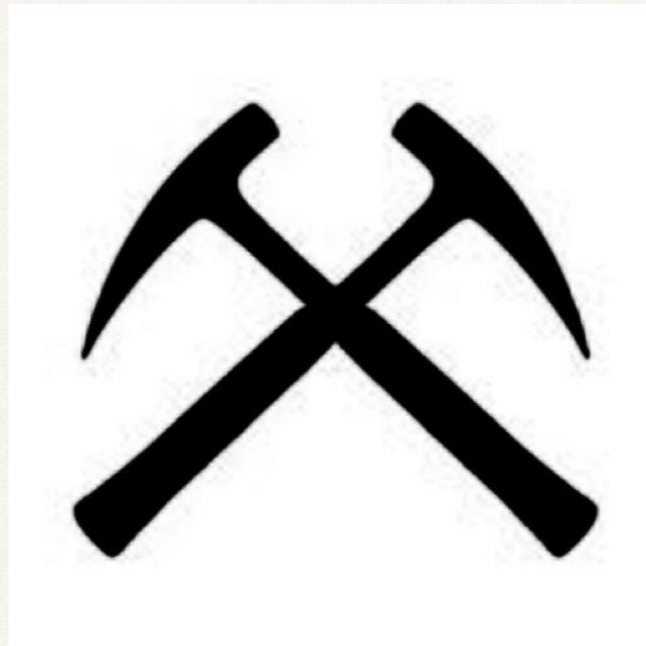


Geology Stuff



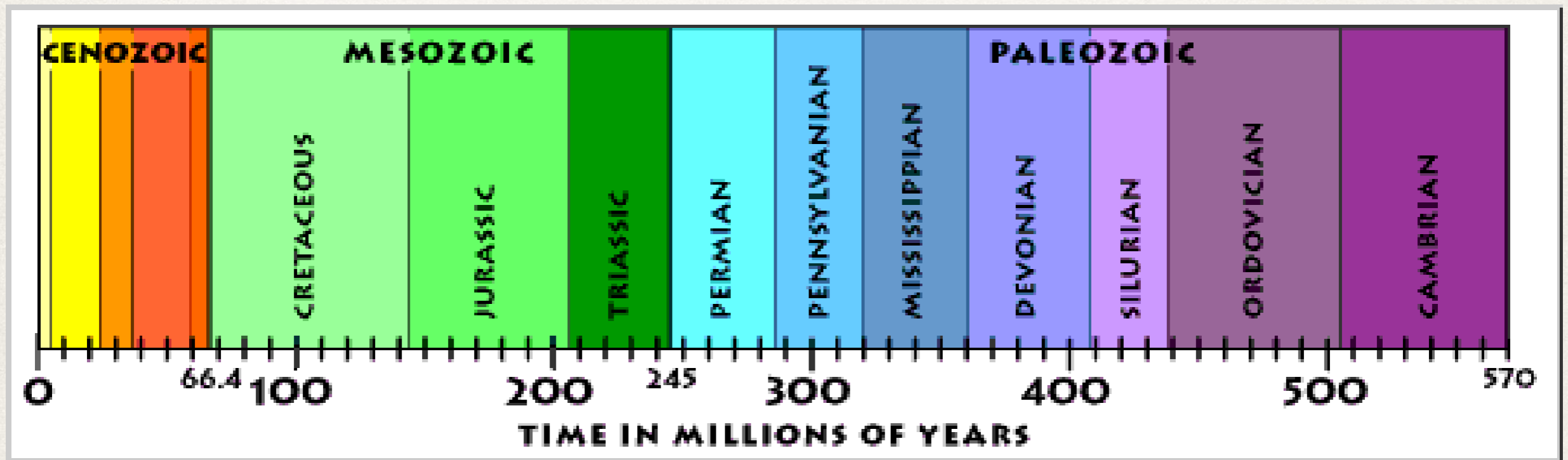
with
Prof. Robles

Geology Stuff

- The basics of Geologic Time
- The birth of our universe, solar system and planet
- Earthquakes and Volcanoes related to plate tectonics



Geologic Time



Principle of Uniformitarianism

- “The present is the key to the past”
 - Founding principle of geology
- Credited to James Hutton (1726-1797)



portrait of James Hutton

Important Principles

Original Superpositionality



Siccar Point

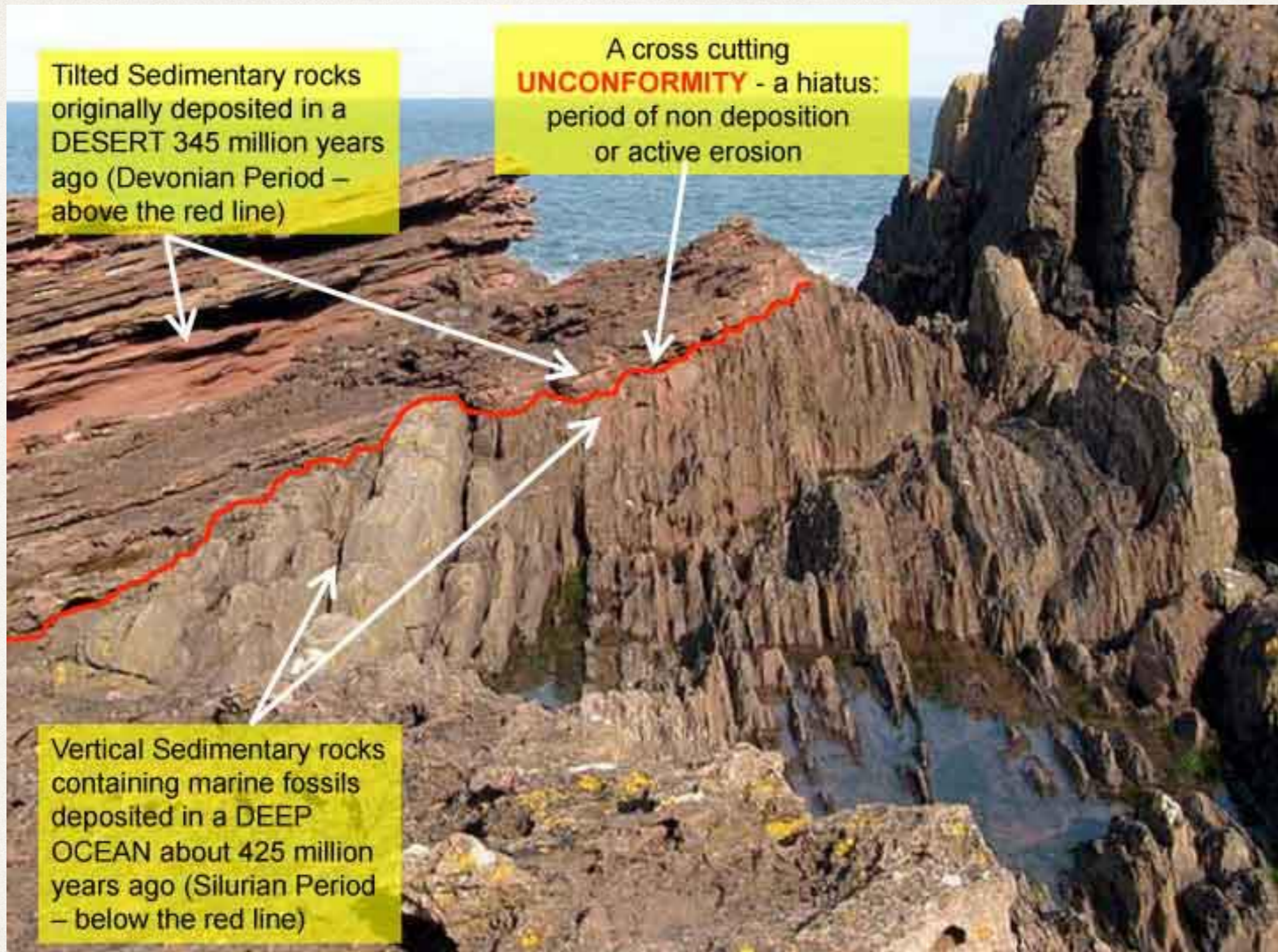


image of Siccar Point





Underlying Concept

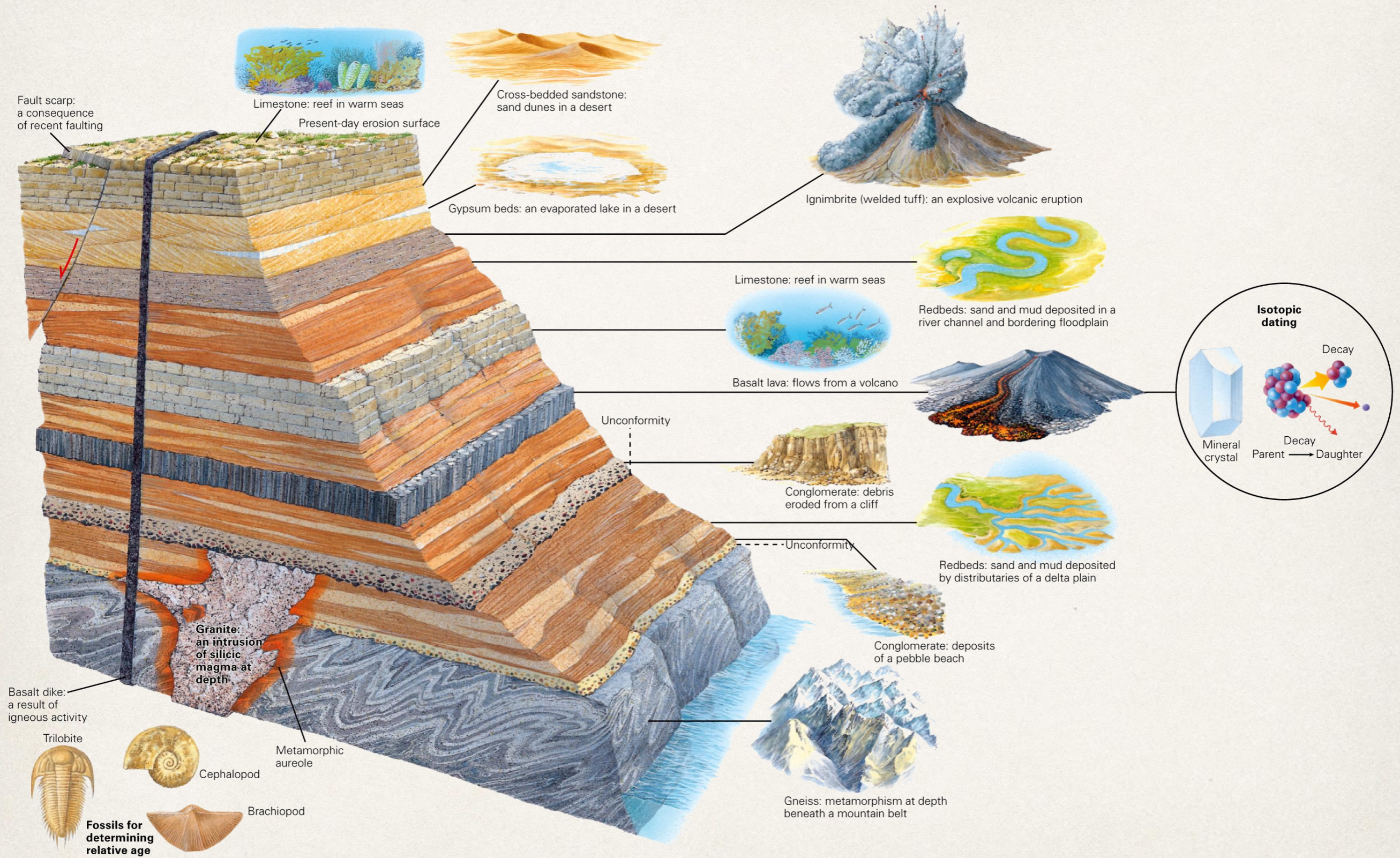
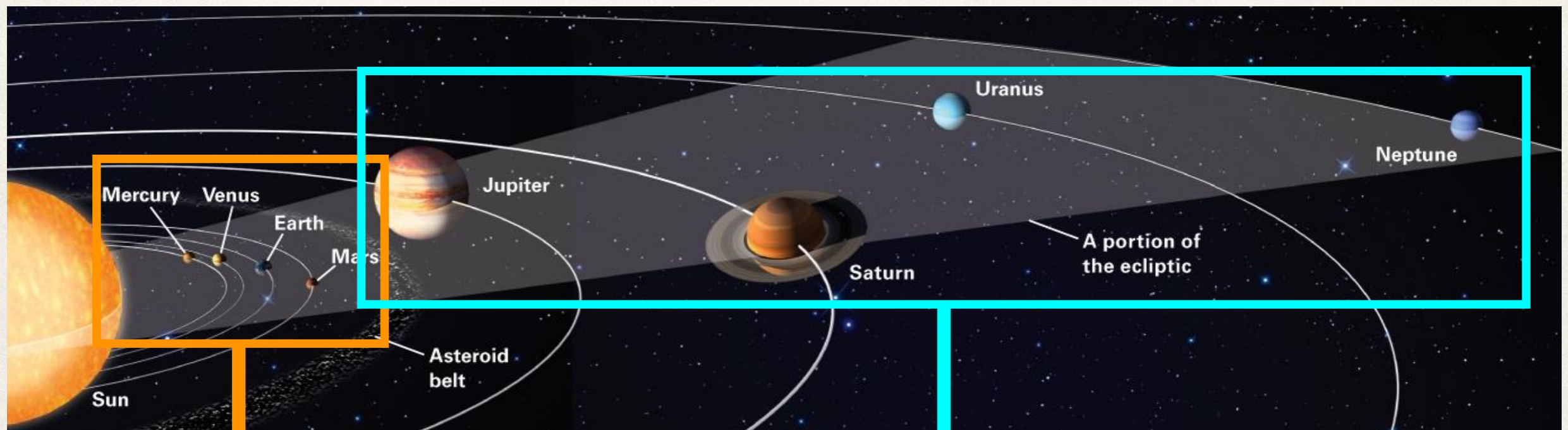


figure: image showing various geologic processes and related rock units

Why Is Earth Called “The Pale Blue Dot”?



Our Solar System



Terrestrial

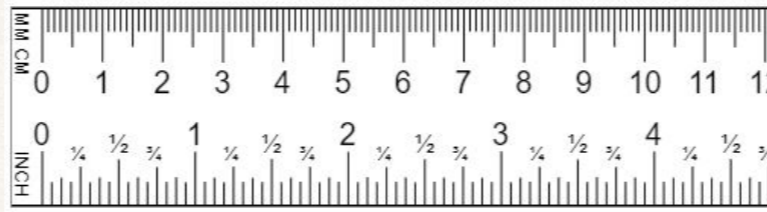
Jovian

Motions of the planetary bodies

- ❖ Earth spins on an axis of rotation.
 - ❖ Axis tilt of 23.4°
 - ❖ Rotational speed is 1,040 mph at the equator.
- ❖ Earth orbits the Sun.
 - ❖ 150 million km elliptical path
 - ❖ Orbital speed is 67,108 mph.
- ❖ Solar System revolves around the center of the Milky Way.
 - ❖ One revolution per 250 million years
 - ❖ Solar System speed is 447,387 mph.



Distances of the planetary bodies



Light-year = distance light travels in one year
1 light-year = 5.9 trillion miles

- Our moon is ~220,000 miles away (1.25 light-seconds)
- Our sun is ~92 million miles away (8 light-minutes)
- Pluto is 3.5 billion miles away: took our fastest aircraft 10 years to get there (327 light minutes)

Distances of the planetary bodies

- Our galaxy is 100,000 light years across (there are 5.9 trillion miles in one light year).
- Our nearest Galaxy is 2 million light years away
- There are over 100 billion stars in our galaxy
- There are over 100 billion galaxies in our universe each with over 100 billion stars



Size Comparisons

Terrestrial Planets to Dwarf Planet Pluto

Earth



Venus



Mars



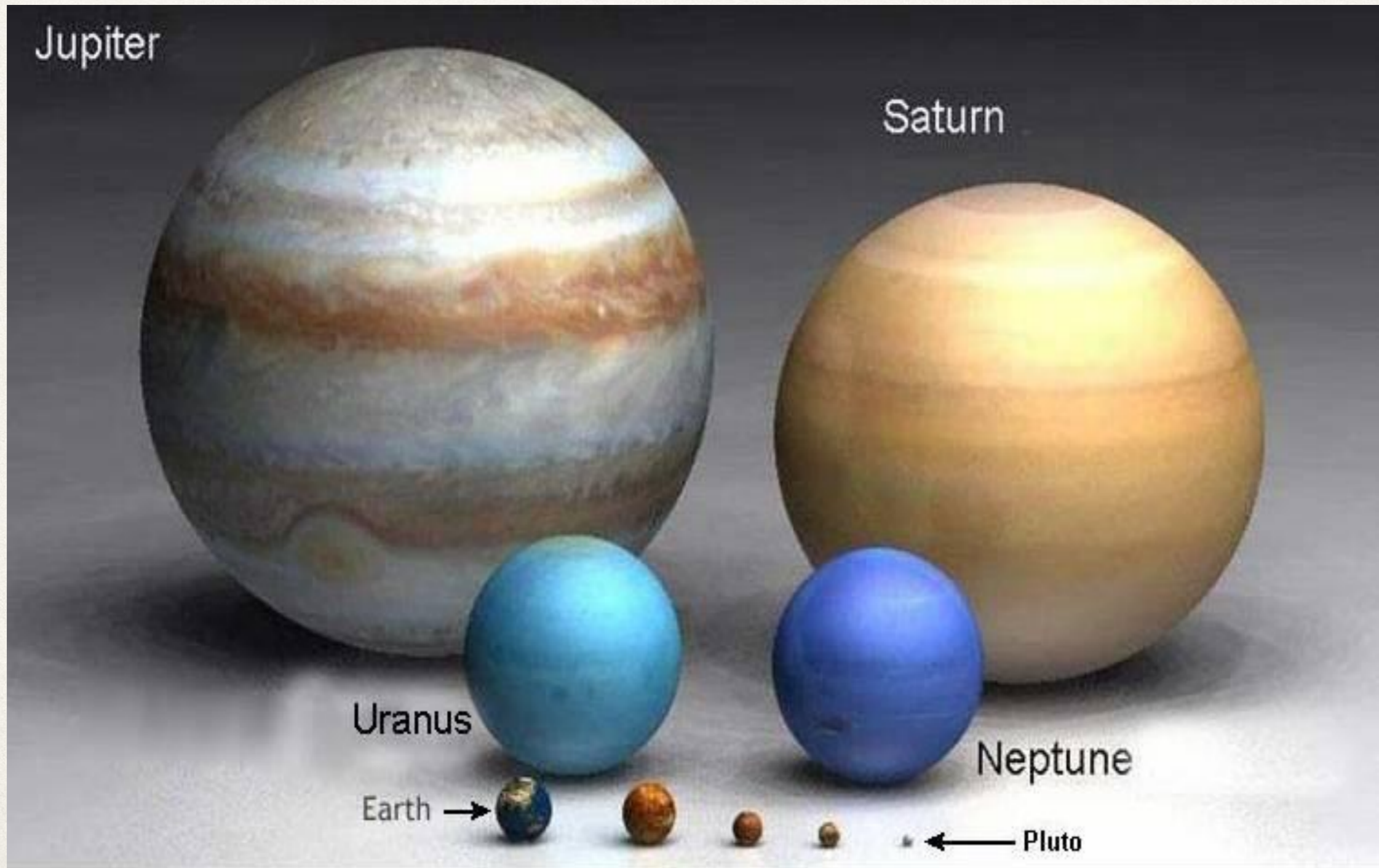
Mercury



Pluto

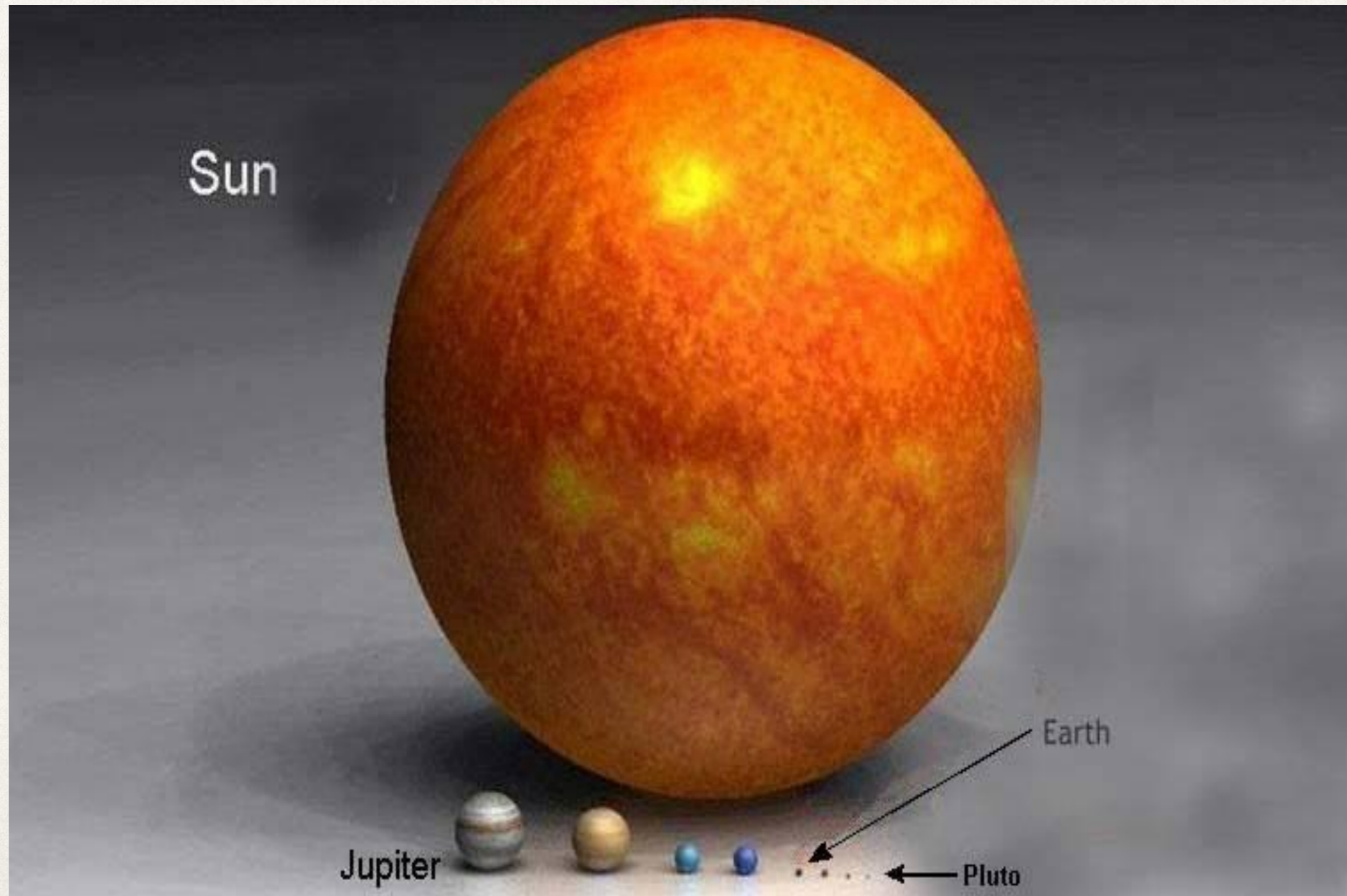
Size Comparisons

of Jovian Planets to Terrestrial Planets & Pluto



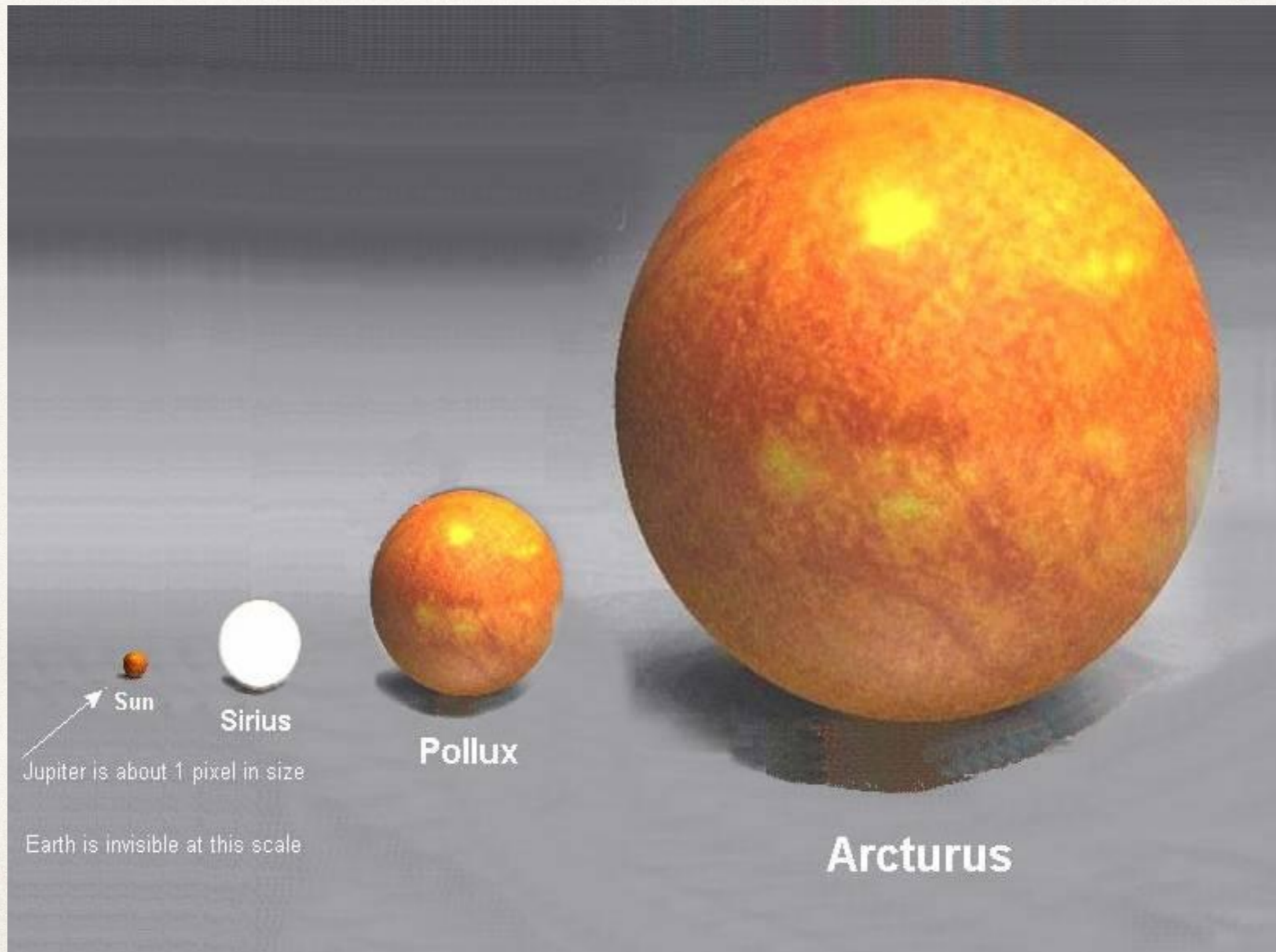
Size Comparisons

of Sun to planets in the solar system



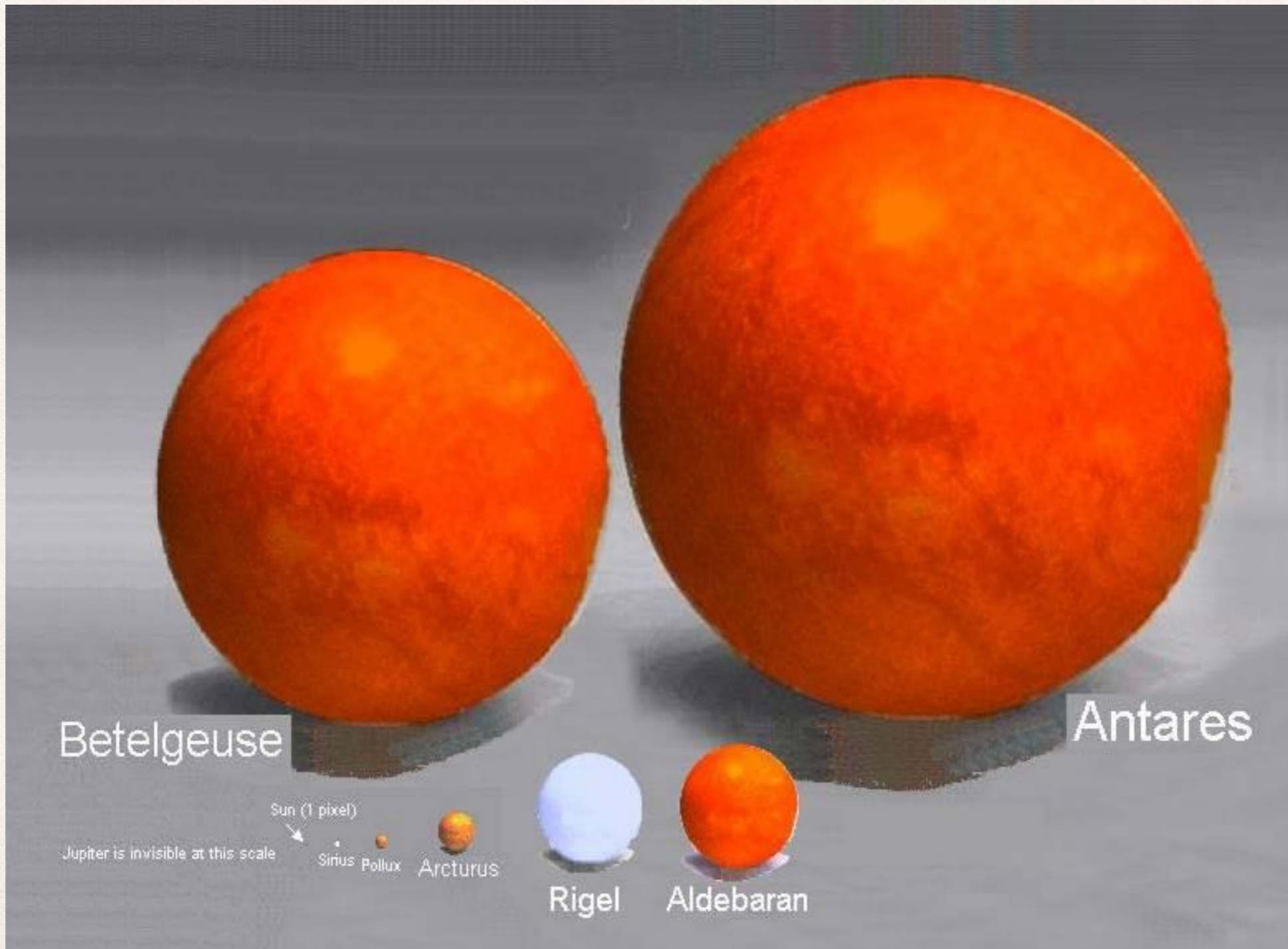
Size Comparisons

of our Sun to some other stars



Size Comparisons

with even larger stars



The Milky Way



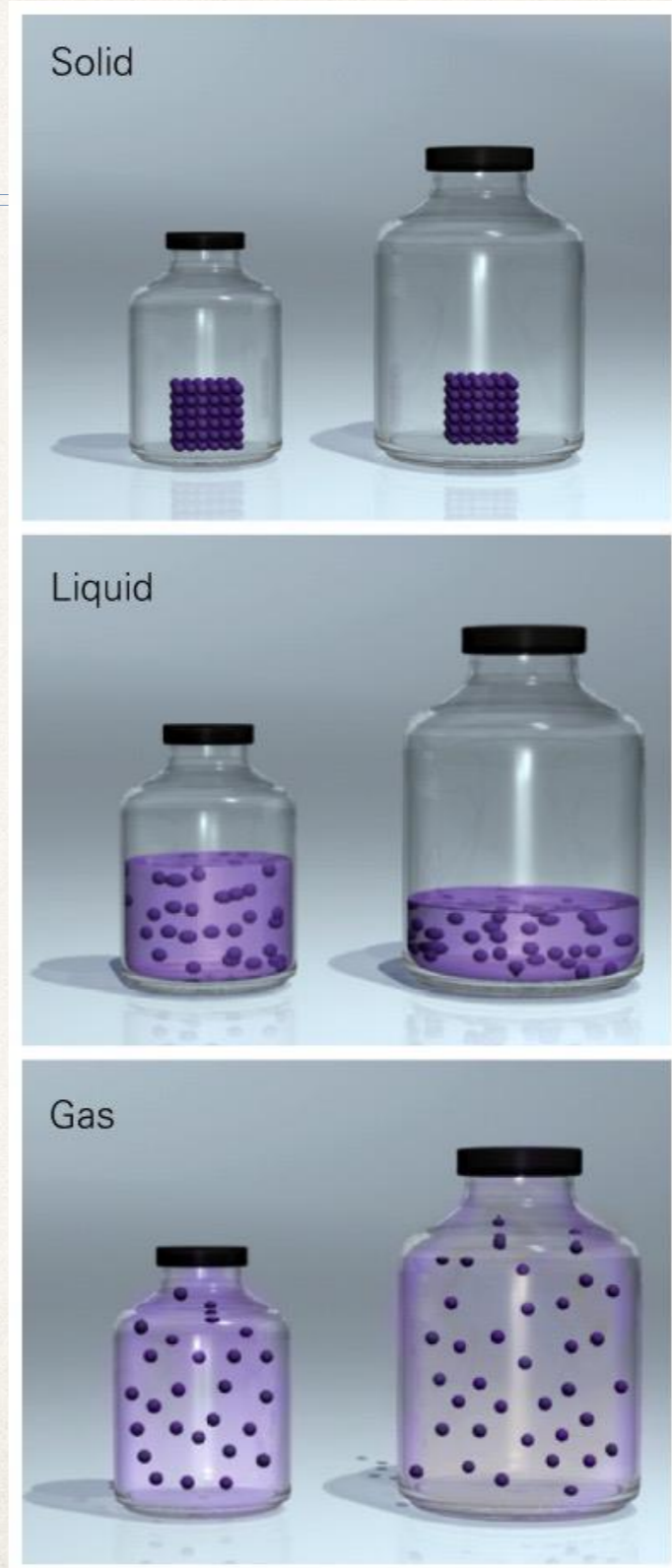
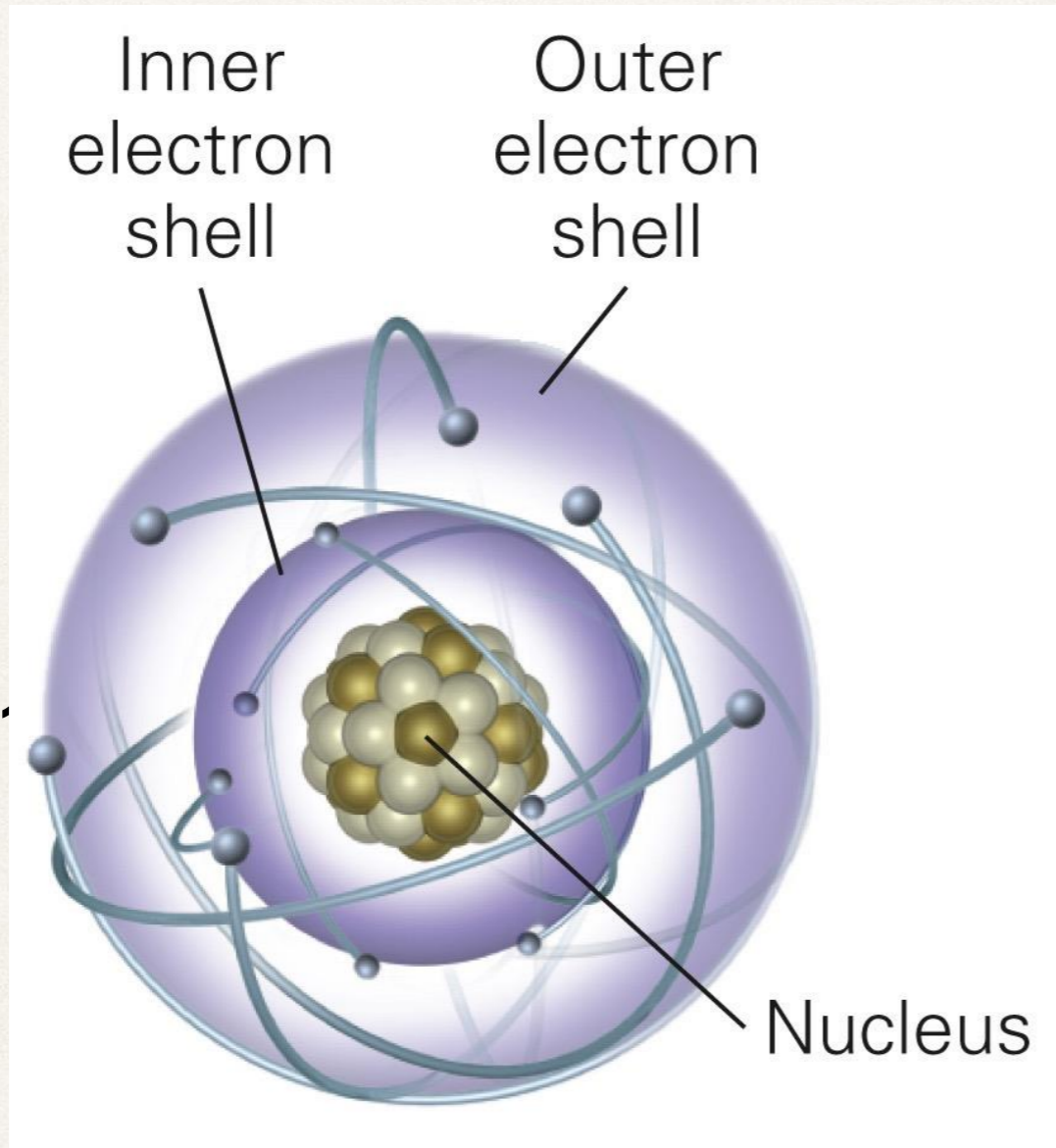
So . . . How did all of this start?

The Big Bang Theory



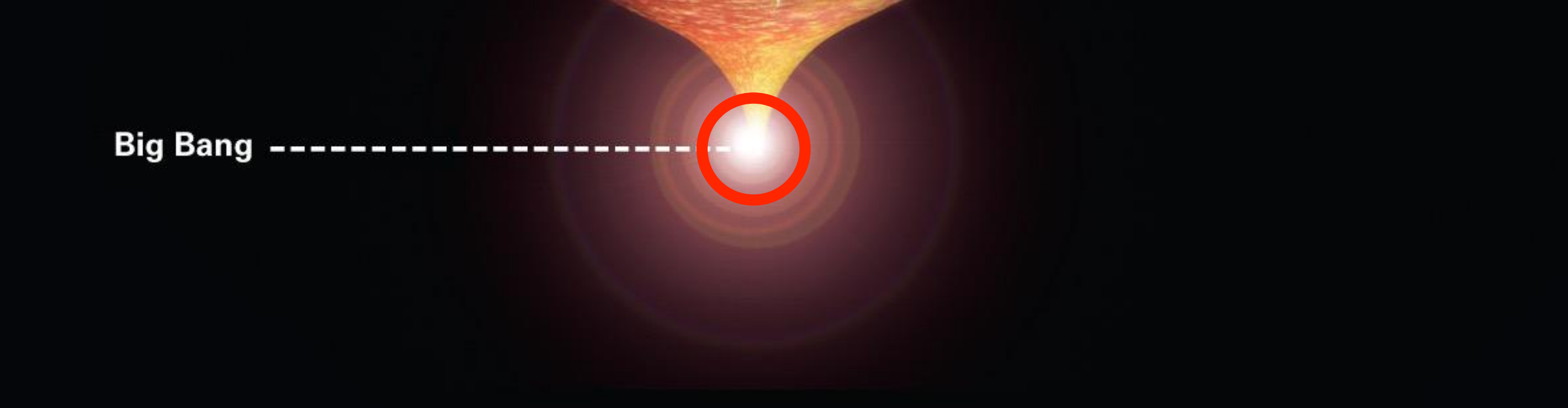
States of Matter

Box 1.1



Light Elements H, He, Li, Be

- Big Bang nucleosynthesis formed the lightest elements.
 - H, He, Li, Be, and B
 - All have atomic numbers less than five.



The diagram shows a central bright white point representing the beginning of the Big Bang, enclosed in a red circle. A dashed white line extends from the text 'Big Bang' to this point. From the point, a funnel-shaped structure expands outwards, with a color gradient from white at the center to yellow, orange, and red at the edges, symbolizing the expansion and cooling of the universe.

Big Bang

Stellar Nucleosynthesis

Heavier Elements up to Iron

