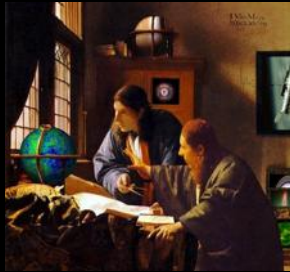


ASTR 312:

The History of Astronomy

Clicker question solutions



CLICKER: Which faculty do you belong to?

- (a) *Sci & Tech*
- (b) *Arts & Humanities*
- (c) *Social Sci*
- (d) *other*

CLICKER: How did you hear about this course?

- (a) *VIU calendar*
- (b) *recommended (by advisor, friend, etc.)*
- (c) *course website or poster on campus*
- (d) *other*

A Sense of Time...

If the Universe is **14 billion years old**, and we represent the **Big Bang** to the **present** on a **12 month calendar**...

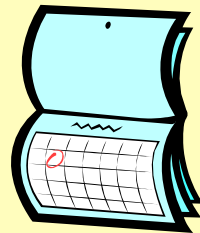
- **Big Bang** took place **Jan 1st**
- **Milky Way** formed in **February**

CLICKER: When did Earth form?

- (a) *January 1st*
- (b) *late February*
- (c) *mid August***
- (d) *early December*

- **earliest simple life** appeared in **September**

Q: When did modern humans appear?



The Sky



- 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

CLICKER: Nanaimo News Horoscope, Sep 03 2019

“You're in the mood to have some fun today! It's a wonderful day for getting together with close friends and family, or for inviting some neighbors round to your place. The fact that you're currently oozing charm and warmth will stand you in good stead, and might even mean that you attract the notice of someone.”

- (a) Capricorn (b) Aquarius (c) Pisces (d) Aries (e) Taurus
(f) Scorpio (g) Cancer (h) Leo (i) Virgo (j) Libra

CLICKER: Times Colonist Horoscope, Sep 03 2019

“You may believe that anything is possible now, and you may be right, but the planets warn you could easily bite off more than you can chew and end up choking! Your goals must be both well defined and within your reach, if only just.”

- (a) Capricorn (b) Aquarius (c) Pisces (d) Aries (e) Taurus
(f) Scorpio (g) Cancer (h) Leo (i) Virgo (j) Libra

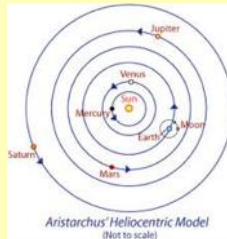




CLICKER: *What aspect of Stonehenge do you think leads some people to claim alien assistance in its construction?*

- (a) the precision of its alignment(s)*
- (b) the size and mass of the stones used*
- (c) the distance over which the stones were moved*
- (d) other*

The Greeks



CLICKER: *Aristarchus' Sun-centered model did not gain wide acceptance primarily because...?*

- (a) Aristarchus did not argue forcefully enough*
- (b) observations did not seem to support the idea*
- (c) the Sun is too small for the Earth to orbit it*
- (d) the Earth simply had to be at the center*



CLICKER: *Ptolemy was important to the history of astronomy because he...?*

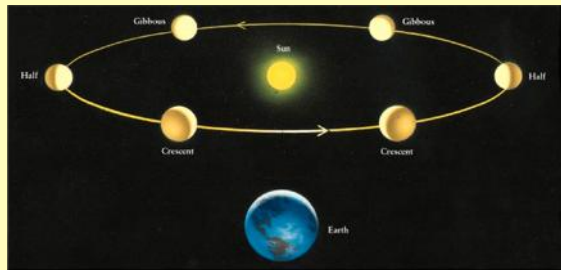
- (a) constructed a predictive solar system model*
- (b) was the first to propose a Sun-centered system*
- (c) was the first to believe all orbits are circular*
- (d) invented the geocentric model*

The “Age of Reason”



CLICKER: For Saturn, $P \approx 30$ years, so a is *roughly*
(a) 5 AU (b) 10 AU (c) 30 AU (d) 1000 AU

Q: What effect did the 3rd law have on our view of the solar system (universe) & our place in it?

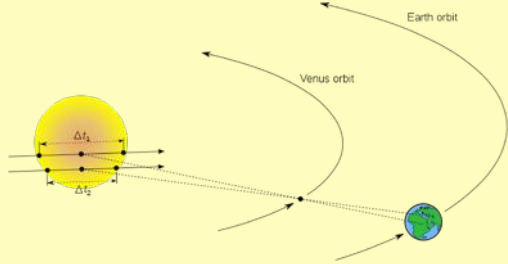


CLICKER: How did the *observed* phases of Venus support the *heliocentric* over the *geocentric* model?

- (a) more phases could be seen than expected
- (b) Venus is always fully lit being nearer the Sun
- (c) the phases were opposite to those of the Moon
- (d) the phases took place faster than expected

The Modern Age





CLICKER: Determining the **astronomical unit** using planetary transits required...

- (a) accurately known viewing positions
- (b) precise timing of the transit's duration
- (c) non-trivial mathematics (geometry)
- (d) all of the above**



CLICKER: Earth's location in the Milky Way is best described as...?

- (a) far above the "disk" of the galaxy
- (b) close to the center
- (c) about half way between the center & edge**
- (d) near the visible edge



CLICKER: HST takes amazing images because...

- (a) it is above Earth's atmosphere**
- (b) it is the largest reflecting telescope ever built
- (c) it utilizes an array of multiple CCD imagers
- (d) of advances in image processing software

The Space Age



"We shall not cease from exploration, and the end of all our exploring will be to arrive where we started and know the place for the first time."

- T. S. Eliot

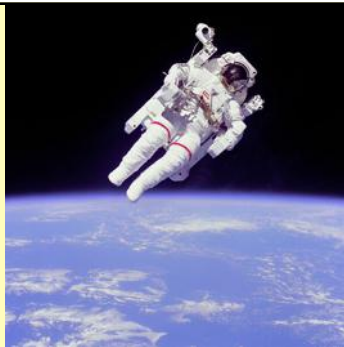


CLICKER: What part(s) of Apollo return to Earth?

- (a) the Command/Service Module
- (b) CSM and the Lunar Module
- (c) only the Command Module**
- (d) the entire rocket

CLICKER: Do you accept that humans went to the Moon ~50 years ago (ie. NASA's Apollo)?

- (a) absolutely!
- (b) pretty sure
- (c) undecided
- (d) it's a hoax



CLICKER: Would you accept a job as an astronaut (if NASA offered)?

- (a) in a heartbeat!
- (b) no way!
- (c) maybe... depends on where they send me**

CLICKER: The core objection to Newton's Static Universe Model is that it... ?

- (a) required the universe to be too young
- (b) required infinitely many stars
- (c) disagreed with The Law of Gravitation
- (d) conflicted with observations of the night sky**