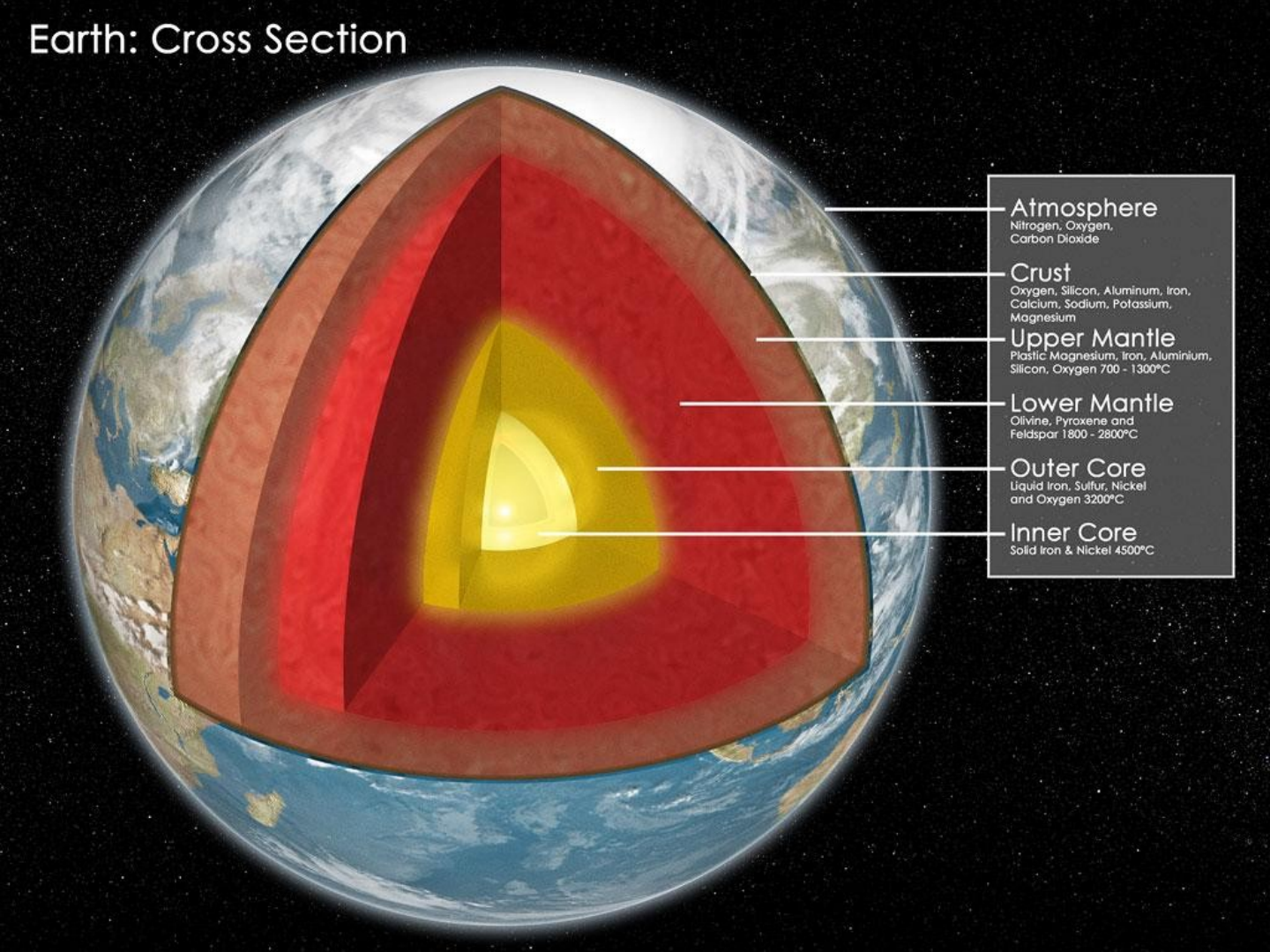

Virgo Supercluster




Local Superclusters

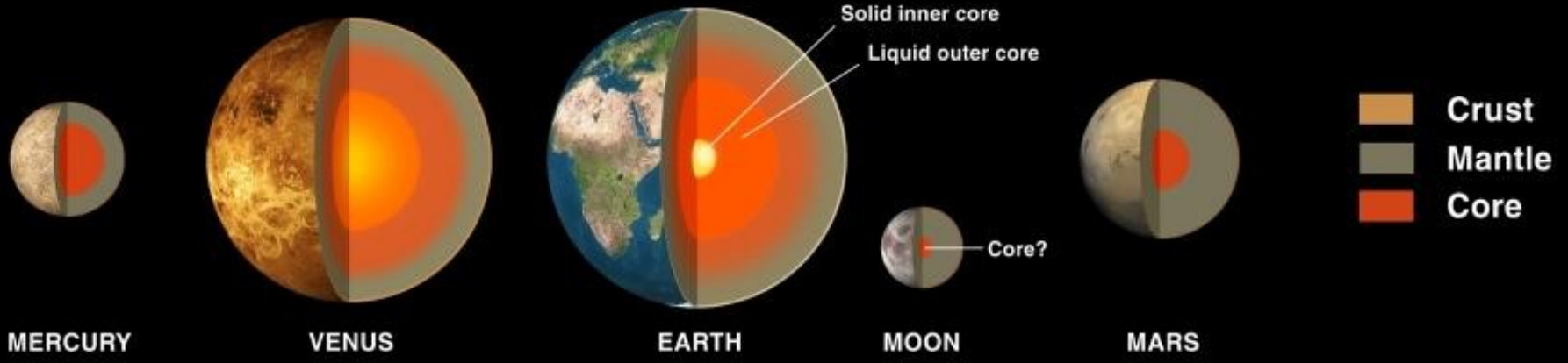


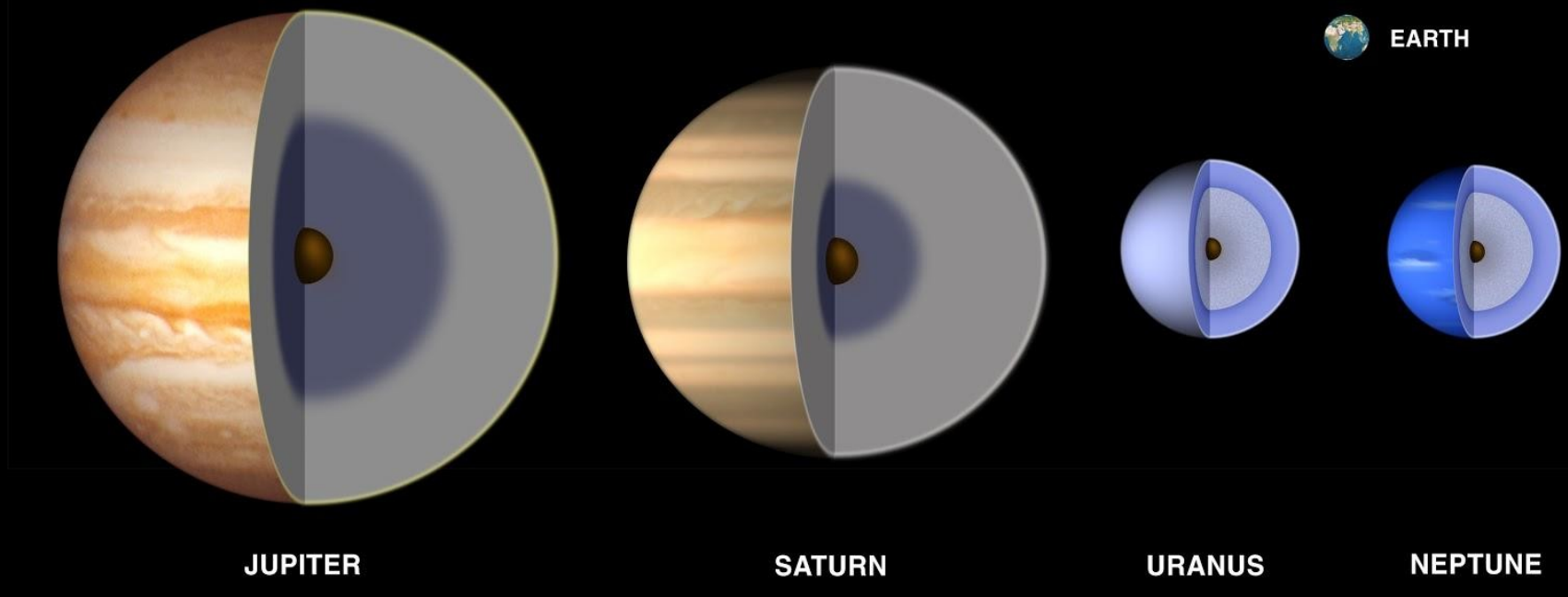

Observable Universe



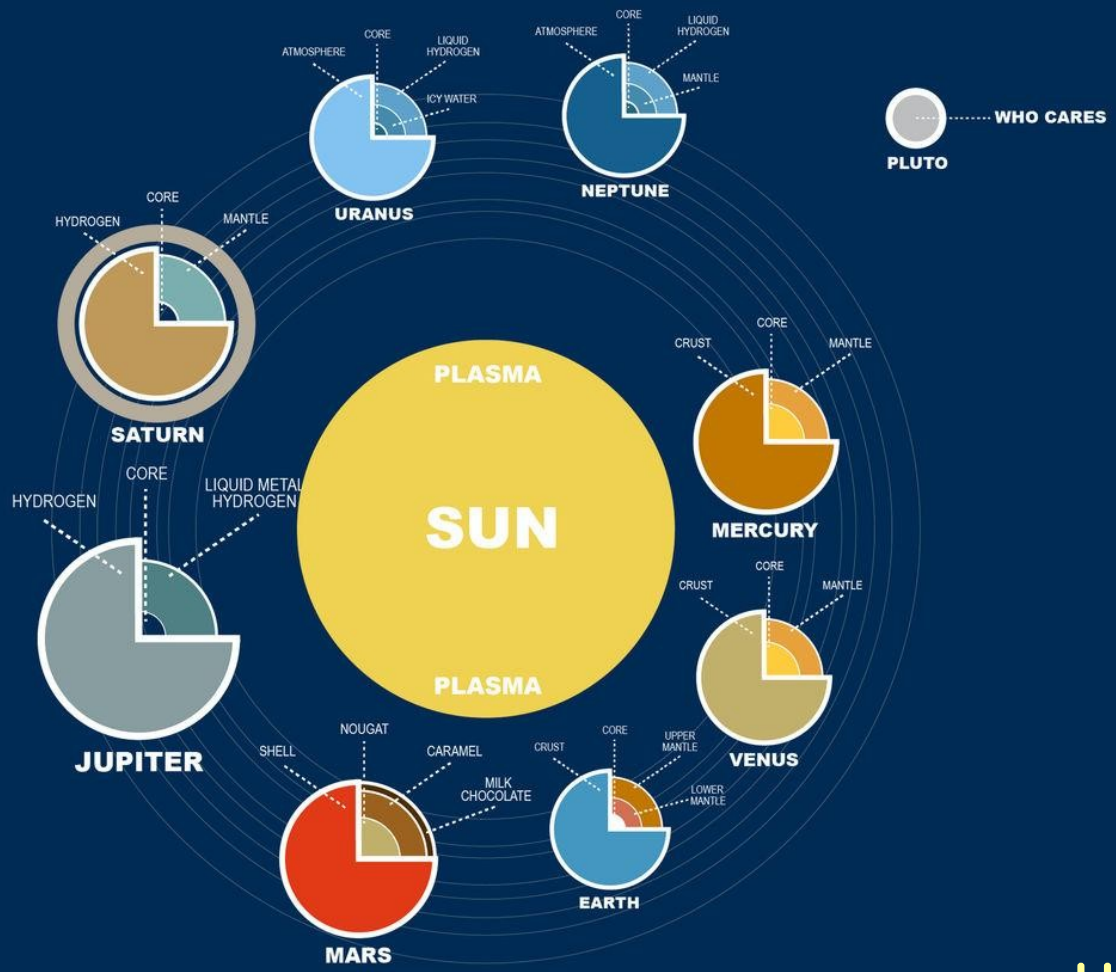

the Earth has a very warm core and some layers

# just like the other rocky planets

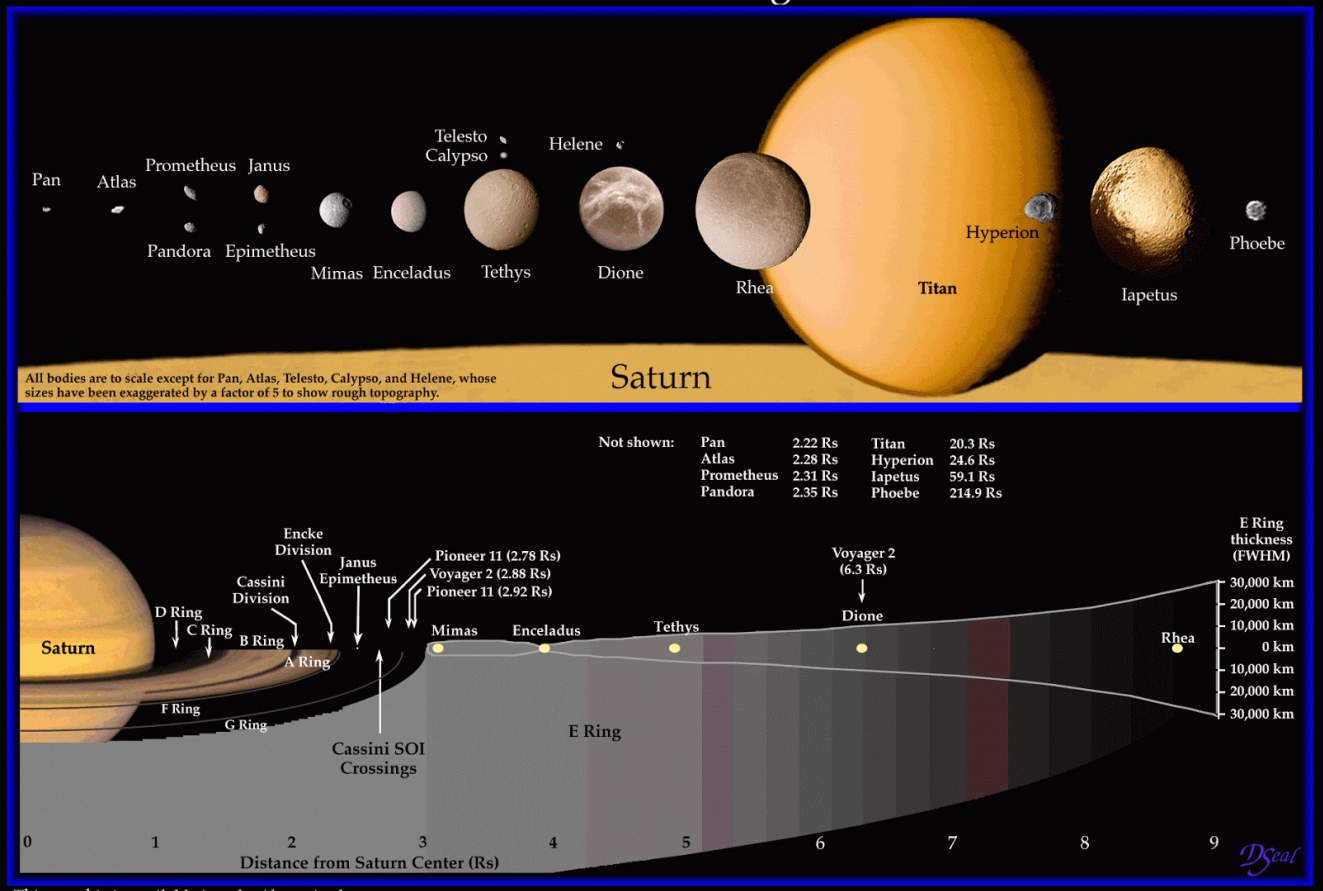





and the gas giants



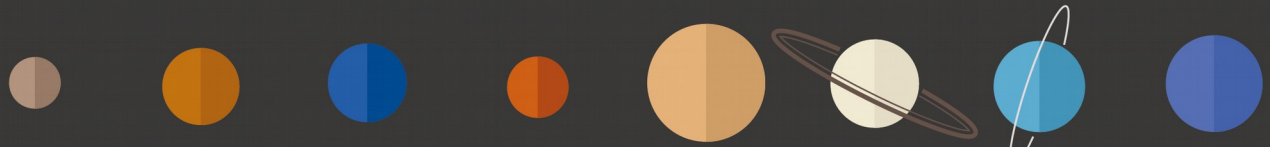

this
is
where We live




This graphic is available in color if required.

# Saturn's rings are impressive

# ATMOSPHERES OF THE SOLAR SYSTEM



## The Terrestrial Planets

### MERCURY

Pressure: ~$10^{-14}$ atm

- $O_2$ OXYGEN — 42%
- Na SODIUM — 29%
- $H_2$ HYDROGEN — 22%
- OTHER GASES — 7%

He, K, Ar, $CO_2$, $H_2O$, $N_2$, Xe, Kr & Ne

### VENUS

Pressure: ~90 atm

- $CO_2$ CARBON DIOXIDE — 96%
- $N_2$ NITROGEN — 3%
- OTHER GASES — 1%

$SO_2$, Ar, $H_2O$, CO, He & Ne

CLOUDS OF SULFURIC ACID

### EARTH

Pressure: ~1 atm

- $N_2$ NITROGEN — 78%
- $O_2$ OXYGEN — 21%
- Ar ARGON — ~1%
- OTHER GASES — <1%

$CO_2$, Ne, He, $CH_4$, Kr & $H_2$

### MARS

Pressure: ~0.006 atm

- $CO_2$ CARBON DIOXIDE — 95%
- $N_2$ NITROGEN — 3%
- Ar ARGON — 1.5%
- OTHER GASES — 0.5%

$O_2$, CO, $H_2O$, NO, Ne, Kr & Xe

## The Gas Giants

### JUPITER

Pressure: >>1000 atm

- $H_2$ HYDROGEN — 90%
- He HELIUM — ~10%
- OTHER GASES — <1%

$CH_4$, $NH_3$, $C_2H_6$, $H_2O$

HYDROGEN IS METALLIC AT HIGH PRESSURE

### SATURN

Pressure: >>1000 atm

- $H_2$ HYDROGEN — 96%
- He HELIUM — 3%
- OTHER GASES — 1%

$CH_4$, $C_2H_6$, $H_2O$

SULFUR GIVES GAS CLOUDS A YELLOW CAST

### URANUS

Pressure: >>1000 atm

- $H_2$ HYDROGEN — 83%
- He HELIUM — 15%
- $CH_4$ METHANE — 2.5%

+ Trace gases: HD

METHANE GAS CAUSES URANUS'S BLUE COLOUR

### NEPTUNE

Pressure: >>1000 atm

- $H_2$ HYDROGEN — 80%
- He HELIUM — 19%
- $CH_4$ METHANE — ~1%

+ Trace gases: HD, $C_2H_2$

STRONGEST WINDS IN THE SOLAR SYSTEM

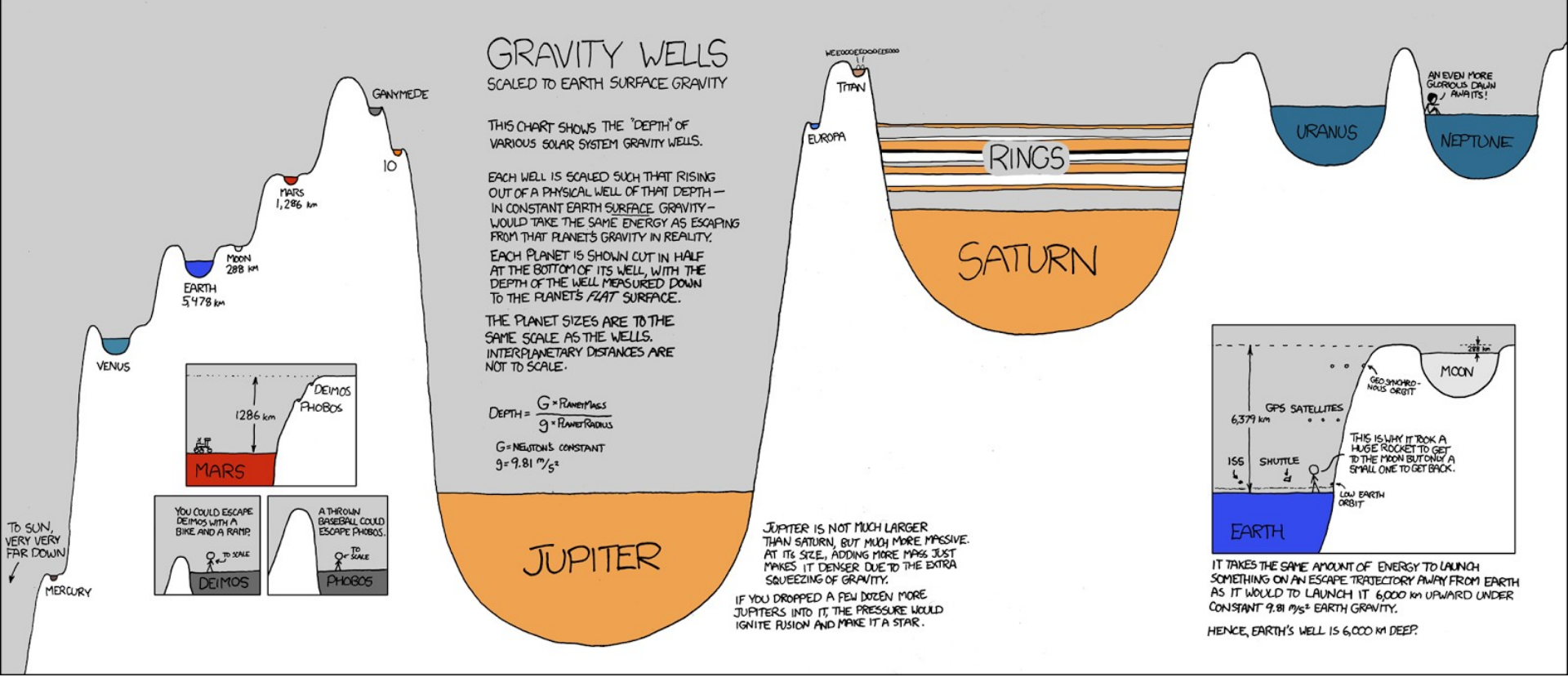
*Note:* Planet sizes not to scale. Pressures for terrestrial planets are surface pressures. Mercury's atmosphere is not an atmosphere in the strict sense of the word, being a trillion times thinner than Earth's.



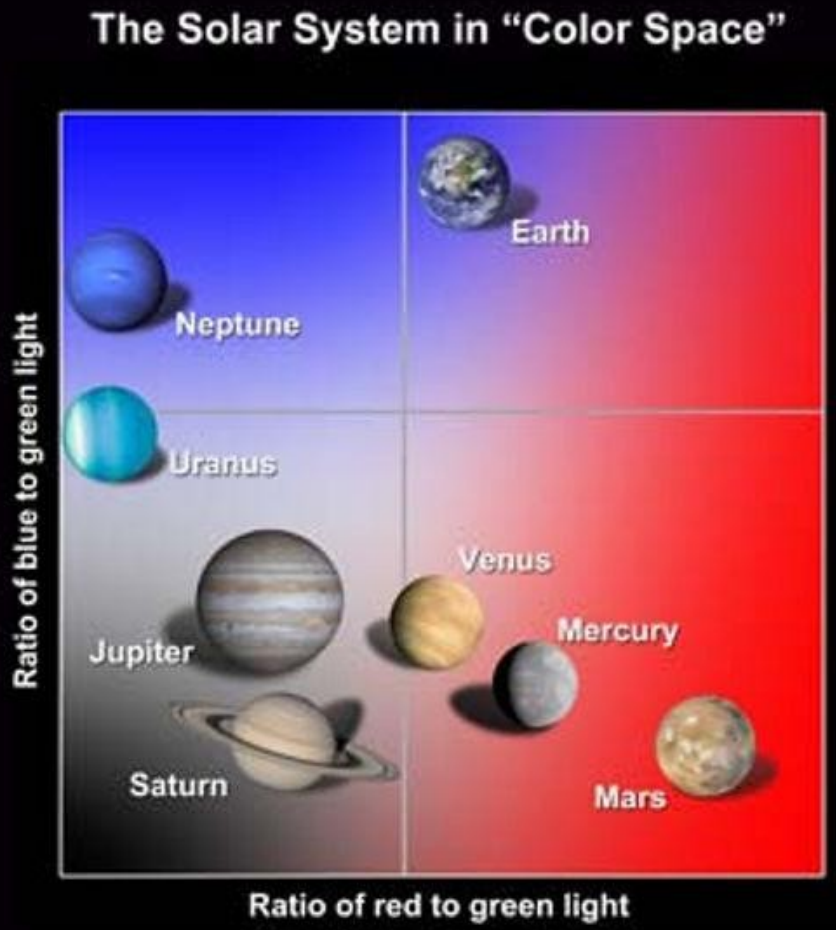
Atmospheric compositions taken from NASA, http://quest.arc.nasa.gov/projects/astrobiology/astroventure/challenge/Articles/planetatmoscomp.pdf



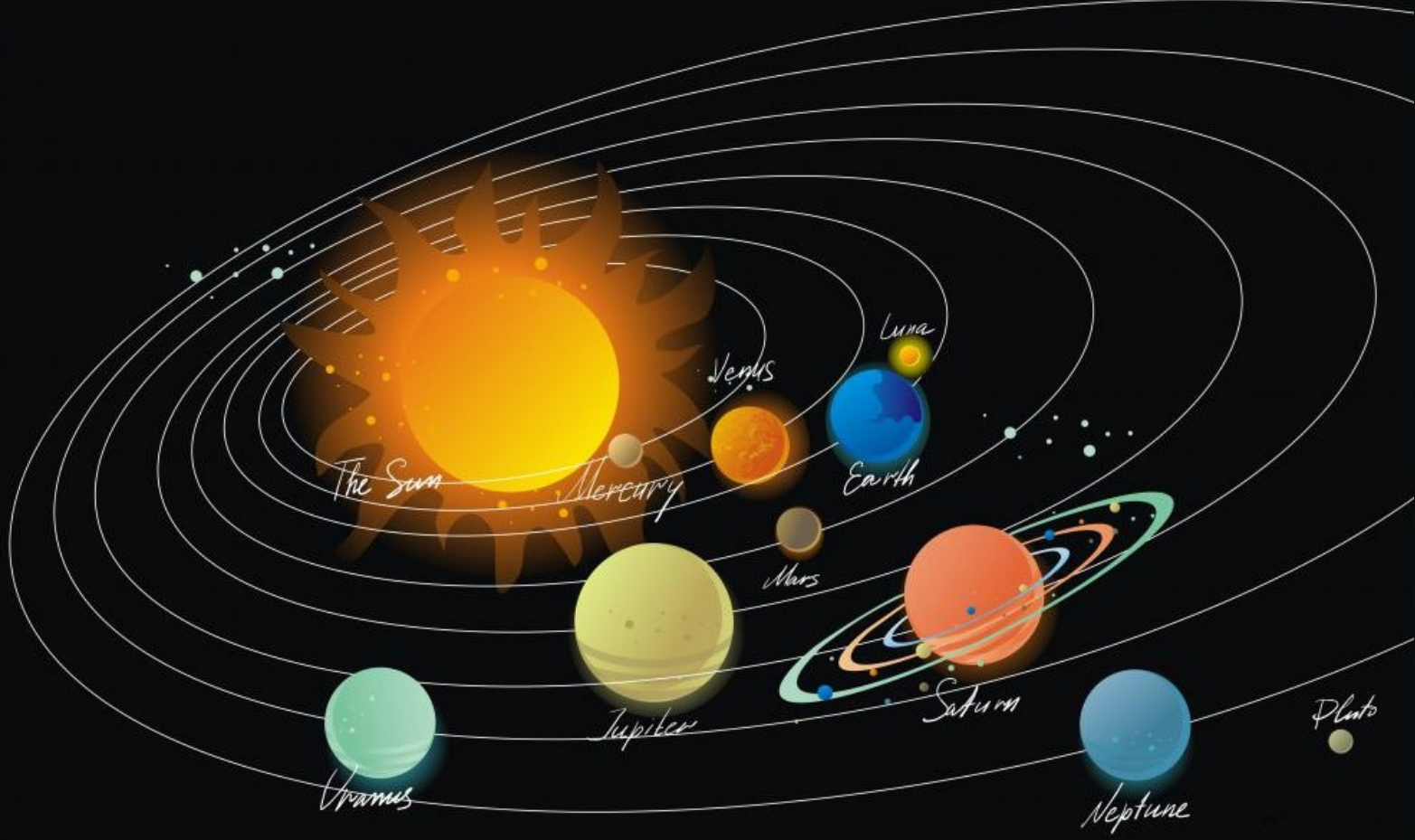
all the Planets have atmosphere



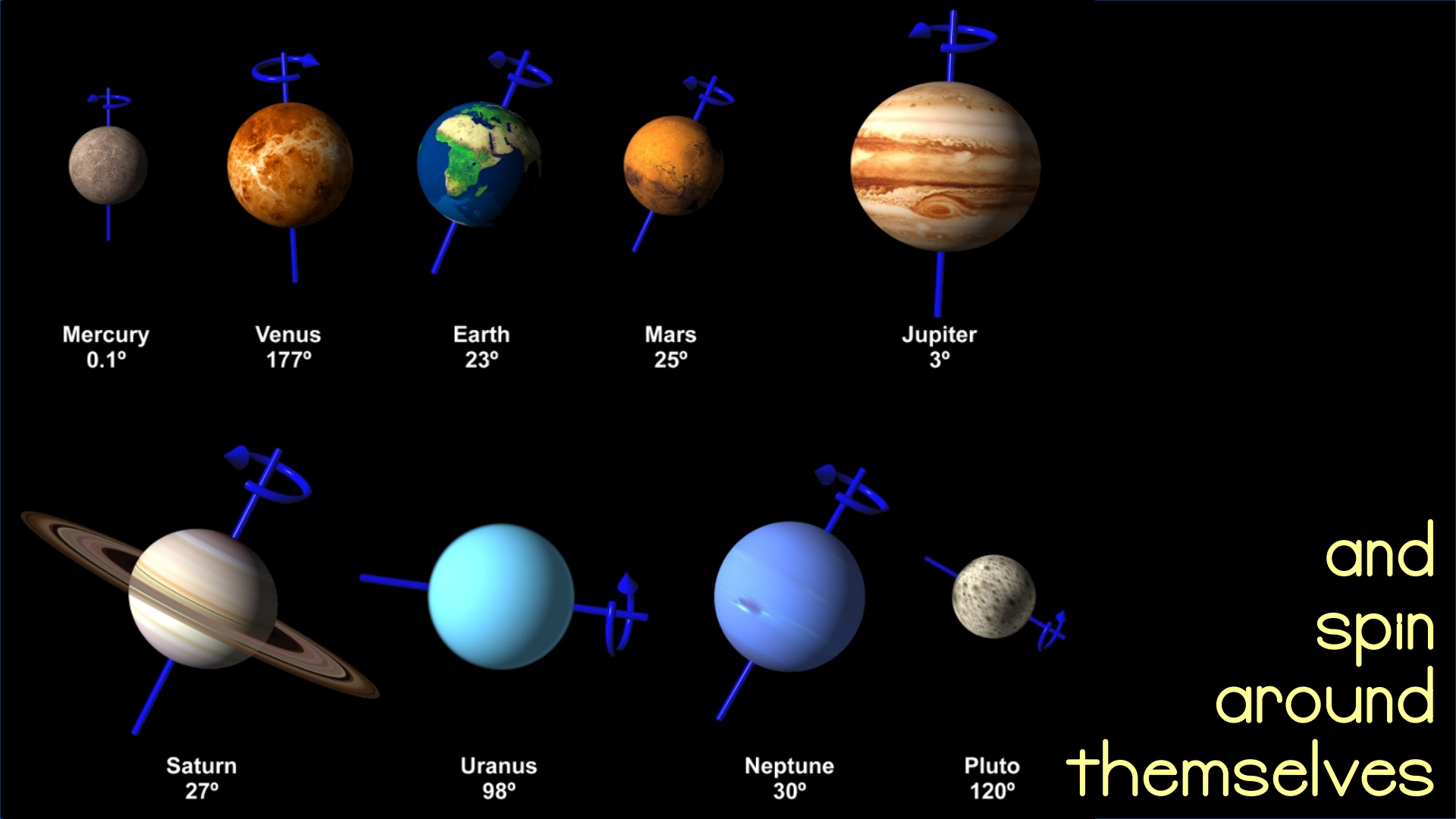

the bigger a planet is, the more it weights, and the more it attracts other objects



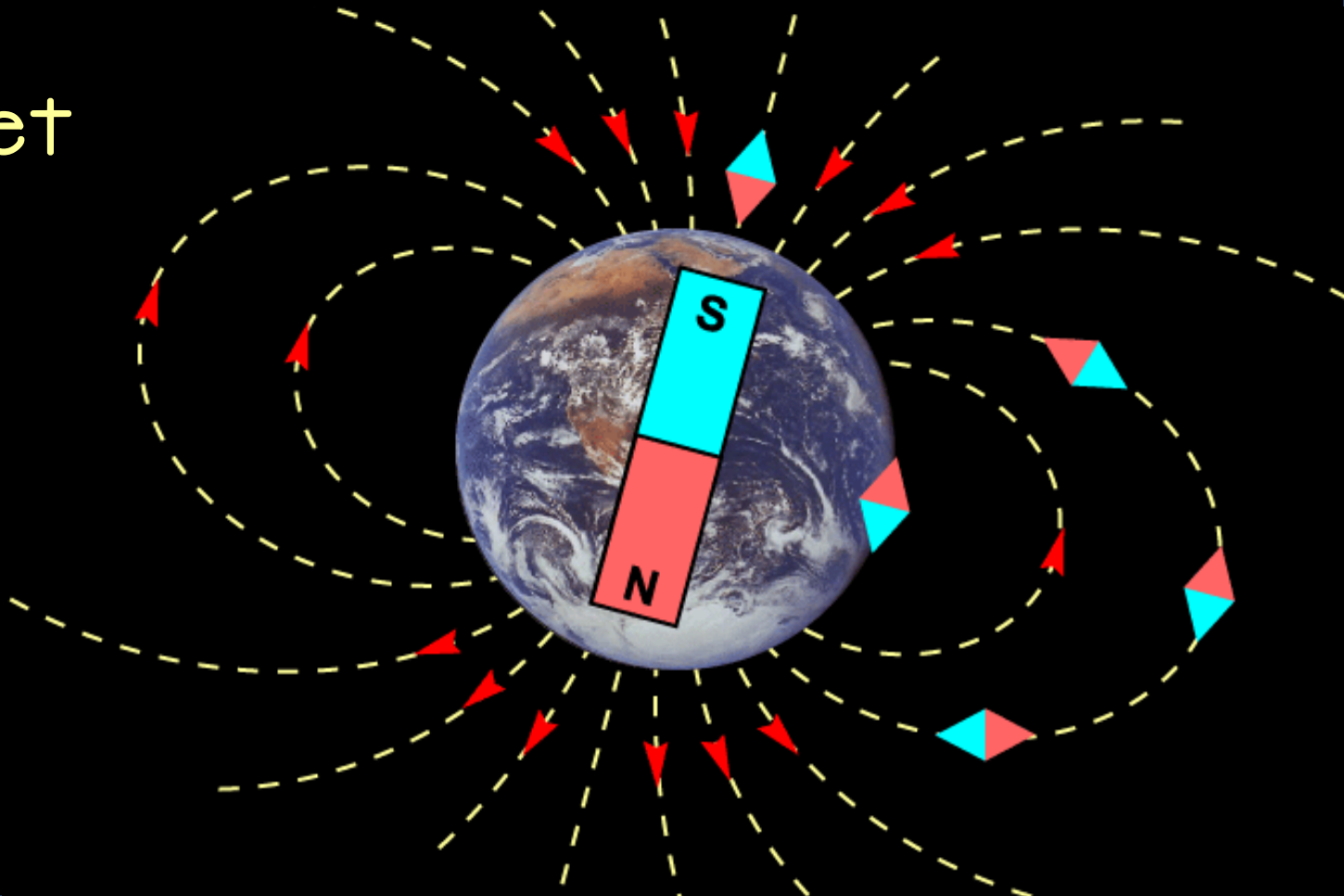

Their
color
depends
on which materials they are made of



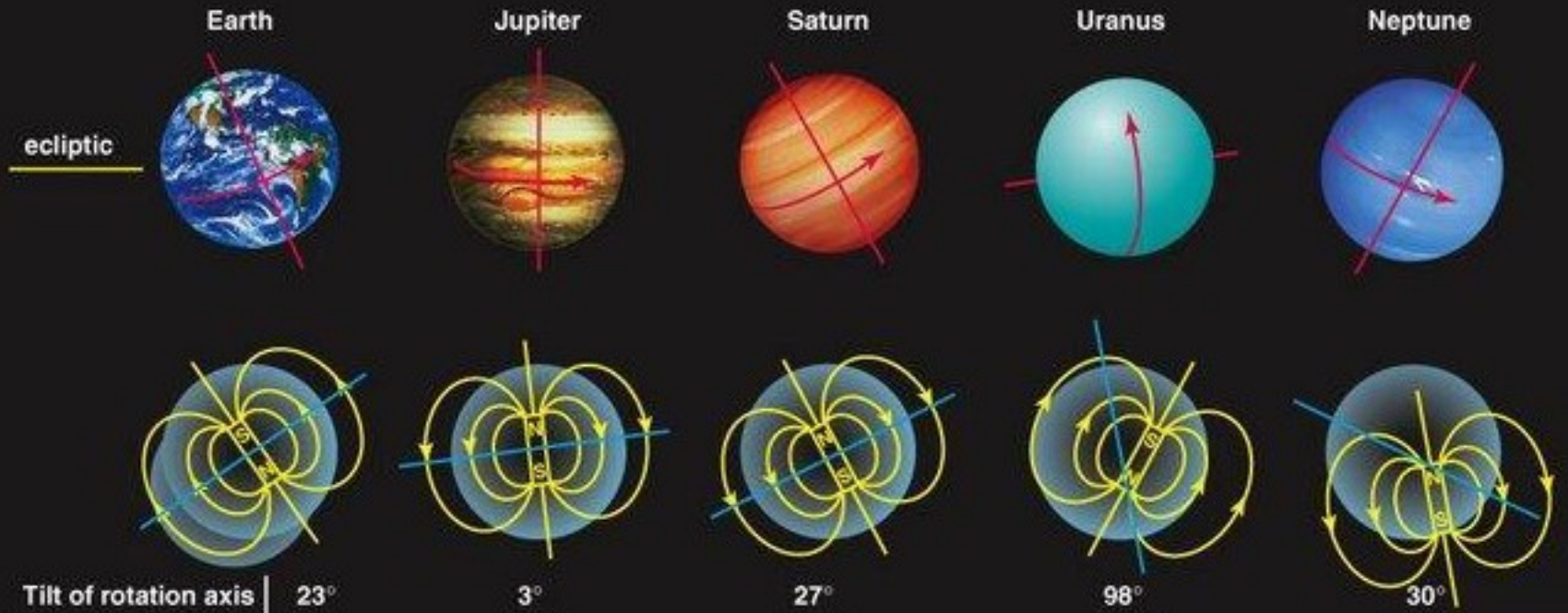

the planets orbit around the Sun


Mercury
0.1°
Venus
177°
Earth
23°
Mars
25°
Jupiter
3°
Saturn
27°
Uranus
98°
Neptune
30°
Pluto
120°
and
spin
around
themselves

the Earth's magnetic field
makes it
a big magnet



# other planets have magnetic fields too



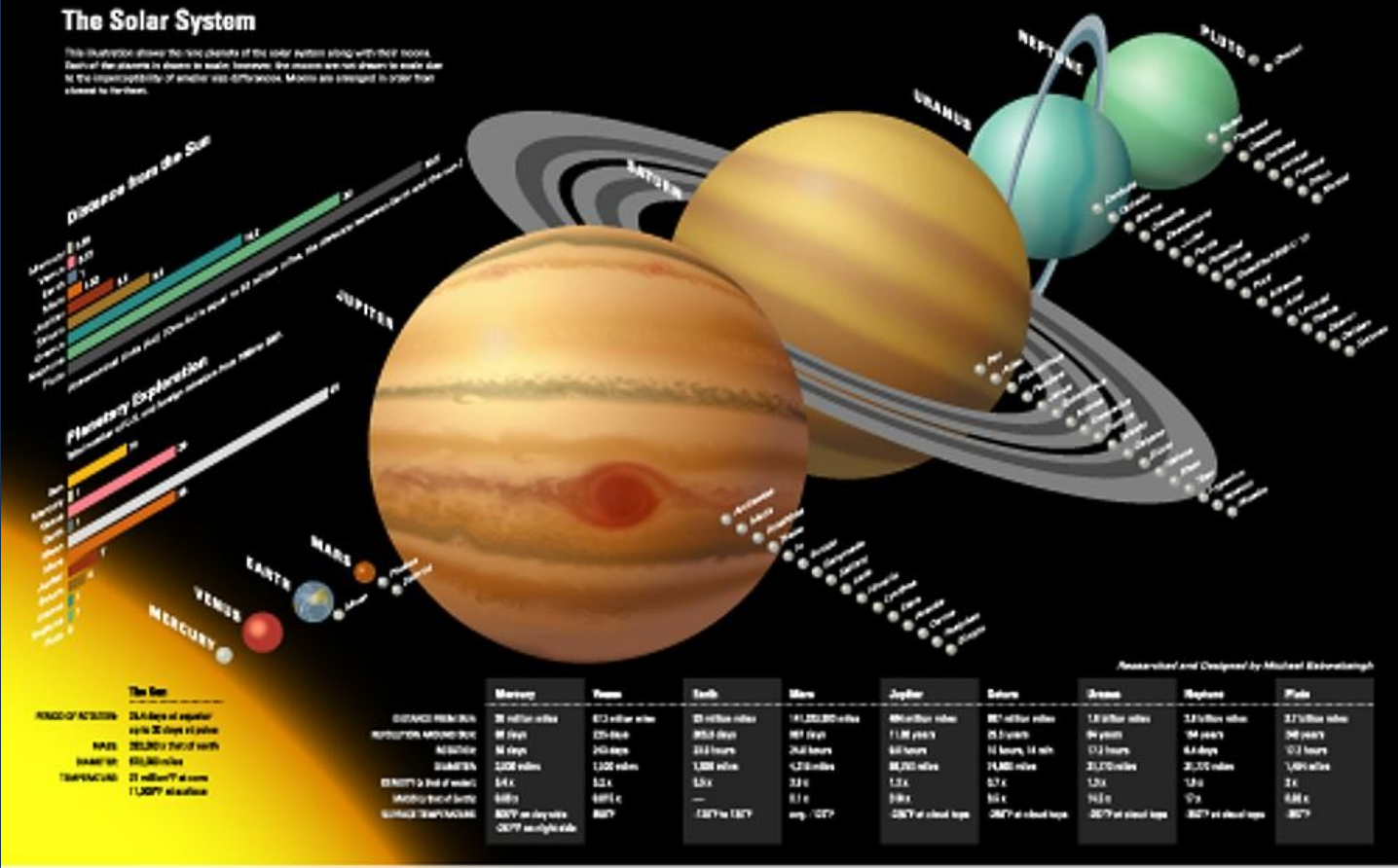

| | Earth | Jupiter | Saturn | Uranus | Neptune |
|---|---|---|---|---|---|
| Tilt of rotation axis | 23° | 3° | 27° | 98° | 30° |
| Tilt of magnetic axis | 12° | −10° | −0° | −59° | −47° |
| Offset of magnetic axis | 8% | 10% | 5% | 31% | 55% |
| Field at equator | 31,000 nT | 428,000 nT | 22,000 nT | 23,000 nT | 13,000 nT |
| Magnetosphere | 10 $R_{Earth}$ | 65 $R_{Jupiter}$ | 20 $R_{Saturn}$ | 18 $R_{Uranus}$ | 25 $R_{Neptune}$ |

# when the solar wind collide with them they cause the auroras



Video: https://www.youtube.com/watch?v=JWw0wZoUE-4

# there are many things in our Solar System



but we only have One Earth,

and we have to take care of it

# Planets

## in our Solar System