



Early Astronomy

- *humans* observed the sky from *very early on*

Q: Why? How did the sky affect us?

- **Sun** (heat, light → crops, etc.), **Moon** (tides)
- **other** objects *also* move (**planets**) – effect?
- *celestial phenomena* appeared to **directly influence Earthly events**: foundation for **astrology**
- **astronomy** & **astrology** were *one & the same!*

Constellations

- on a *dark* night, can see ~**3000 stars** with naked eye
- modern astronomers divide sky into **88 unequal regions** called **constellations** (eg) *Starry Night*
- **50 ancient** and **38 modern** constellations
- *some ancient constellations* originated **4000 years ago** in *Mesopotamia* (**Babylonians**)
- many constellations *renamed* by ancient **Greeks**

(eg) *What do you see?*



- objects "permanently" residing *within constellation boundaries* are considered *part of that constellation*



(eg) constellation of Orion "The Hunter" includes GON

- convenient to *imagine* stars *as if* they were "glued" onto *large sphere centered on the Earth*: the **Celestial Sphere** DEMO: Celestial Sphere

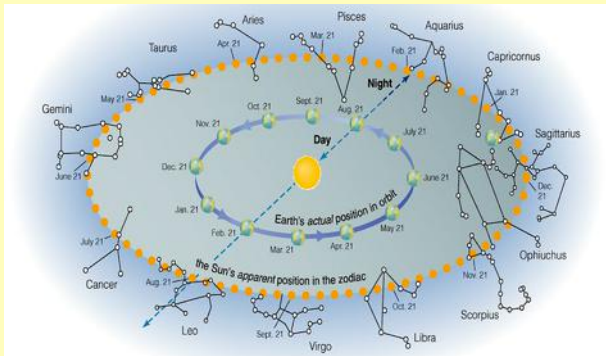


- ancient peoples *believed CS* was a *real* object!

The Zodiac

DEMO: Earth looking at the Sun...

- imagine Earth orbiting – where is Sun wrt stars?



- **Zodiac constellations** are those which **Sun appears to travel** through over a year
- *originally 12 Zodiac constellations; now 13* (constellation boundaries have changed over time)
- *early cultures* believed **Zodiac** was important *because it also contains paths of Moon & planets*
- so *some parts* of sky were *seen as more important*
- "specialists" (*astrologers/priests*) studied the sky, kept records, compiled calendars & sky lore

Astrology

Q: How is *astronomy* different from *astrology*?

- **astrology** is the study of how *celestial phenomena* (Sun, planets, Moon) influence human activity
- many kinds: Sun Sign, Vedic, Chinese...
- all claim a cosmic “**force**” influences us – but how?



• scientists know of **four fundamental forces** responsible for *all* observable physical interactions

- **gravitational force** (1687)
- **electromagnetic force** (1820)
- **weak & strong nuclear forces** (20th century)
- *all* known forces *decrease with distance*
- *all* known forces *depend on “something”* (eg) mass

DEMO: pop can & balloon

• so which of these *is* the “**astrological force**”?

X *weak & strong nuclear forces* very short range

X *gravity* depends on *mass*, *falls off with distance*

X *magnetic fields* are generated by Sun, planets

• *none of the known forces can explain astrology*

CLICKER: If astrological force *was* gravitational, which object would **dominate** Earthly horoscopes?

(a) Sun (b) Earth (c) Moon (d) stars

Q: Why *can't* it be an *unknown, independent* force?

• if the force is *independent* of *distance, mass*, etc *all objects, regardless of size, distance, affect you!*

• so *why* do *horoscopes* sometimes *seem* “right”?

CLICKER: What astrological sign are you?

(a) Cap/Aqu/Pisc (b) Aries/Taur/Gem

(c) Can/Leo/Vir (d) Lib/Sco/Sag

- but the *sky* has "shifted" over time!

Star Signs, Traditional and actual			
Constellation	Traditional	Actual (2011)	Days
Capricornus	Dec. 22 – Jan. 21	Jan. 20 – Feb. 16	28
Aquarius	Jan. 22 – Feb. 21	Feb. 17 – Mar. 12	24
Pisces	Feb. 22 – Mar. 21	Mar. 13 – Apr. 19	38
Aries	Mar. 22 – Apr. 21	Apr. 20 – May 14	25
Taurus	Apr. 22 – May 21	May 15 – June 21	38
Gemini	May 22 – June 21	June 22 – July 21	30
Cancer	June 22 – July 21	July 22 – Aug. 11	21
Leo	July 22 – Aug. 21	Aug. 12 – Sep. 17	37
Virgo	Aug. 22 – Sep. 21	Sep. 18 – Oct. 31	44
Libra	Sep. 22 – Oct. 21	Nov. 1 – Nov. 22	22
Scorpius	Oct. 22 – Nov. 21	Nov. 23 – Nov. 30	8
<i>Ophiuchus</i>		Dec. 1 – Dec. 18	18
Sagittarius	Nov. 22 – Dec. 21	Dec. 19 – Jan. 20	33

Review: Sky, Science & Astrology

- *constellations* are (one of 88) *regions of the sky*
- *Zodiac constellations* contain *path of Sun, planets*
- *science* uses *sci method: predict, test, review*
- *astrology* studies how *the sky influences humanity*
- *astrology* fails *rigorous scientific examination*