Size+Time Scales and Scientific Method
Lecture outline -- 1

Reading: ***Astronomy Notes*** sections 1.1 through 1.4 and skim chapter 2

Vocabulary terms used:
astronomical unit—average distance between the Earth and the Sun (149.6 million kilometers). Used for inter*planetary* distances. Abbreviated with "AU".
light year—distance light travels in one year (9.461 trillion kilometers, over 63,000 AU!). Used for inter*stellar* distances.

model—an abstraction that is a simplified view of reality.
theory—a logical, systematic set of principles or explanation that has undergone testing or validation from careful observations and has stood up against attempts to prove it false. A scientific theory can be used to make a variety of predictions of what will happen under different circumstances**.**

Outline

Sense of Scale

Size (solar system models: campus + quarter coin)

If Pluto orbit fits in a quarter, nearest star is how far away:_____

Milky Way galaxy is how big in this scale model: _____

Time (cosmic calendar + walk through history)

If universe's history is put on the solar system model between the Sun and Uranus, then each big step (1 meter) would equal _____ years.

The solar system formed_____ steps beyond Saturn = _____ years ago.

Life began_____ steps beyond Saturn = _____ years ago.

All of human history_____

Figuring out how things work

Observe

Generalize

Model definition

What separates a scientific theory or model from other types of explanations:_____

"Theory" in everyday language vs. a "science theory" _____

Observe + experiment

Revise, expand, or reject the theory/model

What is the sole judge of scientific truth: _____

Assumption #1: _____

Assumption #2: _____

"Scientific truth" — _____

Self-imposed limitation: _____

Science – religion conflict? Not necessarily! _____

Communicate results in clear, logical fashion & Peer Review

Value of Astronomy

Why/how astro*logy* is *not* a science