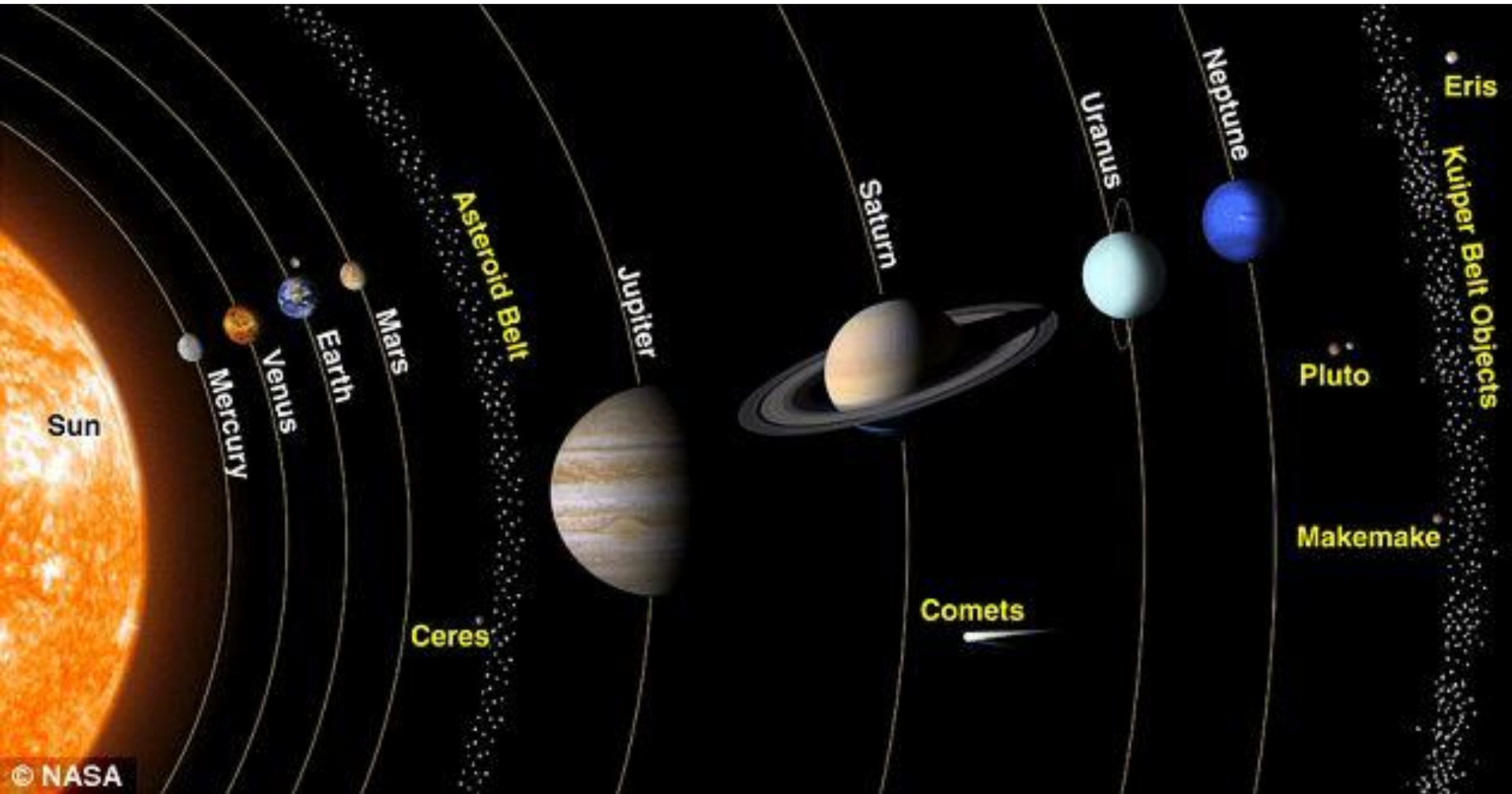
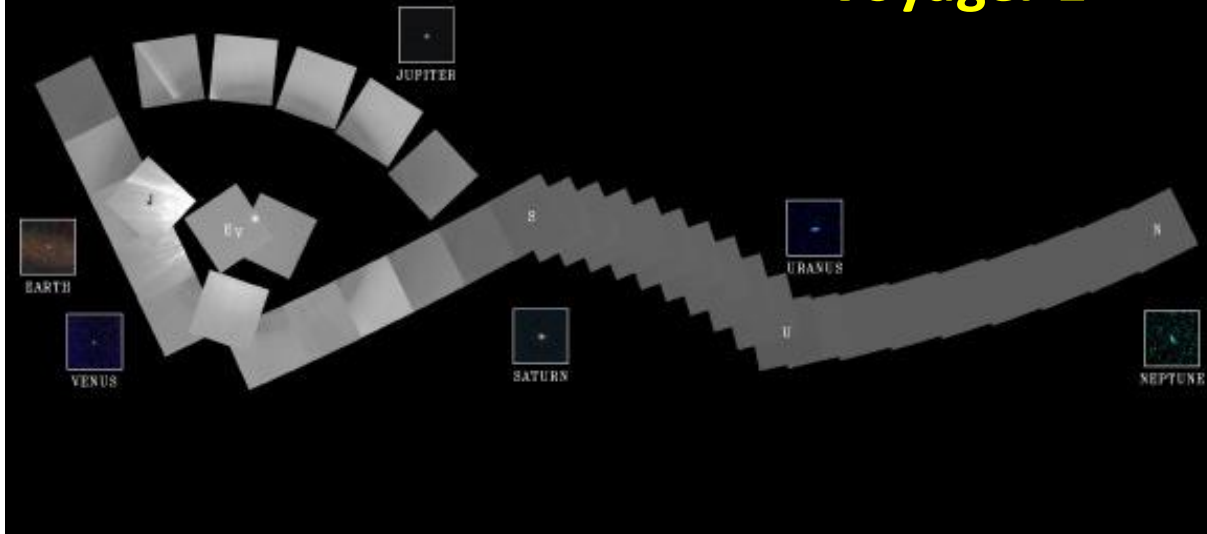


Solar System

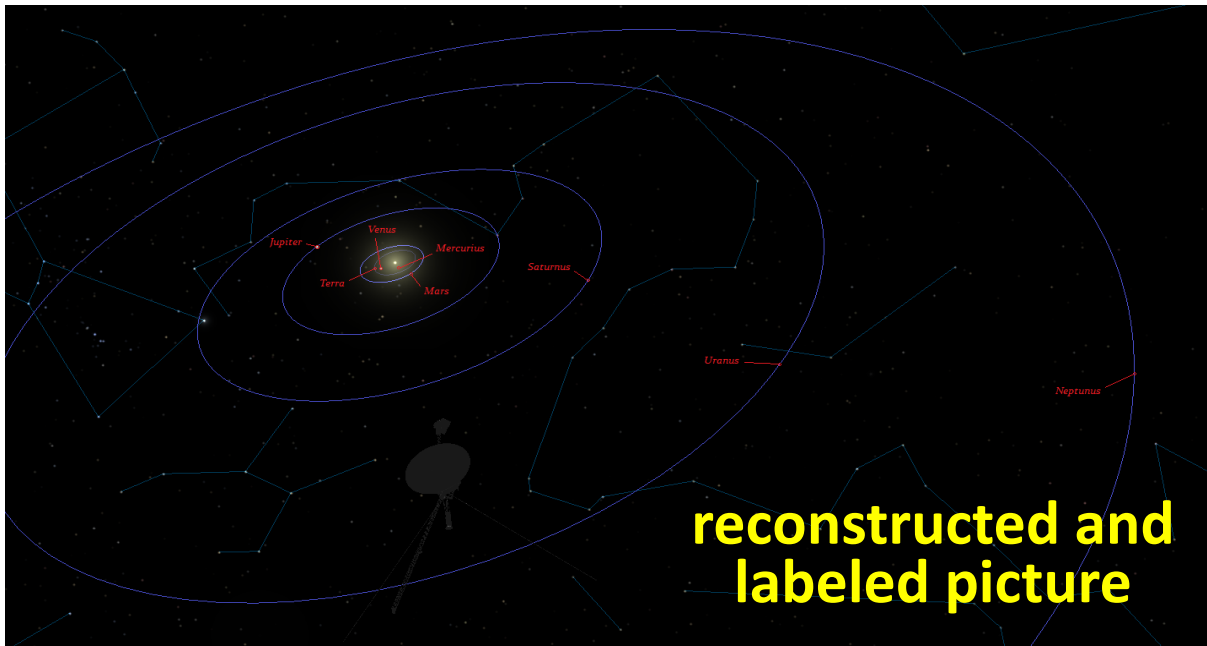


images taken by Voyager 1

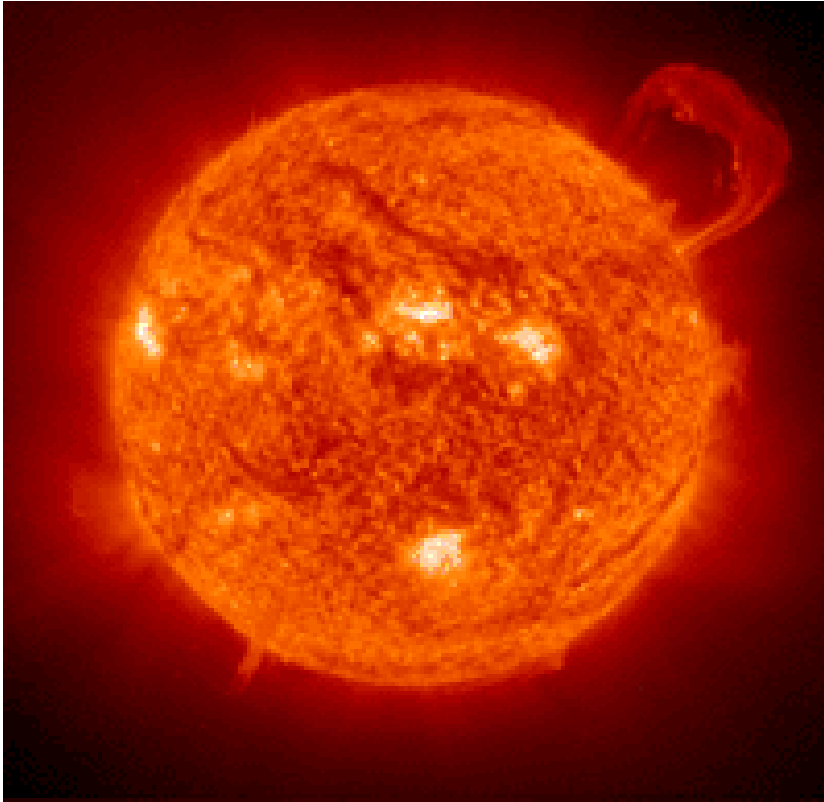


On **February 14, 1990**, the cameras of **Voyager 1** pointed back toward the Sun and took a series of pictures of the Sun, Earth and other planets, making the first ever **'family portrait'** of the **Solar System** as seen from the **outside**.

reconstructed and
labeled picture



Our star: the Sun

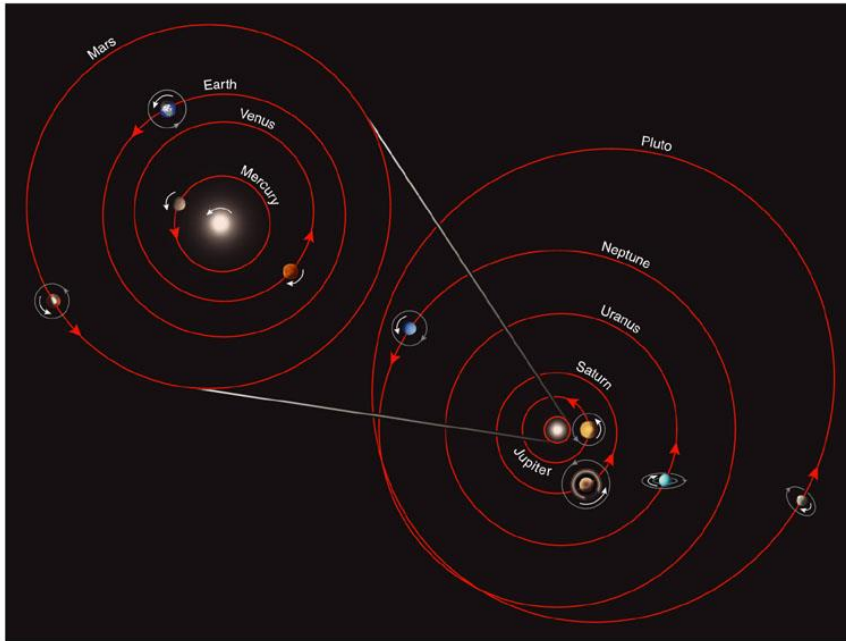


The Sun is a star at the center of our Solar System

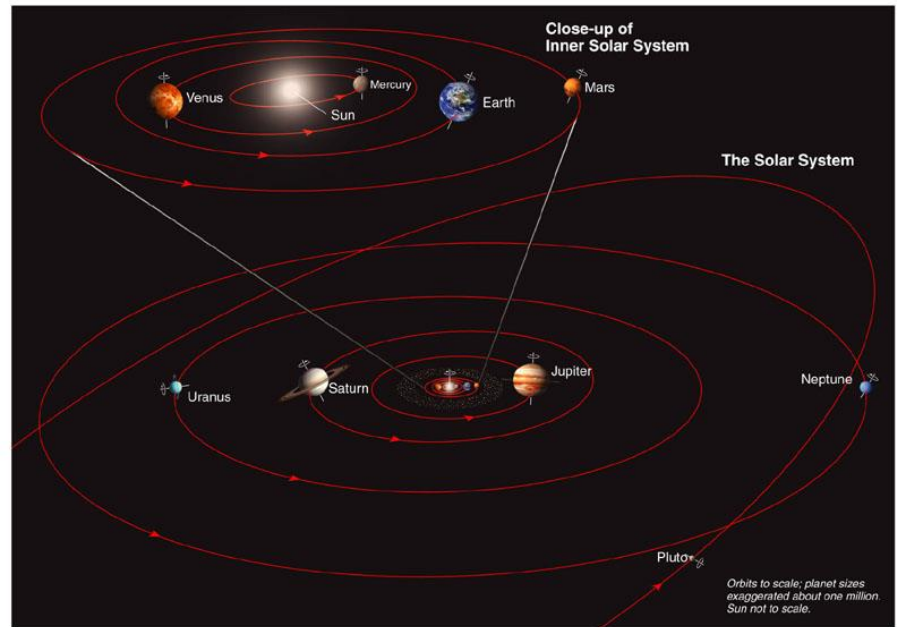
- The Sun is estimated to be **4.5 billion years old**.
- It is **333,400 times more massive** than the Earth.
- It is **99.85% of all the mass** of the Solar System.
- **Core** temperature: **~28 million °F**
- **Surface** temperature: **~10,000 °F**
- It takes **several hundred thousand years for light to escape** from the dense core and reach the surface.
- The Sun generates energy equivalent of **100 billion tons of TNT** (*famous explosive*) exploding **every second**.
- It **supports all life on Earth**.

General Characteristics of Major Planets

Nearly **circ**ular orbits (Mercury and Mars most *eccentric*).
All orbits within 10 degrees of Earth's orbital plane.



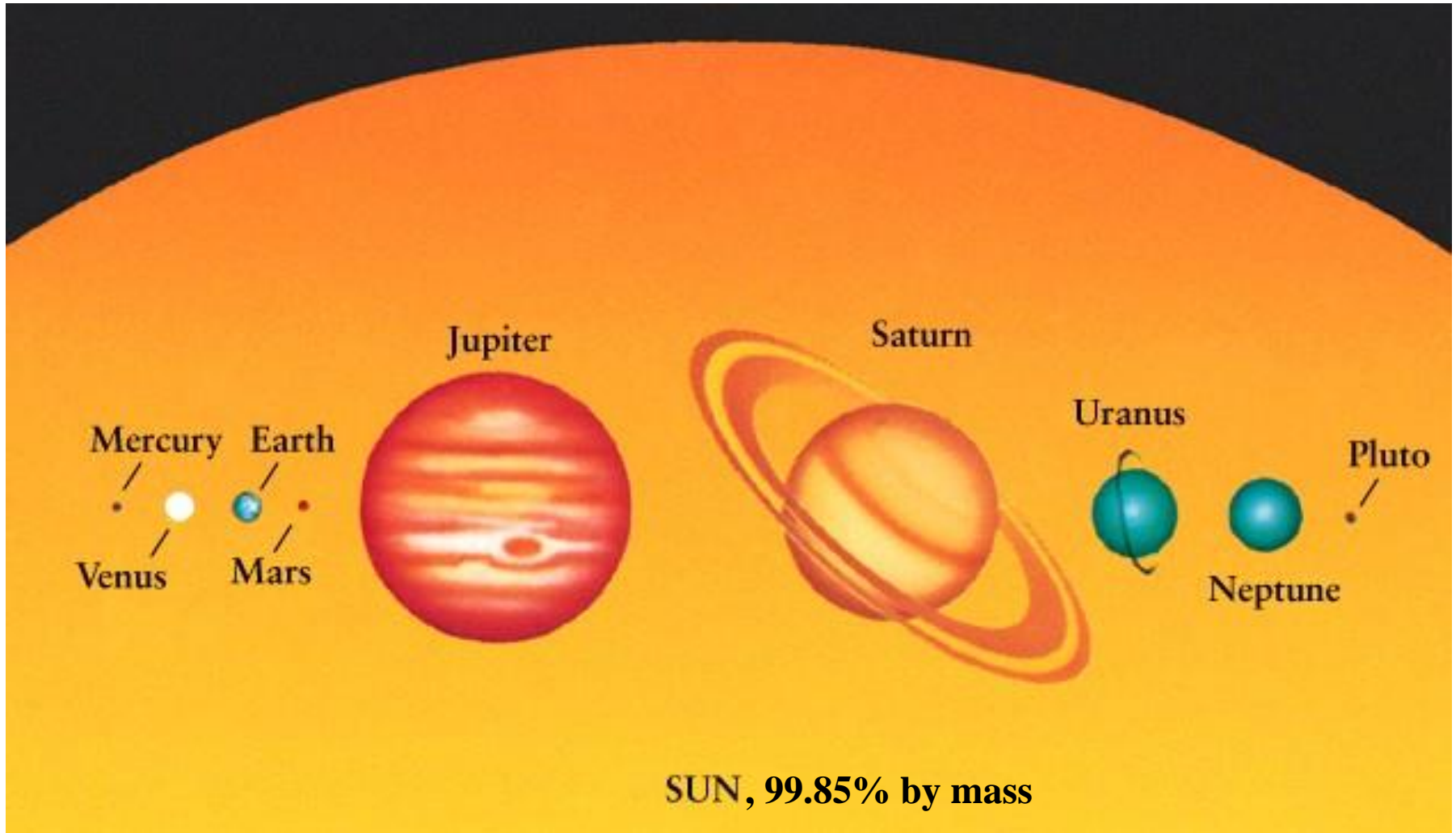
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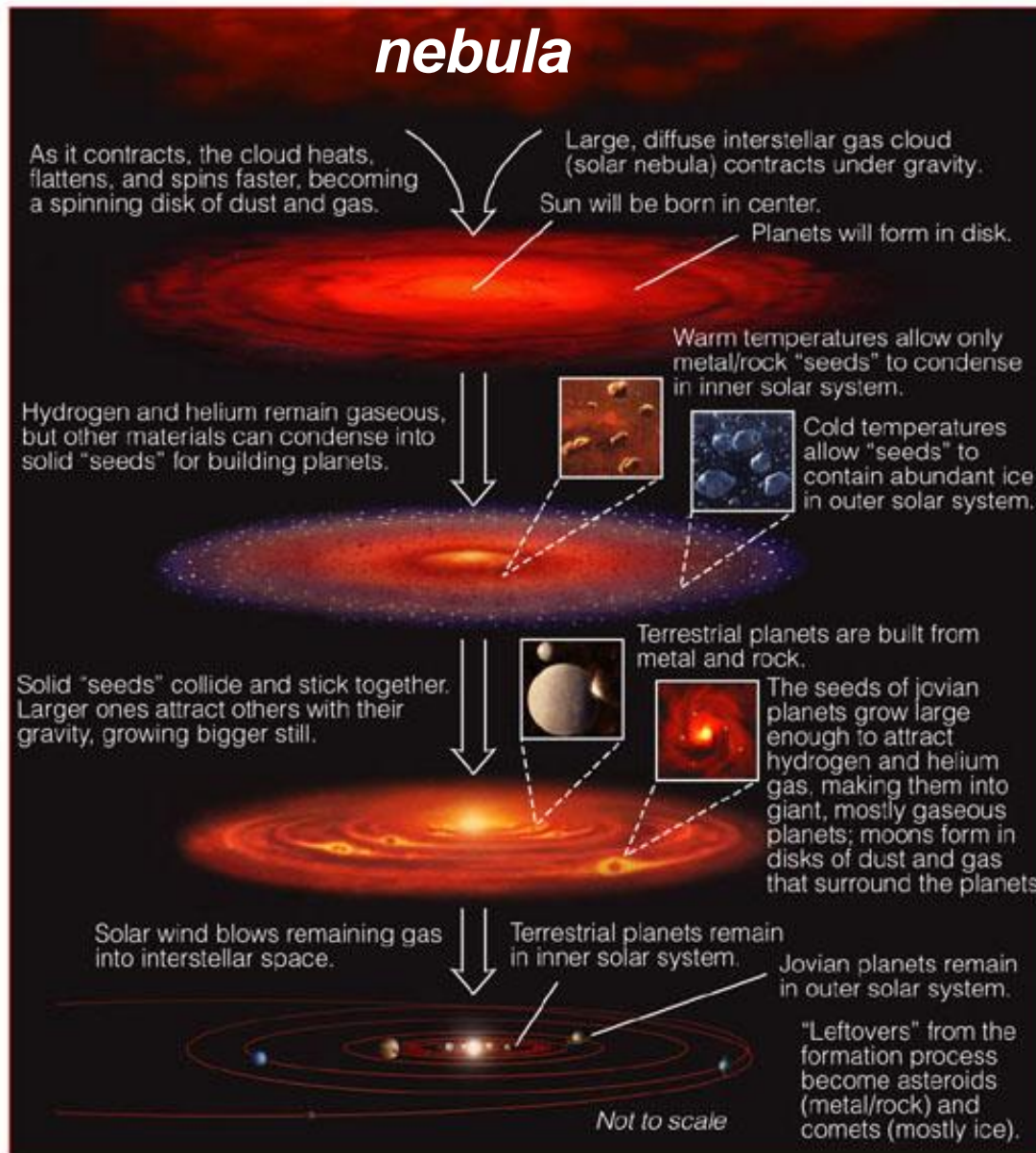
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All planets **revolve** in the same direction.
All **except Venus** **rotate** in the same direction.

Sun and Planets: sense of scale



The Formation of the Solar System

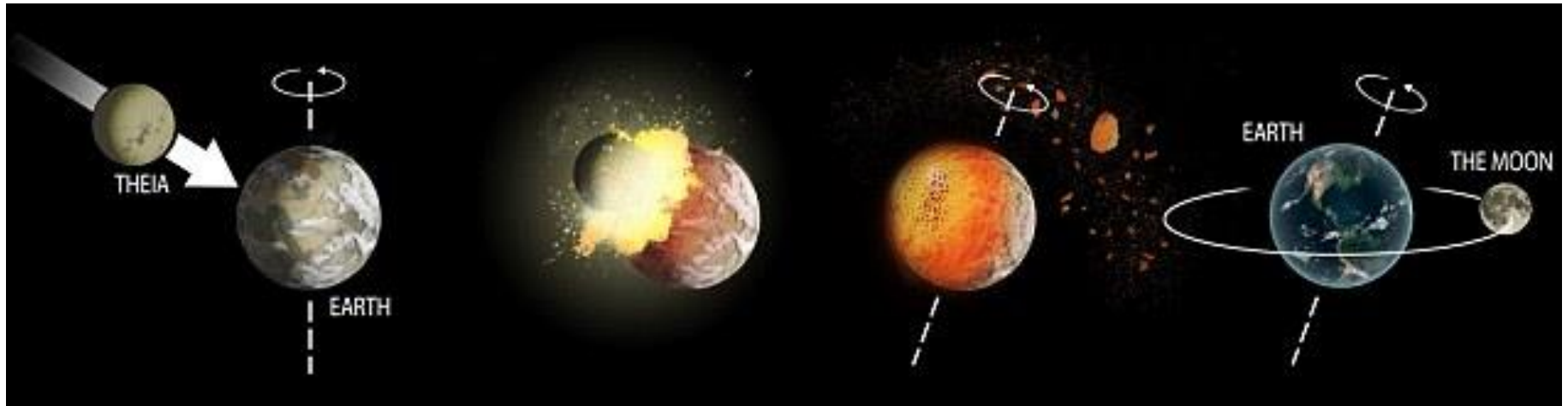


Solar System formed about **4.6 billion years ago**, when gravity pulled together low-density **cloud of interstellar gas and dust** (called a **nebula**).

The Sun, planets, moons, comets, asteroids are believed to form **within ~100 million years**.

Moon Formation

The Giant Impact Hypothesis



- Suggests that the Moon formed out of the debris left over from a **collision between Earth and an astronomical body the size of Mars**, approximately 4.5 billion years ago, about 20 to 100 million years after the Solar System coalesced.
- The colliding body is sometimes called **Theia**.
- **Mystery**: Earth and Moon have almost **identical composition**!
- Other hypotheses: capture; accretion (formation together).