

Astronomy

In a nutshell...

Levels of Organization

1. **The Universe:** Contains everything.
Infinite
2. **Galaxies:** 24 billion in the universe;
Each galaxy contains billions of stars.
1 billion = 1,000 million
3. **Solar Systems:** A sun and its
planets.

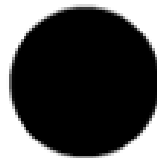
Galaxies are Classified by Shape

- Spiral
- Elliptical
- Irregular

SPIRALS

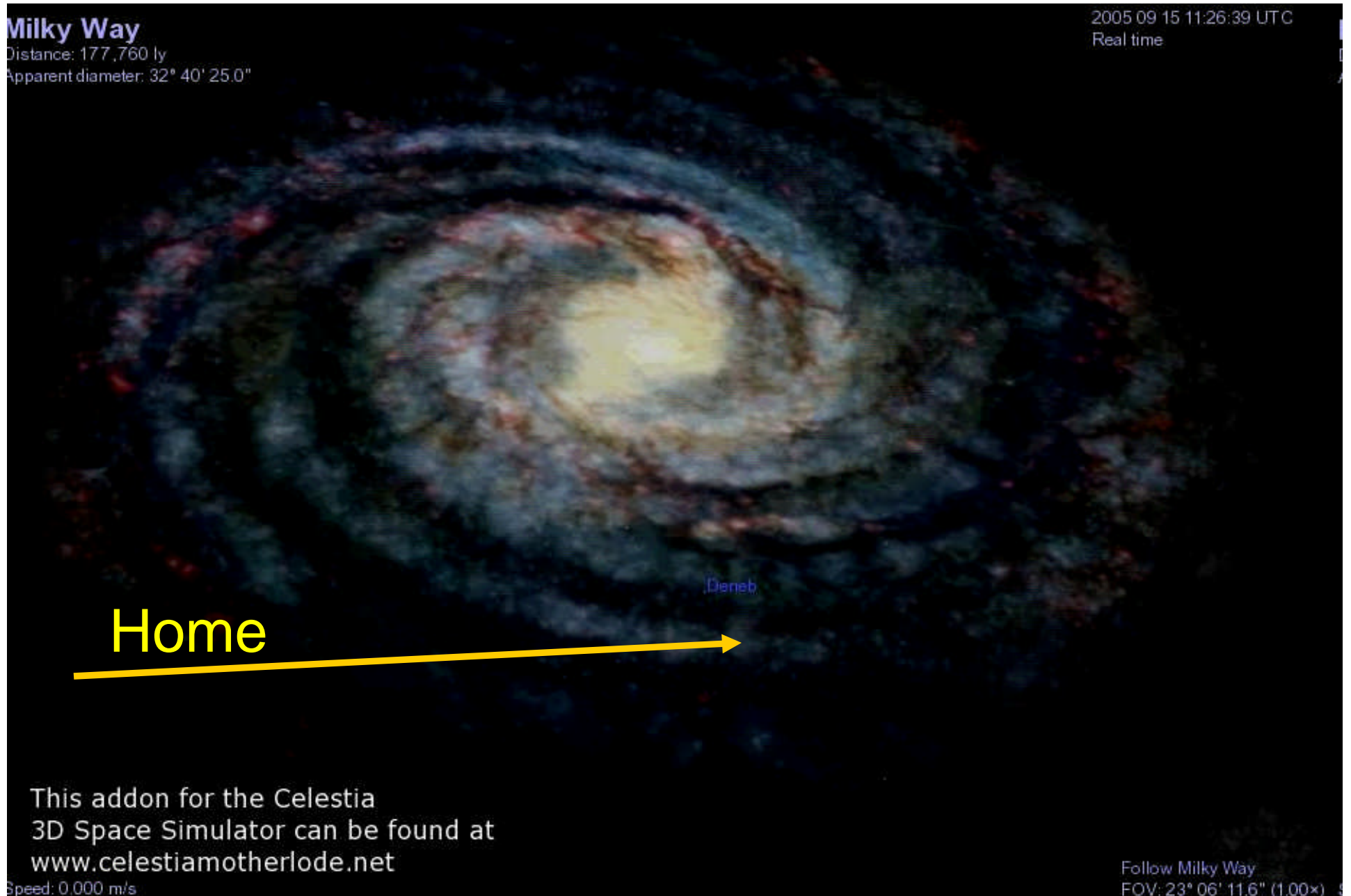


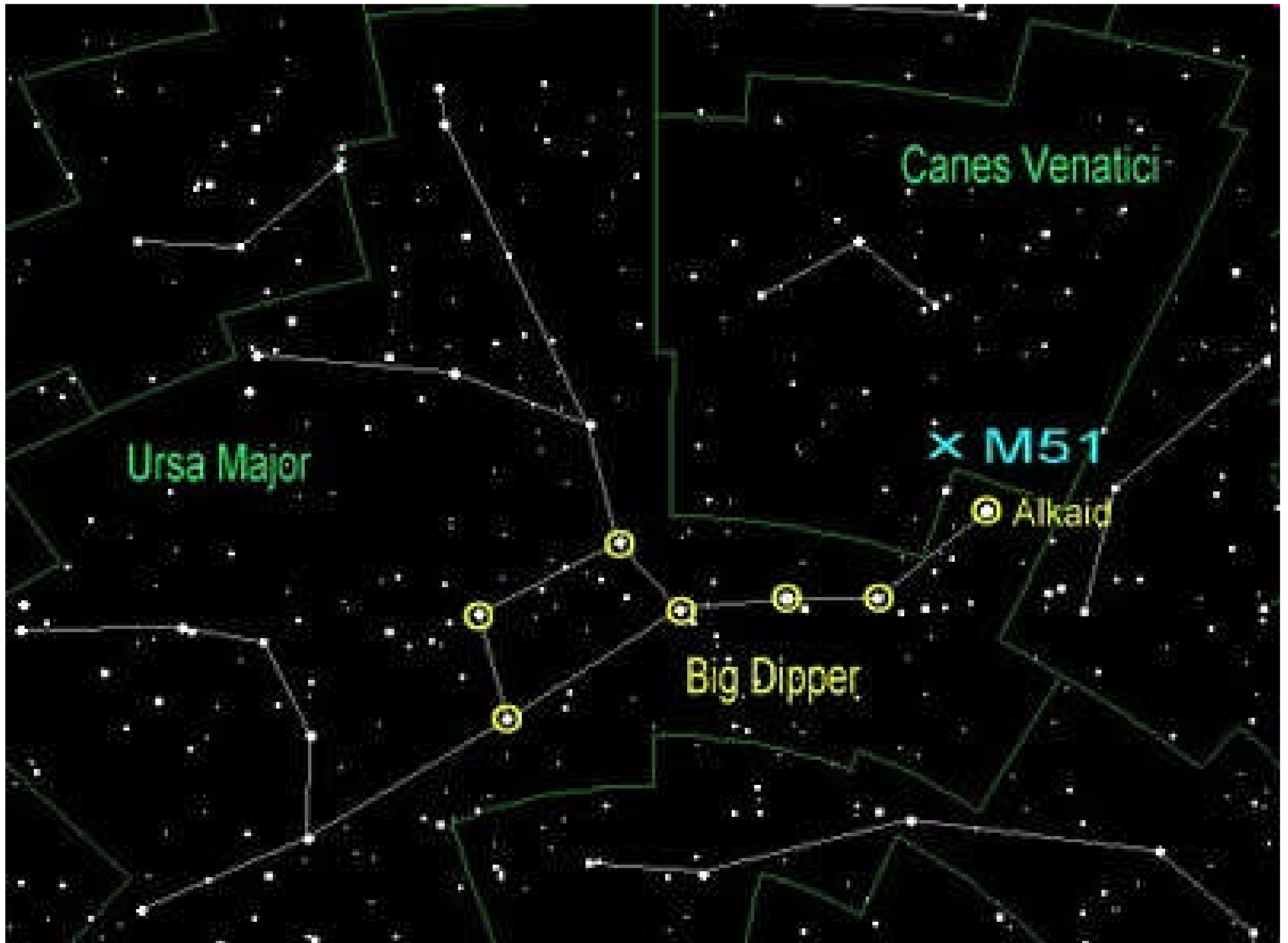
ELLIPTICALS





Our solar system is part of the milky way galaxy.





Ursa Major

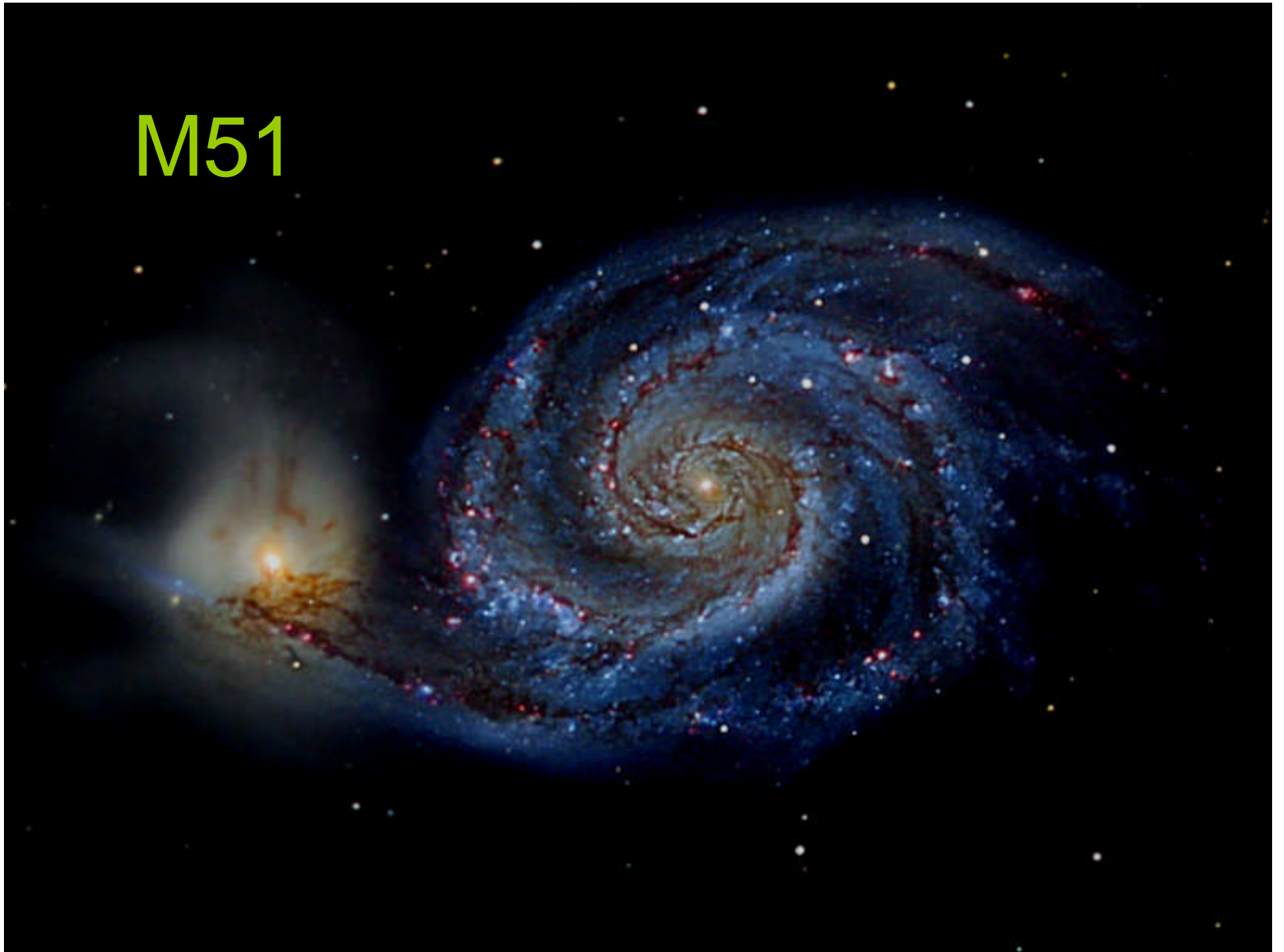
Canes Venatici

x M51

Alkaid

Big Dipper

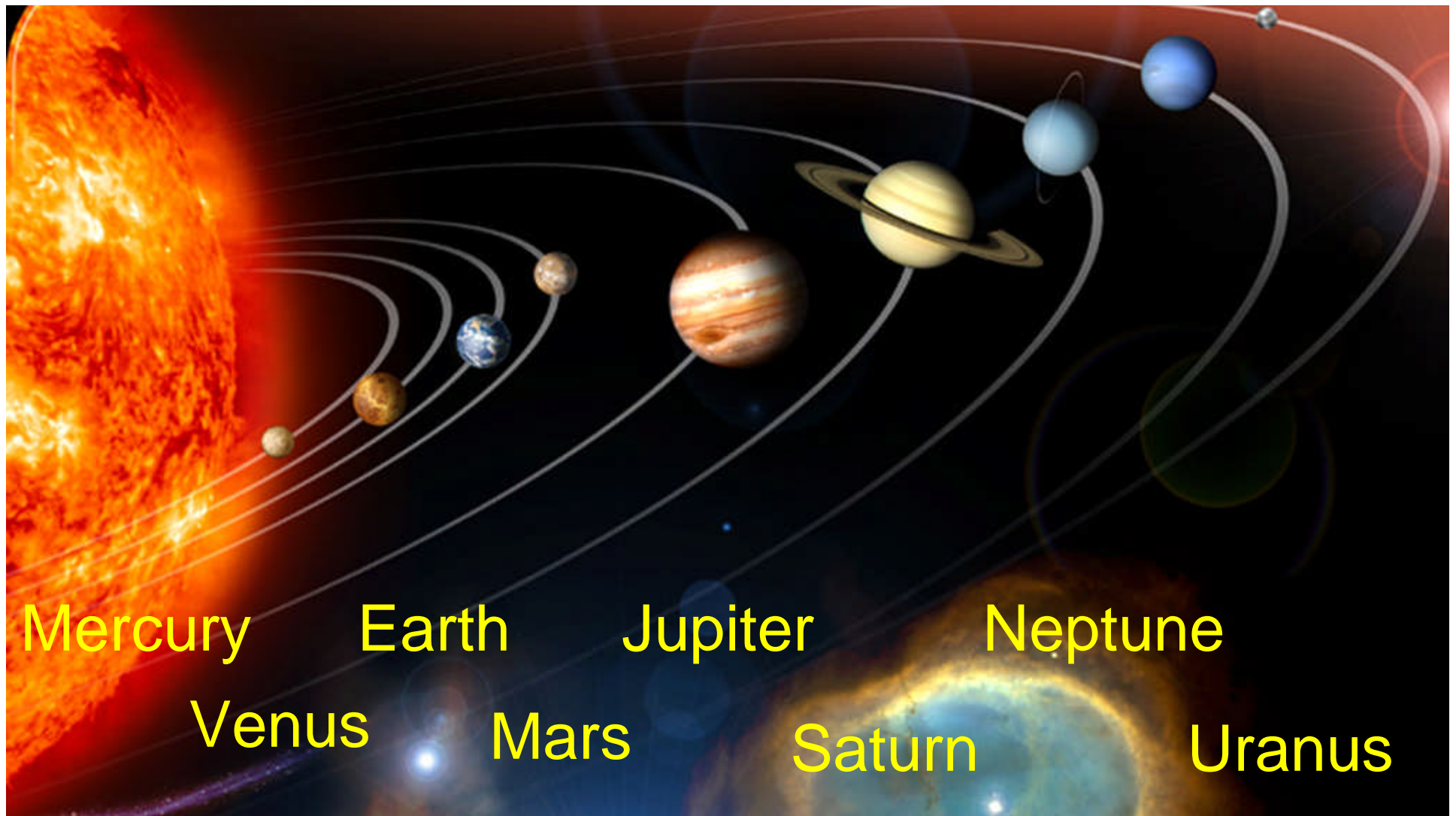
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II. Our Solar System

- Includes the sun and 8 planets.



Planets:

The inner 4 planets are rocky.

The outer 4 planets are made of gases.

Moons: objects that orbit planets.

Earth has 1 moon.

Jupiter has 8 moons.

Asteroids: Smaller objects composed mostly of rock. An asteroid belt exists between Mars and Jupiter.

Comets: Smaller objects composed of ice.

Sun: a medium-sized star that produces its own light.

Planets and Moons do not produce their own light. They reflect light from their surface.

II. Measuring Distance

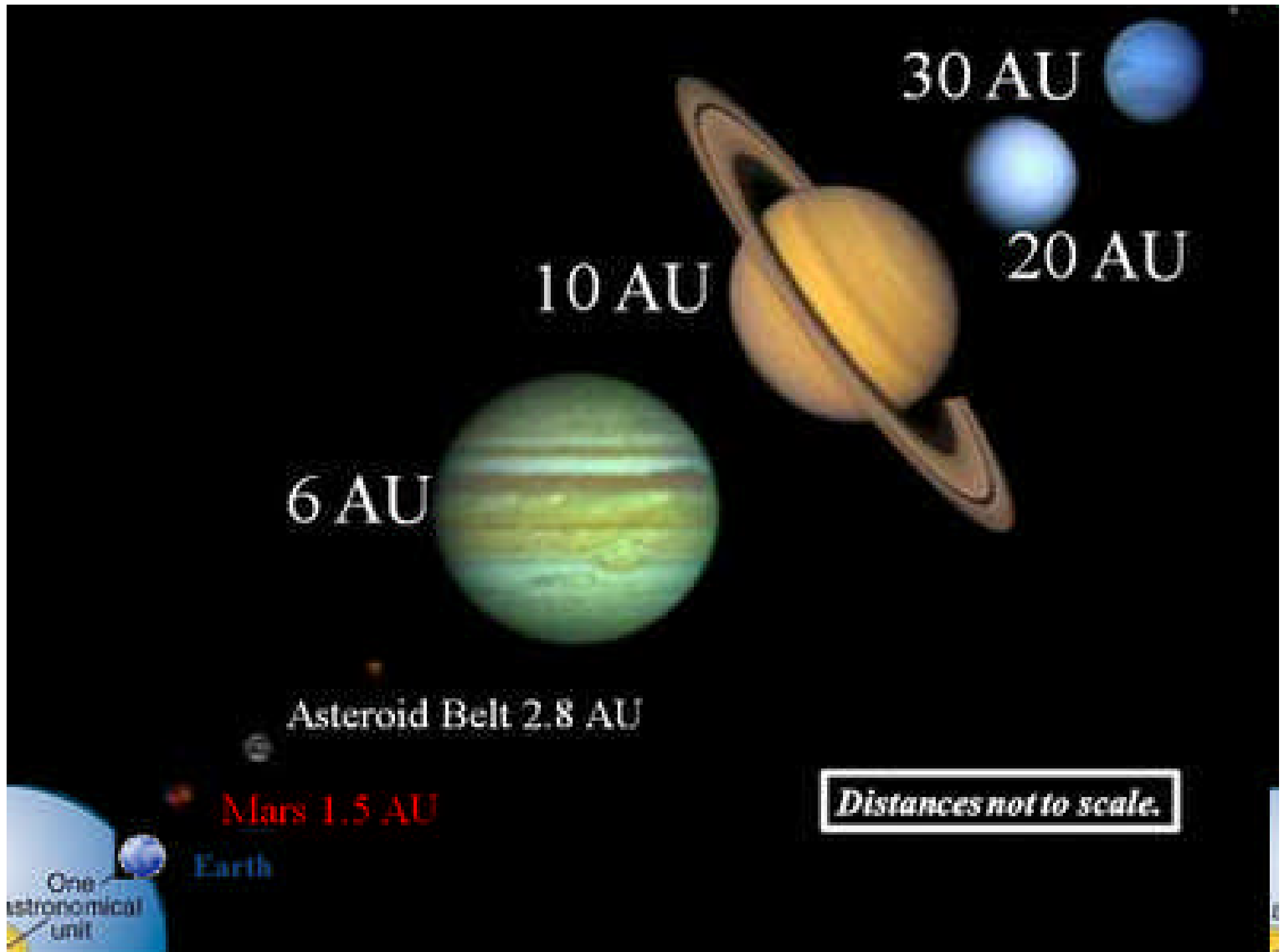
Within our Solar System

Astronomical Unit (AU): Distance from Earth to Sun

$$1 \text{ AU} = 92,960,000 \text{ miles}$$

TPS: What is the distance between Jupiter and the sun in AU if Jupiter is 600 million miles away.

~ 6 Astronomical Units



Beyond Our Solar System

Light Years: The distance traveled by light in one year.

Speed of light = 186,000 miles/sec

How far can light travel in 1 year?

$$S = \frac{D}{T} \rightarrow D = S \cdot T$$

$$D = (186,000 \frac{\text{miles}}{\text{sec}})(31,536,000 \text{ sec})$$

$$D = 5,880,000,000,000 \text{ miles} = 5.88 \text{ trillion miles}$$

Object

Distance

Mercury

3.22 light-minutes

Venus

6.01 light-minutes

Earth

8.32 light-minutes

Mars

12.7 light-minutes

Jupiter

43.3 light-minutes

Saturn

1.32 light-hours

Uranus

2.66 light-hours

Neptune

4.16 light-hours

Farthest comets

1.58 light-years

Proxima Centauri (nearest star)

4.3 light-years

Orion Nebula

1,500 light-years

Center of the Milky Way

26,000 light-years

Andromeda Galaxy (farthest naked-eye object)

2.36 million light-years