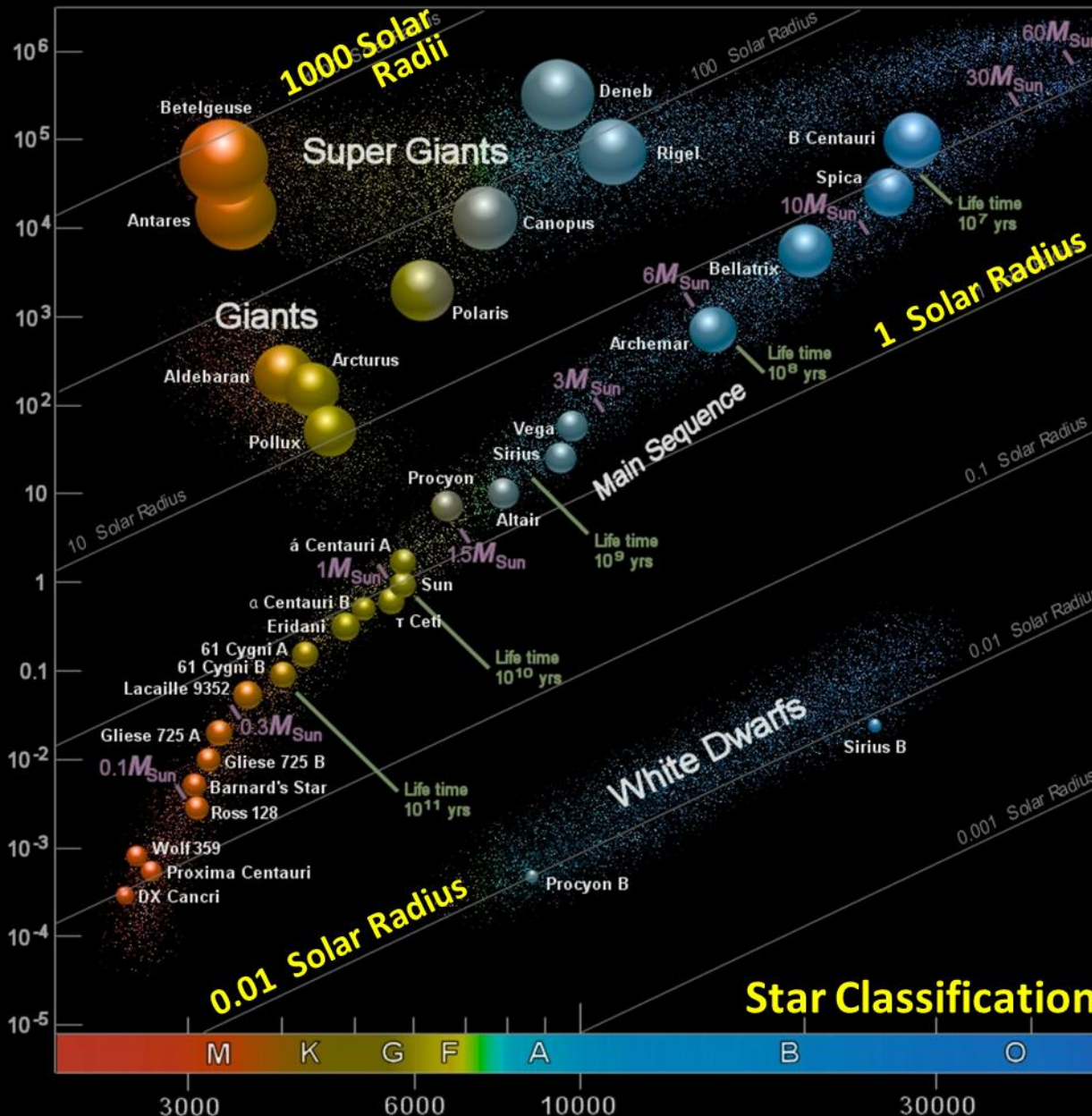


# The HR (Hertzsprung-Russell, 1910) Diagram

Star Brightness (Solar Units)



(←lower) Star Surface Temperature (Kelvin) (higher→)

- A major step towards our understanding of stellar evolution or "the lives of stars".
- Temperature (x) vs Luminosity (y) plot
- Stars tend to group into certain areas.
- Most of the stars occupy the region in the diagram along the line called the **main sequence**, in the order of their mass (*shown in  $M_{Sun}$* ).

# Our star: the Sun



**Age:** ~4.6 billion years

**Shape:** near perfect sphere

**Rotation:** 25.6 days at equator, 33.5 days at poles (due to convection)

**Mass:** ~330,000 times the Earth's mass

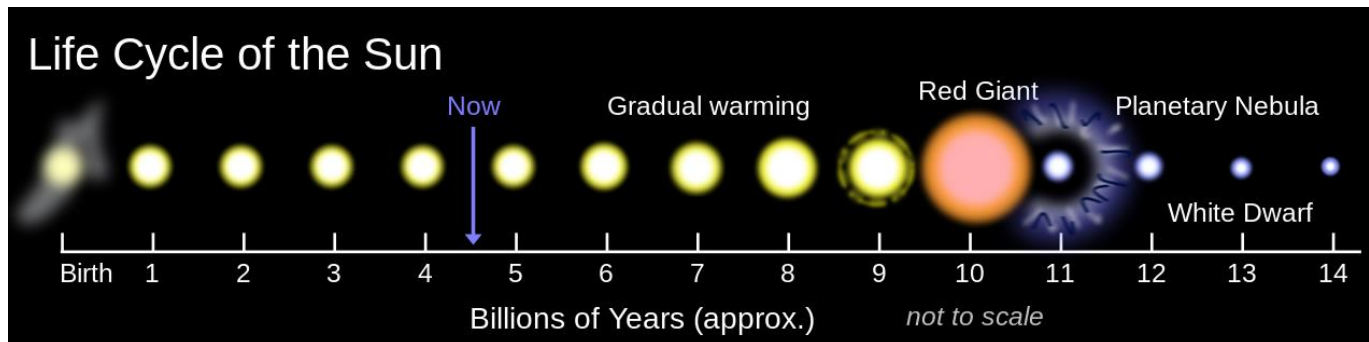
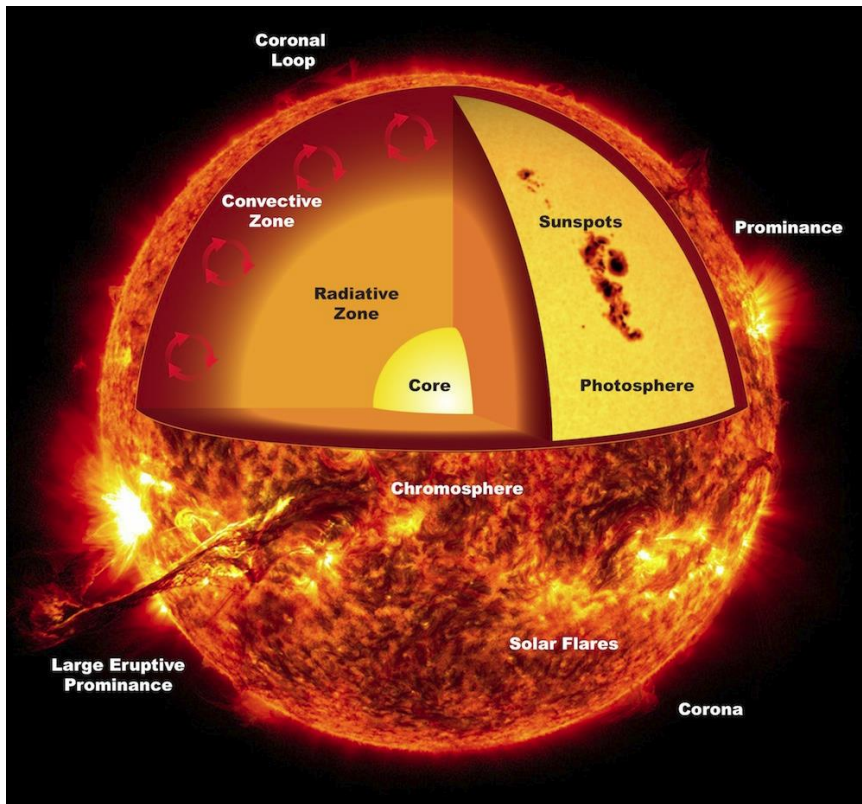
**Size:** ~109 times that of the Earth

**Color:** yellow

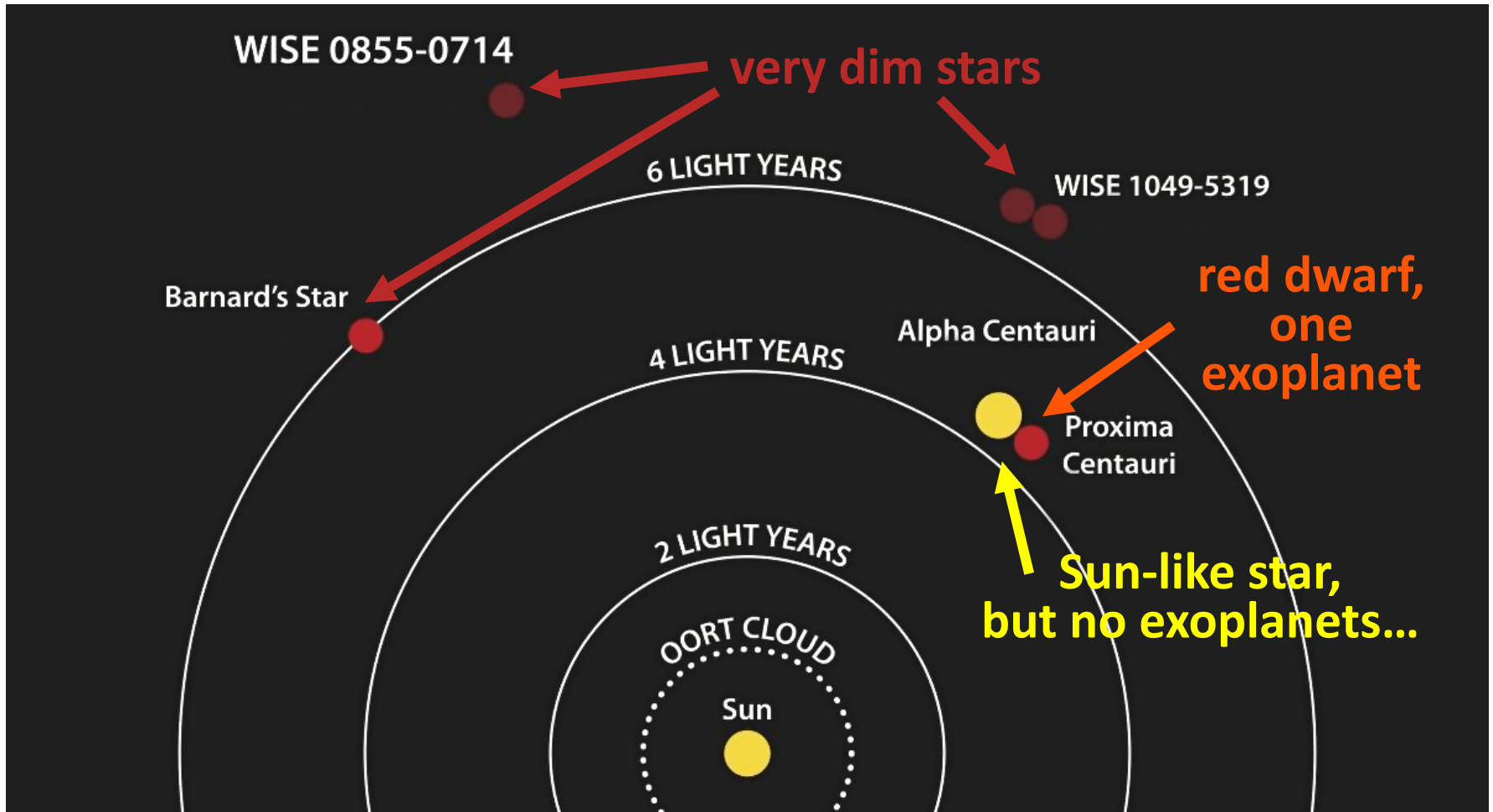
**Temperature:** surface ~5700 K, core ~15000000 K

**Type:** Yellow Dwarf, G-type Main Sequence

**Composition:** ~75% H, ~23% He, ~1.7% heavier elements including O, C, Ne, Fe ("heavy-element-rich" star)



# Sun's Closest Neighbors

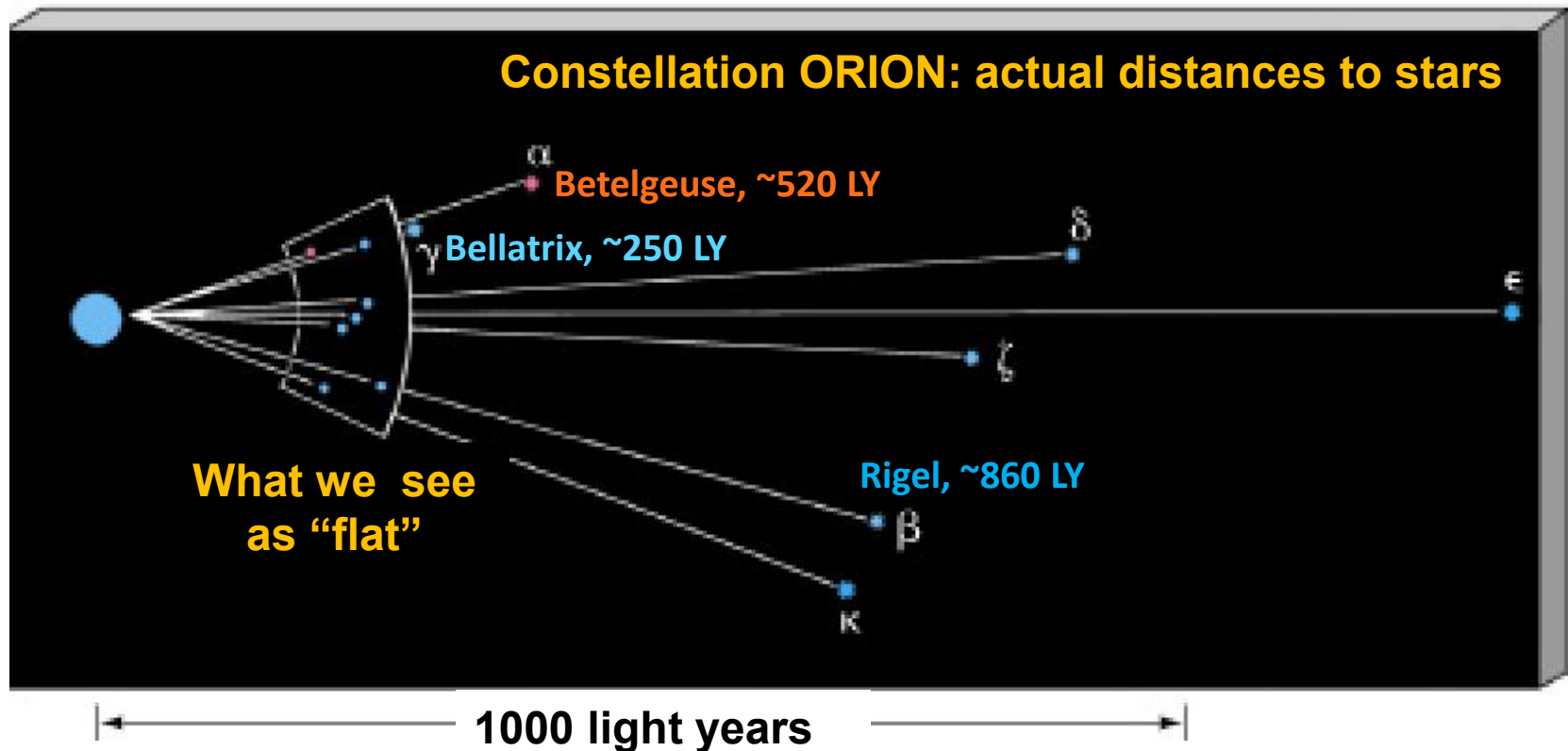


**Exoplanet:** a planetary body orbiting a star other than the Sun

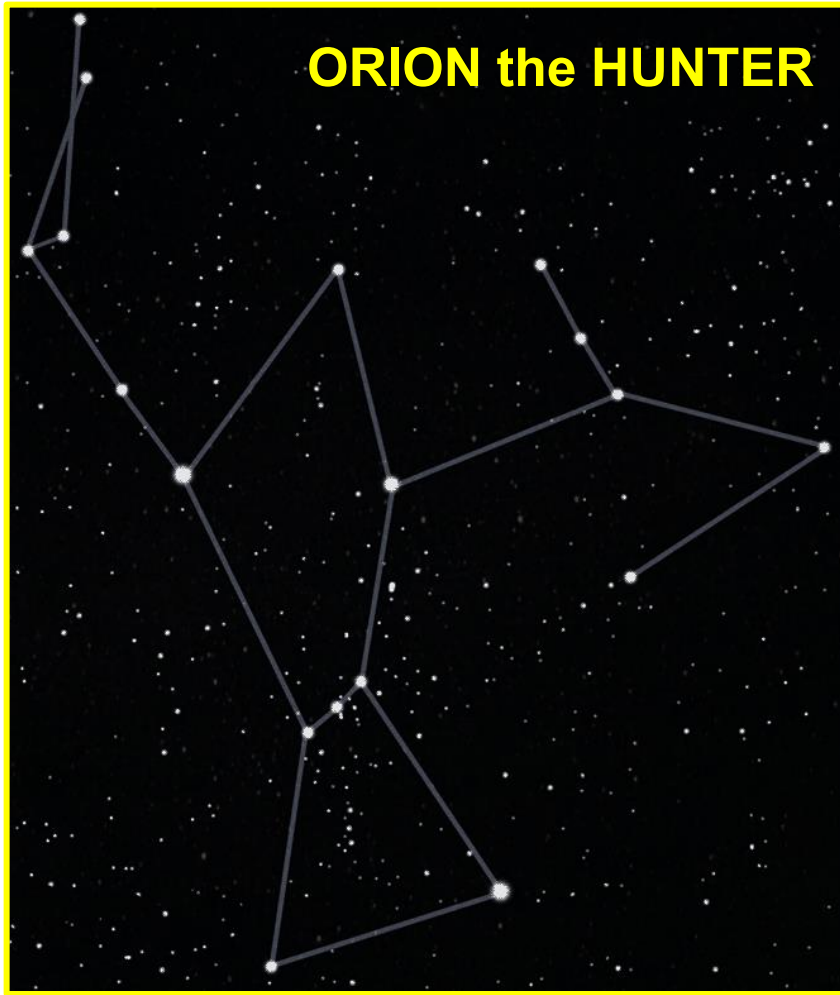
**1 light-year equals 5.88 trillion miles**

# Constellations

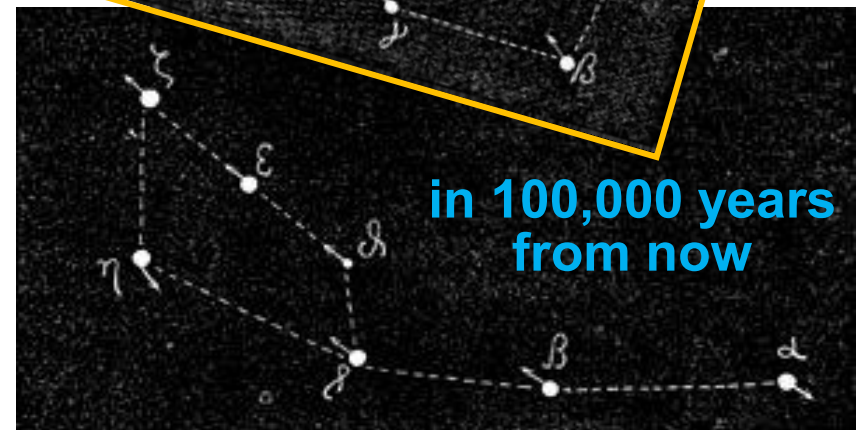
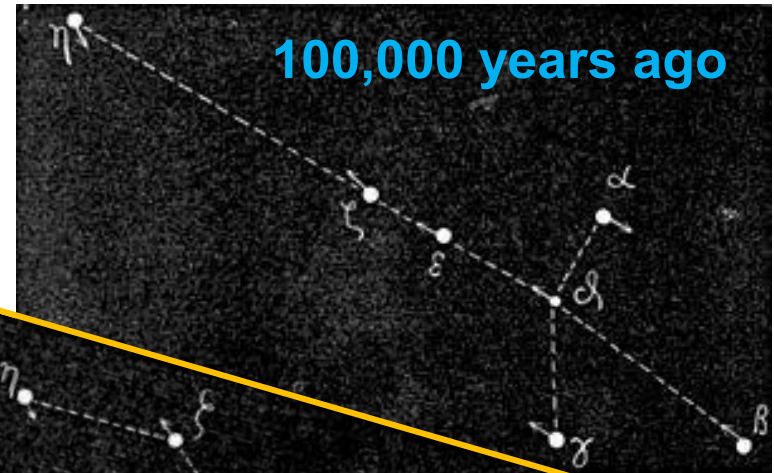
- Constellation is a group of stars that form a pattern in the sky.
- The shapes you see all depend on your point of view!
- Stars in a constellation are NOT close to each other, but when viewed from Earth they *seem to be grouped* together.



# Constellations change over (very long) time

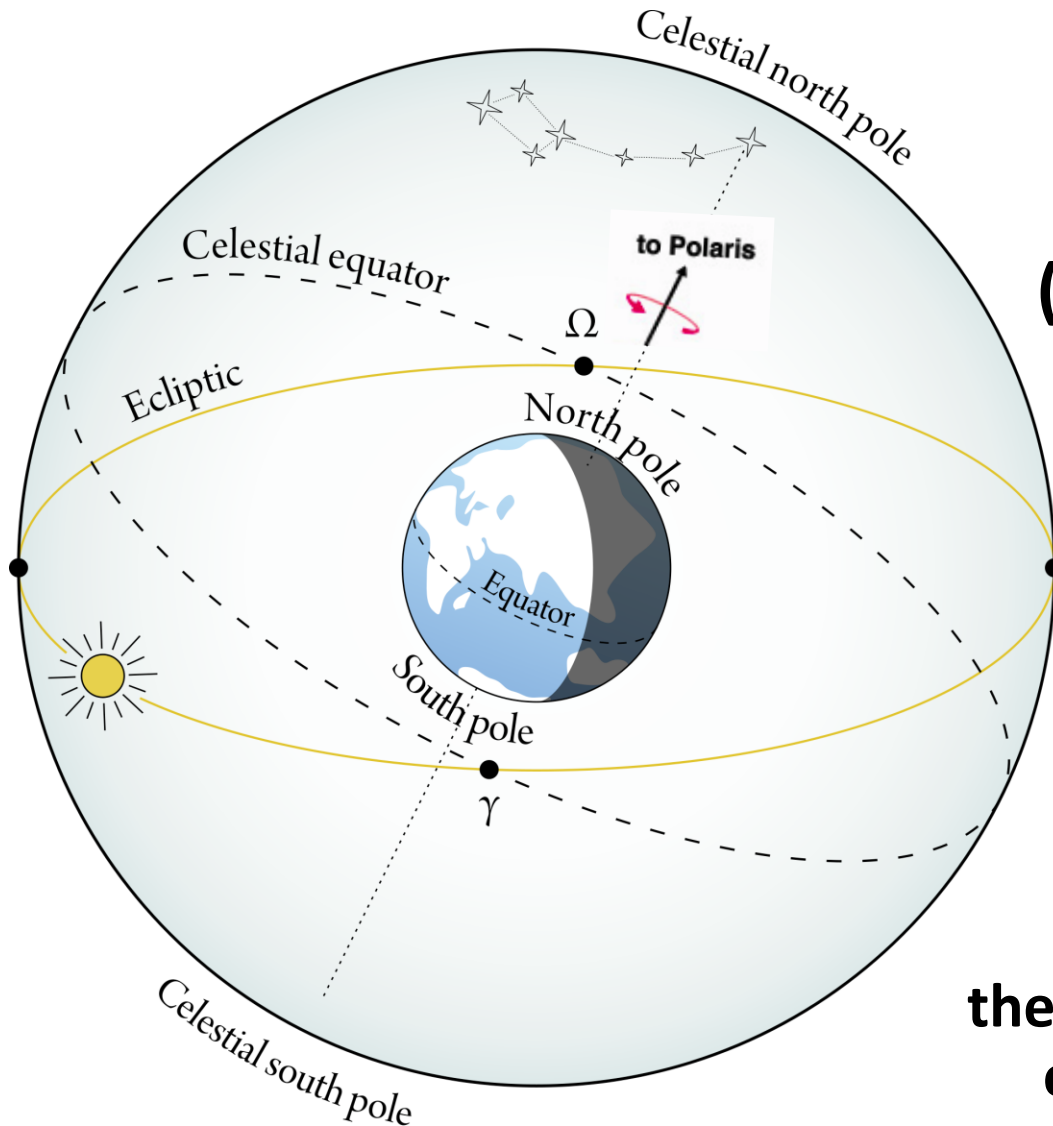


**Watch Orion's head and bow!**  
(from 50,000 years ago to 100,000 from now)



# Celestial Sphere

is an apparent sphere around Earth which contains “fixed” stars forming **88 official constellations** (48 ancient + 40 modern).

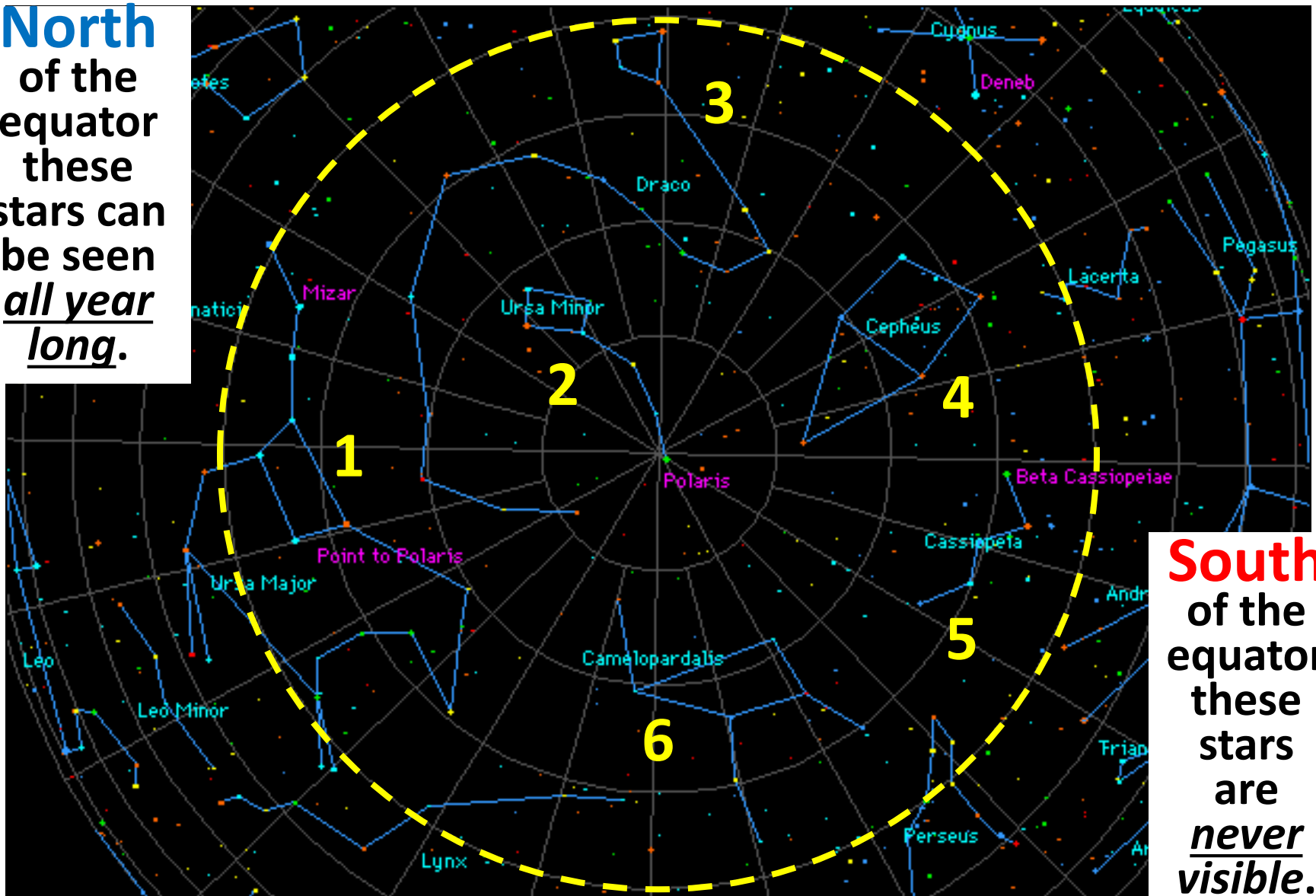


- ***Celestial equator*** - the projection of the Earth's equator onto the celestial sphere, dividing the sky into two hemispheres.

- ***The Ecliptic*** - the apparent path of the Sun on the celestial sphere.

# Northern circumpolar constellations

North  
of the  
equator  
these  
stars can  
be seen  
all year  
long.



South  
of the  
equator  
these  
stars  
are  
never  
visible.