Astronomical Time Periods

9/18/2009

Opening Discussion

- http://www.youtube.com/watch?v=KmegYNGWwyc
- Have you see anything interesting in the news? What did we talk about last class?

Minute Essays 1

- Eccentricity of Earth's orbit is 0.0167.
- Is there a pull beyond the scope of the Universe drawing things away?
- Relativity and flow of time. Impact of gravity and speed.
- Funding for research stations on the moon.
- Can planets become perfectly aligned?
- Planets in multi-star systems.

Pseudoscience

- Claims that make statements about the observable world, but ignore evidence are called pseudoscience.
- In pseudoscience, people either make claims that are testable and ignore the evidence, or they make claims that are sufficiently vague as to be impossible to test.
- Unfortunately, pseudoscience looks like real science to most people. The best way to not be taken in is to have a better understanding of what we know from science. Science can have bias too, but with experimentation over time, the better model wins.

Minute Essays 2

- Instances of pseudoscience you listed:
  - Phrenology, chiropractors, medicine, anything you find in the back of a magazine, science fiction, life on other planets, impact of full moon, global warming, acupuncture, weather forecasts, UFOs, creationism/religion, superstitions, psychology/sociology
  - Not all of these really qualify. Fiction is making claims. Things that can't be tested yet vs. things that can't be tested. Inaccuracy vs. incorrectness. Rigor of evidence.

Astrology

- Historically astronomy and astrology was closely tied with the same people doing both. In many ways, astrology paid for early astronomy.
- The idea of astrology is that the positions of the Sun, Moon, and planets among the stars impacts our lives. In many ways it is true for the Sun and Moon in that they control seasons and tides. However, with what you now know about the stars and the planets you can fairly easily see that the claim that the location of the planets against the stars as seen from Earth quite literally has no impact upon you at all.

Days and Months

- Length of day determined by rotation of the Earth.
  - Sidereal day – real rotation rate relative to stars. 23H 56m 4.09s
  - Solar day – average time for Sun to get back to highest point. 24 hours on average, but can be 25 seconds longer or shorter.
- Month is roughly the orbit of the Moon.
  - Synodic month is 29.5 days. Lining up with the Sun.
  - Sidereal month is 27.333 days.

Years and Planetary Periods

- Sidereal year is time it really takes to orbit the Sun.
- We use tropical year though because we want to stay consistent with seasons. This is 20 minutes shorter due to 26,000 year procession period.
- Planets have sidereal and synodic periods too.
  - Conjunction – in line with the Sun
  - Opposition – opposite in the sky from the Sun
  - Greatest elongation – only for interior planets

Telling Time

- A sundial gives you apparent solar time. This varies in length with where Earth is in its orbit.
- Average out over year to get mean solar time.
- These are local and vary with longitude.
- Standard time required with growth of railroads. Created timezones.
- Greenwich mean time also called Universal time.

Leap Years

- Egyptian calendar had 365 days. Seasons drifted one day every four years.
- Julian calendar added leap year so every fourth year would have 366 days. Still drifted 11 minutes each year.
- Gregorian calendar skips leap years on century marks unless divisible by 400. This is what we use today.

Minute Essay

- So how do you feel going into the first midterm?
- After the midterm we will begin chapter 4 where we stop doing history and start doing physics.
- A reading quiz will be posted this weekend. It won't close until Wednesday, but it could be a good way to practice for the exam.