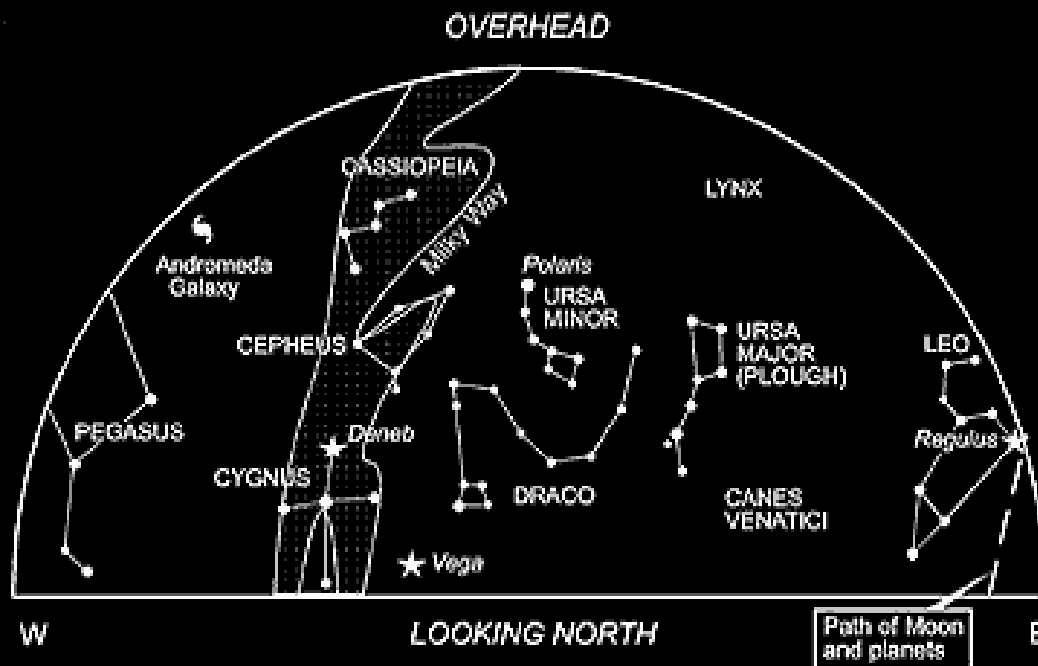


Bell Ringer

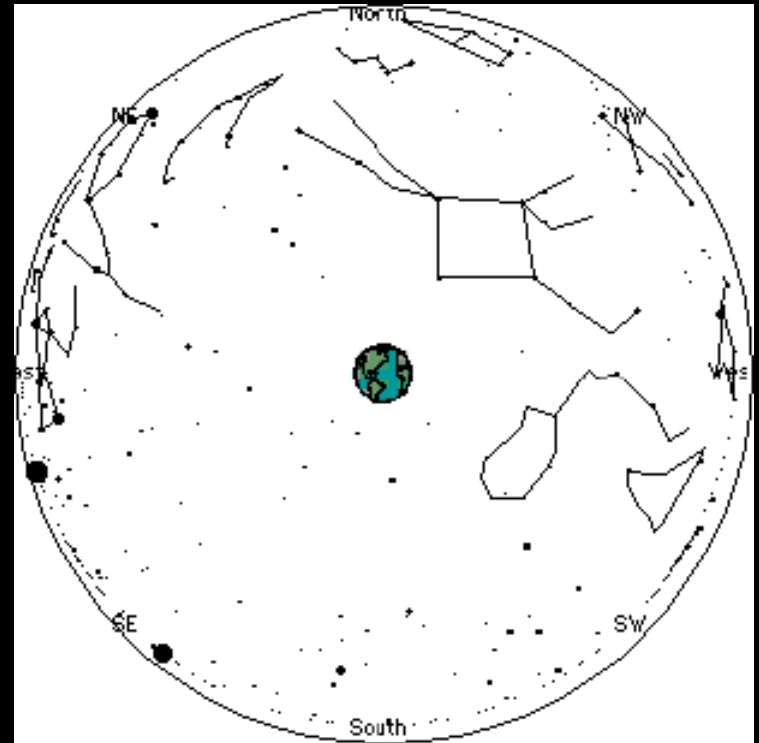
1. What does a protostar form from?
2. What does a protostar form into?
3. By what process do stars create their own energy?

Constellations & Stars



I. Constellations

- Group of stars that appear to form a pattern in the sky.
- 88 recognized by International Astronomy Union



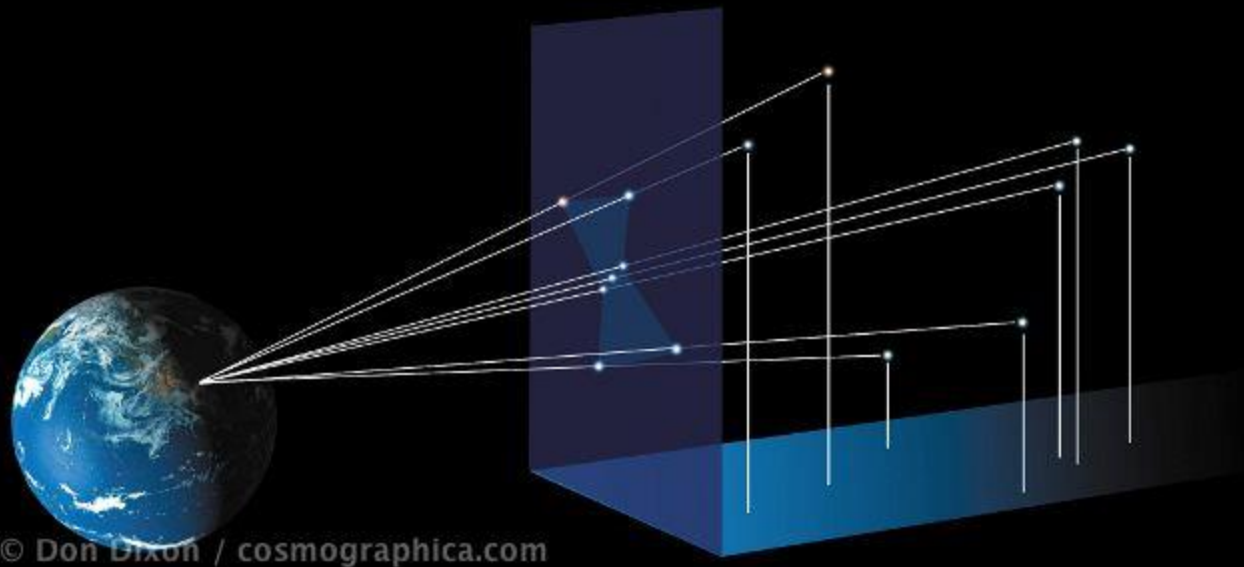
Are stars in a constellation close to each other?

Not necessarily!

Constellations are 3D

- <https://www.youtube.com/watch?v=pXDyzSkxFvs>

Orion



There are 88 constellations in the night sky, but I can never see that many, why?

What stars can I see, and when?

- <https://www.youtube.com/watch?v=BbzCA0Lgf3Y>

Constellations in sight depend on:

- Season (where the sun is)
- Hemisphere (where I am. The Earth is in the way of some.)

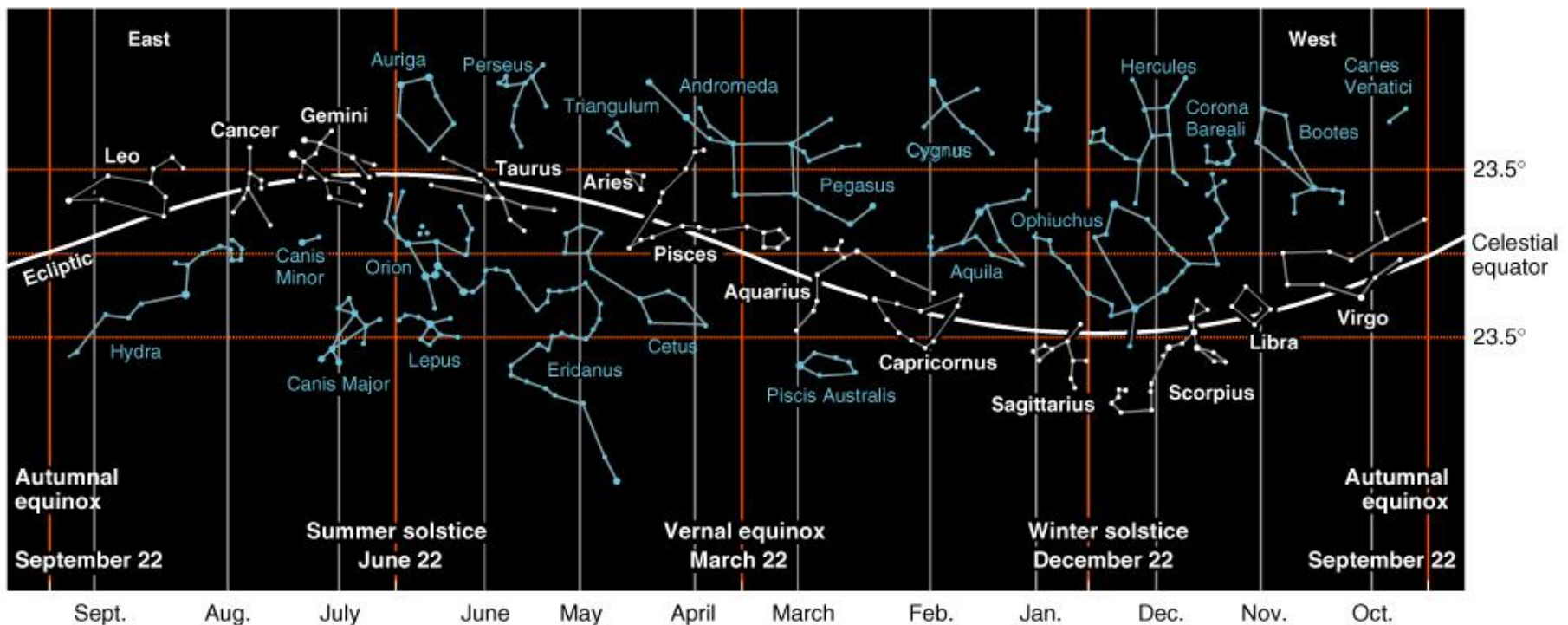
Solar System Model

- <https://www.solarsystemscope.com/>
- Seasons
- Hemisphere
- Zodiac (next)

A. Ecliptic

- The plane of the Earth's orbit around the sun
- The apparent path that the sun (and planets) appear to move along against the star background.

Ecliptic

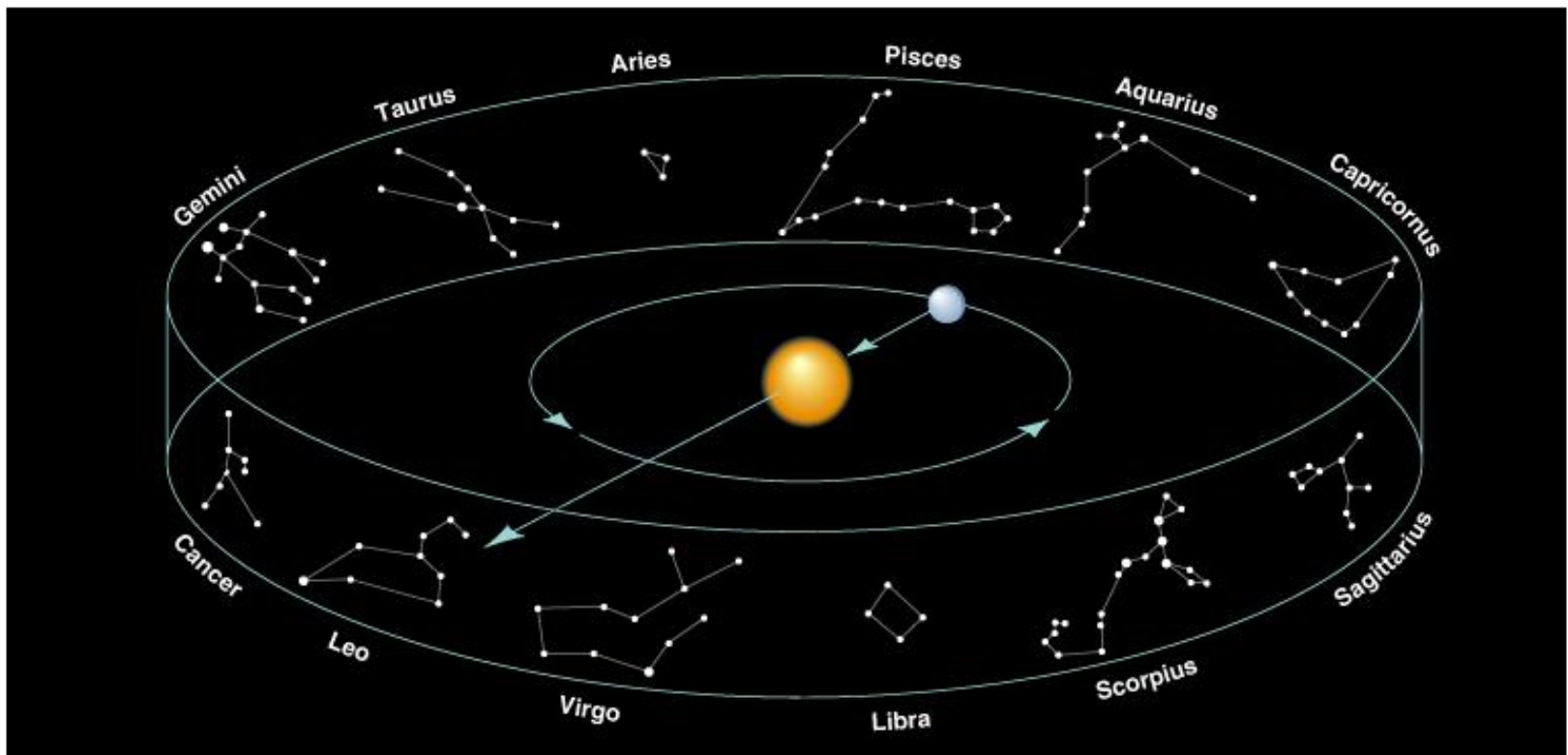


4 Main kinds of constellations we'll talk about:

- Zodiac
- Circumpolar
- Summer
- Winter

B. Zodiac

- Band of 12 constellations along the ecliptic.



Your zodiac

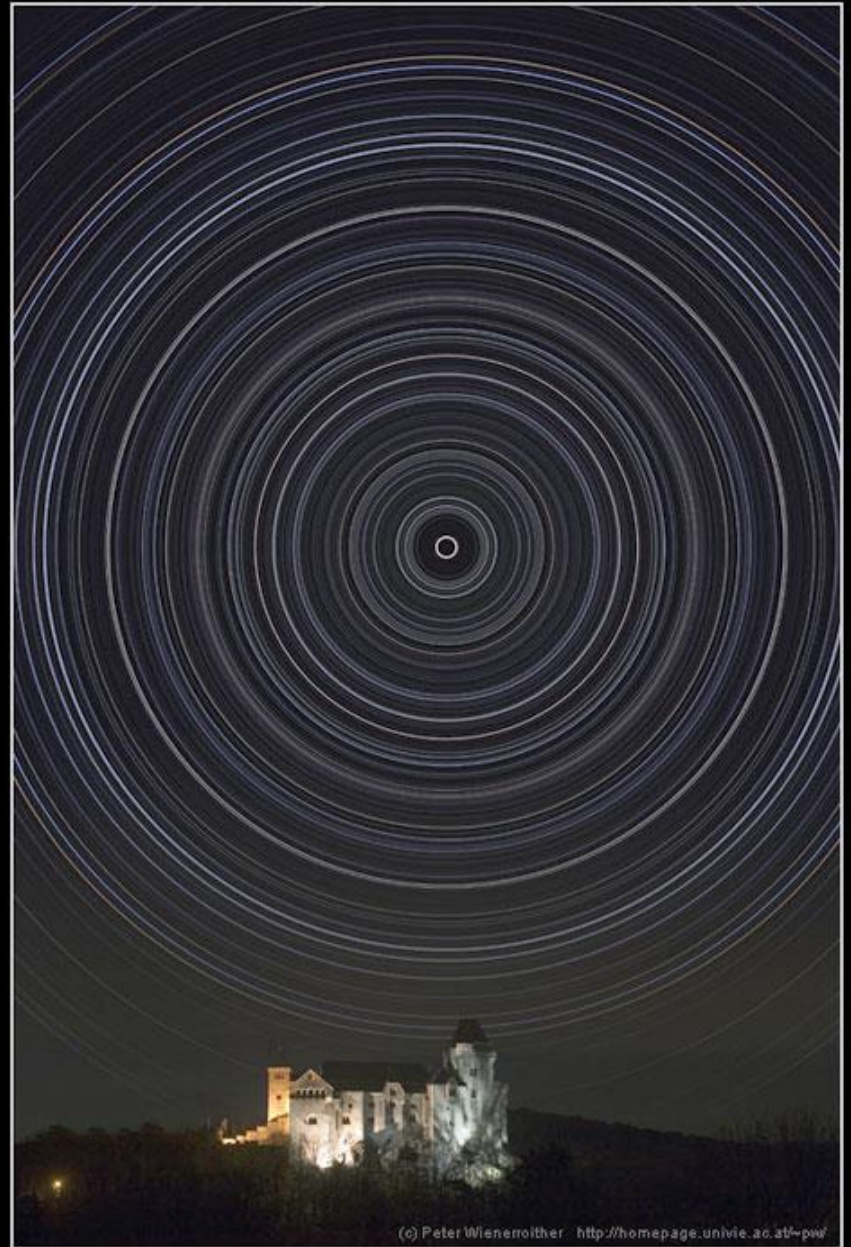
- = The constellation that the Sun was over when you were born.

Circumpolar constellations

- Why does this happen?



Star Trails

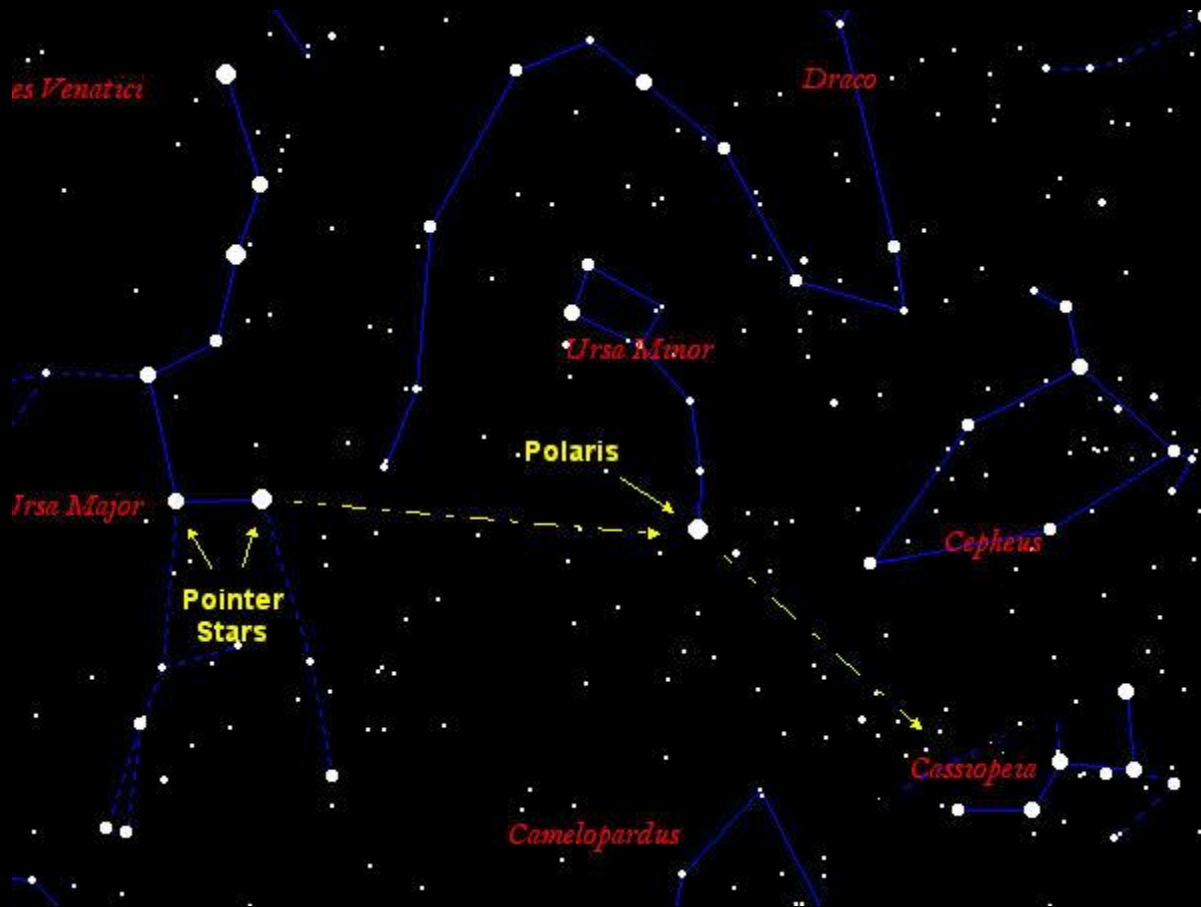


(c) Peter Wienert <http://homepage.univie.ac.at/pww/>

C. Circumpolar Constellations

- Can be seen all year long
- Never fully set below the horizon
- Appear to move counter clockwise around Polaris (North Star)
- Caused by Earth's Rotation

Circumpolar Constellations

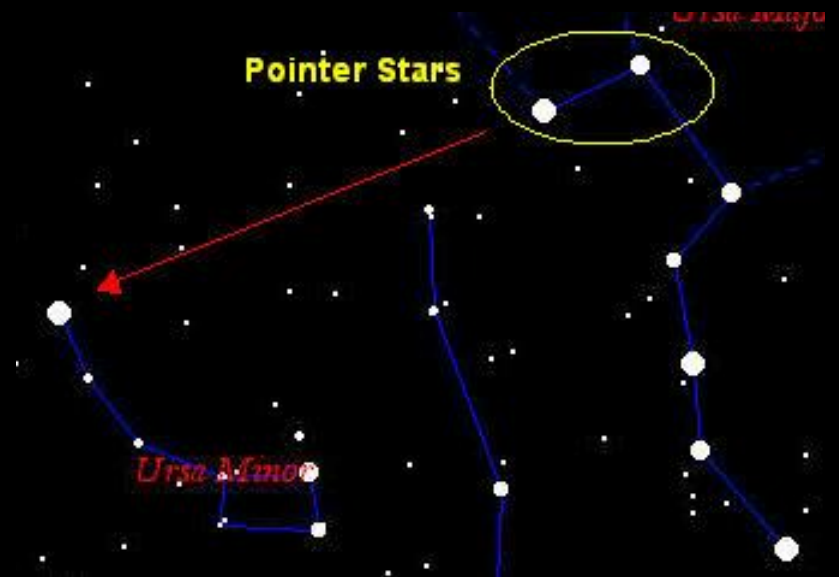


Examples of Circumpolar Constellations

1. Ursa Major – The Big Bear (big dipper)
2. Ursa Minor – The Little Bear (little dipper)
3. Cassiopeia – Queen on Her Throne
4. Draco- The Dragon
5. Cepheus- The King

- The number of stars seen as circumpolar depends on the observers latitude
- Further North the observer lives, the more stars will appear circumpolar
- Earth turns west to east
- Sky appears to turn east to west

Ursa Major (Big Dipper)

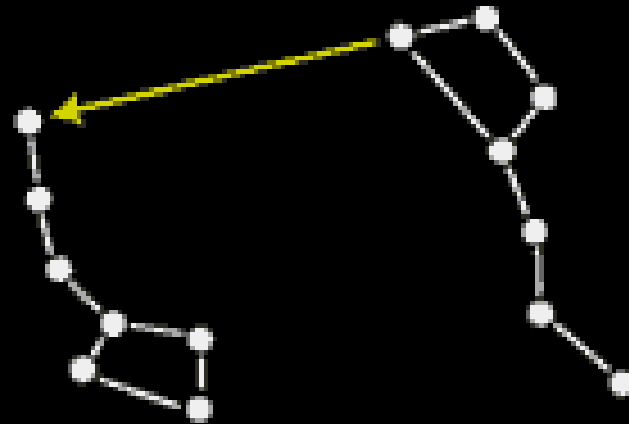


- Best known constellation
- Common name is Big Dipper
- Pointer stars- front 2 stars of the Big Dipper which point to Polaris (North Star)

Seasonal Changes in Constellations

- Big Dipper
 - In Fall: Low over northern horizon
 - Spring: High overhead
- Cassiopeia
 - In Fall: Straight overhead
 - Spring: Low over northern horizon

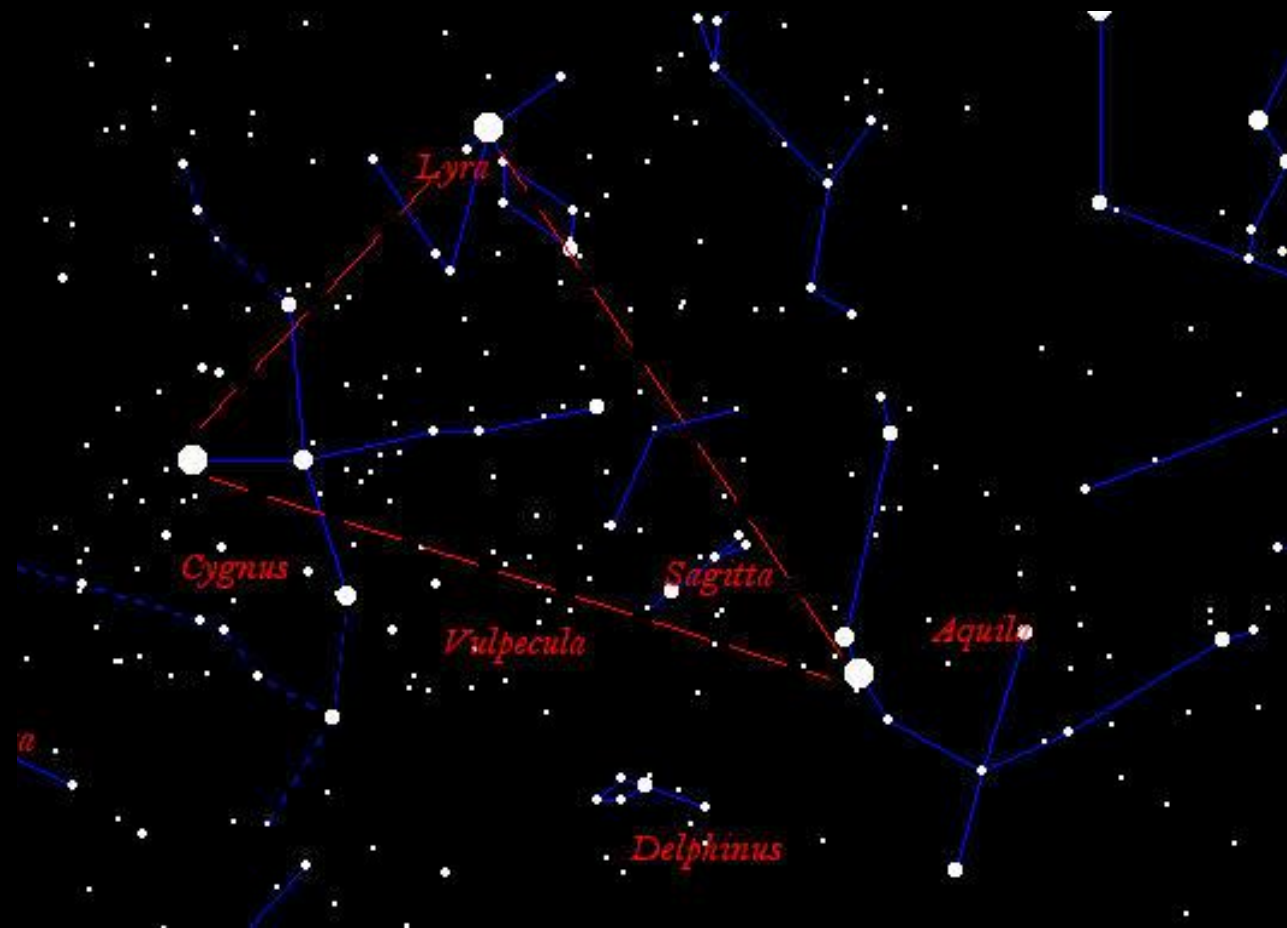
Seasonal Change & Nightly change of the Dippers



III. Summer Constellations

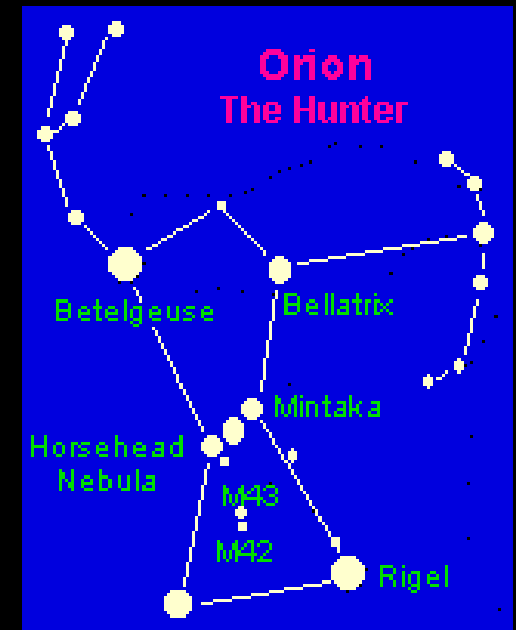
- 1st 3 bright stars that rise form the Summer Triangle
 1. Vega- in Lyra the Harp
 2. Altair- in Aquila the Eagle
 3. Deneb – in Cygnus the Swan
(Northern Cross)

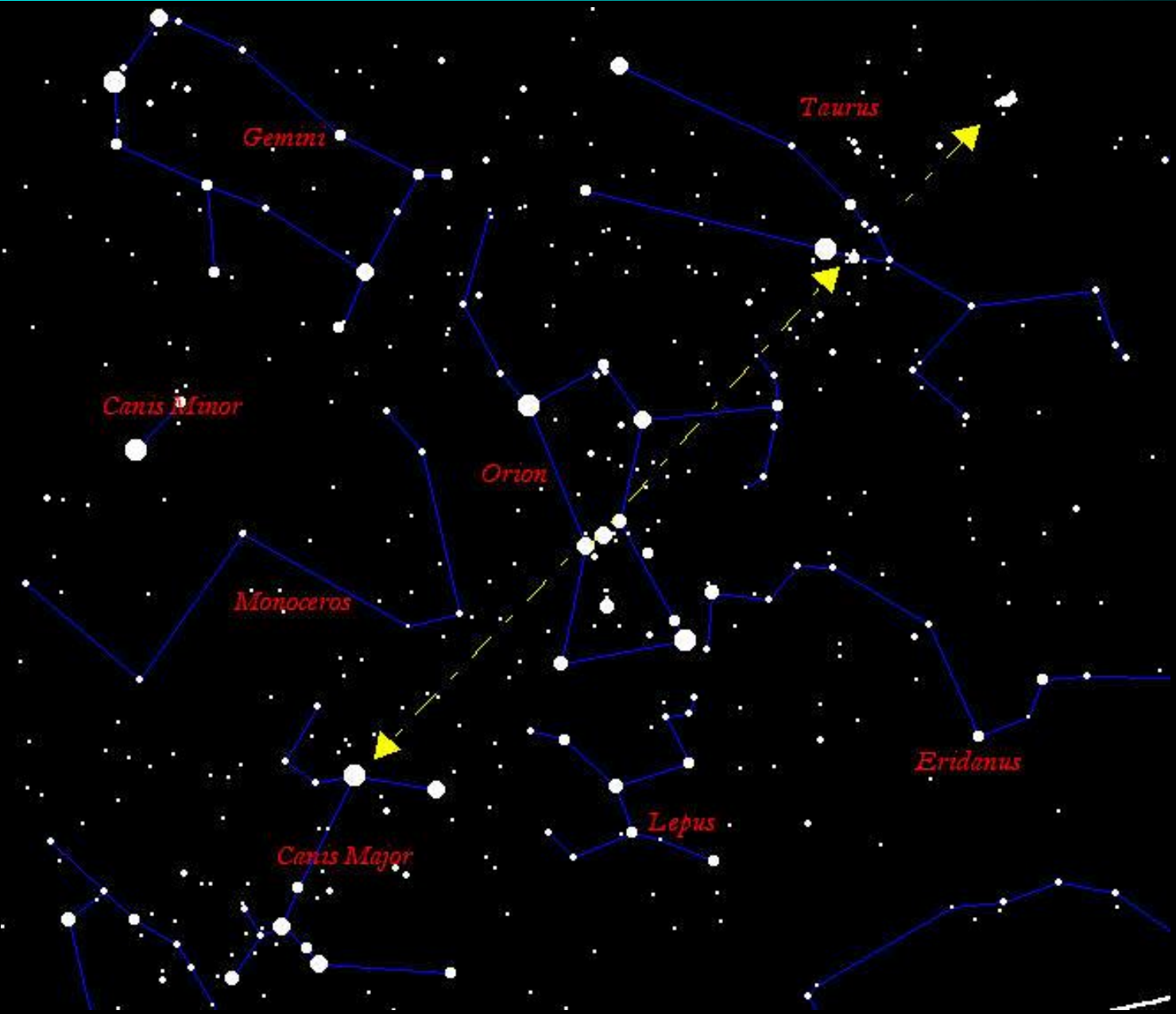
Summer Triangle



IV. Most Famous Winter Constellation

- Orion Contains:
 1. **Betelgeuse** (Bet el jooz) a bright red super giant star found forming Orion's right shoulder
 2. **Rigel** – a blue super giant: 7th brightest star in the nighttime sky





3 Stars of Orion's Belt

- Can be used to find 2 other constellations & a star cluster

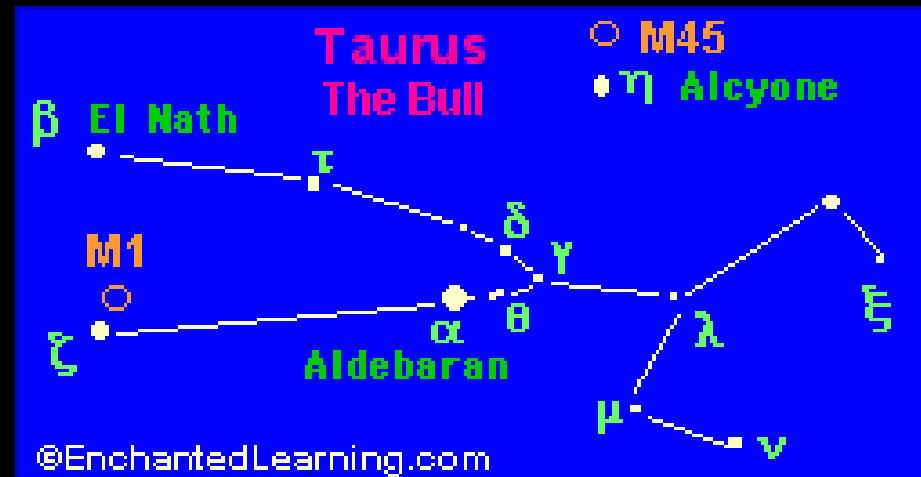
1. Canis Major- (Big Dog)
follow the line made by
the 3 stars of Orion's belt
down to the left

–Sirius– the brightest star in the
nighttime sky is found in Canis Major



2. Taurus (the Bull)

- Follow the line made by Orion's belt up & to the right
- **Aldebaran**- Red star that is the eye of the bull is the 13th brightest in the nighttime sky



3. Pleiades Star Cluster (7 sisters)

- Follow the line made by Orion's belt up to the right, go through Taurus to a clump of stars to the right.
- Called Subaru in Japan – means "Unite"



SUBARU

Graphing Constellations

Bell Ringer

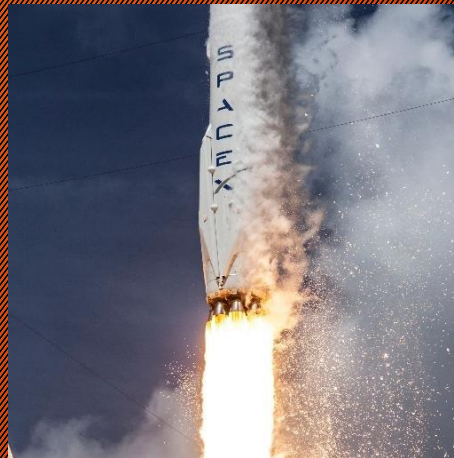
1. What is the difference between a Red Giant and a Red Super Giant?
2. Name one Winter Constellation
3. Name one Summer Constellation

Science Matters

- SpaceX

Elon Musk

- PayPal
- Tesla
- SpaceX
- Solar City





What does this mean?

- Costs cut once the system is improved.
- Cheaper launches = Cheaper price tags on satellites.
- Cheaper satellites = Cheaper phone, tv, gps for transportation industry
- Testing the system for Mars.