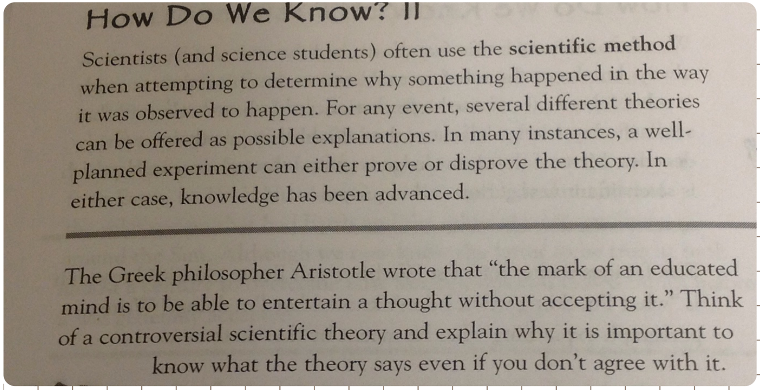
Warm-up:



How Do We Know? II

Scientists (and science students) often use the **scientific method** when attempting to determine why something happened in the way it was observed to happen. For any event, several different theories can be offered as possible explanations. In many instances, a well-planned experiment can either prove or disprove the theory. In either case, knowledge has been advanced.

The Greek philosopher Aristotle wrote that "the mark of an educated mind is to be able to entertain a thought without accepting it." Think of a controversial scientific theory and explain why it is important to know what the theory says even if you don't agree with it.

- Aristotle:
  - Born in 384 BC
  - studied biology, psychology, & literature
  - Known as the first teacher
- Beliefs:
  - Natural Motion: an object that falls towards the center of the earth
    - ↳ heavier object → falls faster
  - Violent Motion: must be caused by a force
    - ↳ Larger Force → faster motion
  - Mathematics doesn't describe natural phenomena
    - ☆ 15th & 16th centuries → ideas accepted

- Copernicus:
  - Born in 1473
  - Before: - people believed that any motion must be caused by a force
    - Force to move the earth is impossible
    - Earth must be still
  - After: - Earth must revolve around sun → based or astronomical observations

- Galileo:
  - 1564 → almost 2,000 yrs later!
  - Appointed profesor of mathematics at Pisa → age 26
  - Challenged older professors → made enemies
- Beliefs:
  - dropped light & heavy objects → arrival times were the same
  - used math to describe motion → contradicted Aristotle
  - Proved that falling objects uniformly accelerate

- Newton:
  - Born in 1643
  - Built on Galileo's ideas → most influential physicists of all time
- Beliefs:
  - why would objects fall if there were no apparent forces
  - Must be some constant vertical force → gravity!
  - without gravity, objects would continue in any direction indefinitely