ANCIENT GREEK PHYSICS

Keen observations, especially astronomy, but no basic laws

- No predictions of future events
- No correlation of disparate phenomena
  - Could not apply Archimedes' buoyancy principle to atmosphere
  - Atomic theory did not tell how atoms combine
- Importance of math, especially geometry

Pythagoras (560-480 BCE)

- Founded school of philosophy
  - Numbers were everything
  - Looked for symmetries and harmonies
    - Found musical harmonies were related to intervals between pitches
    - Tried to relate musical harmonies to motion of the planets
  - Famous for theorem on right triangles
    - Later generalized for non-Euclidian geometry
    - Starting point for Einstein's relativity theory

Aristotle (384-322 BCE)

Tutor of Alexander the Great
Student of Plato at The Academy
(math and political science)
Founded the Lyceum
(biology and natural science)
Classification system, with math the key
for organizing science

Aristotle

- Said there were two kinds of motion
  - Natural motion
    - For Earth: Straight up or down
      - Normal state is rest
      - Things move to “proper” place
      - Force needed to move from that place
      - Earth too big to be moved
  - Celestial motion was circular

Aristotle

Violent motion
- Needed a continually applied force
- No concept of inertia

Body in “proper” place would not move without
- a constant force applied
  - arrow “squeezed” from behind

Believed celestial objects were perfect spheres
- made of ether

Moon was less perfect, corrupted by Earth

Euclid (325-270 BCE)

Father of geometry

- His flat geometry based on postulates

Challenges to his fifth postulate (parallel lines)

- led to two new geometries
  - Elliptical (positively curved)
  - Hyperbolic (negatively curved)

Aristarchus (310-230 BCE)

Heliocentric idea - not accepted
Used geometry to measure distance to
    Sun and Moon
Decided Sun was much farther from Earth
    Bigger than Moon or Earth
Therefore, Moon and Earth should go
    around the Sun

Archimedes (287-212 BCE)

Buoyancy principle

Mass of water = mass of object: floats

Found Pi geometrically

Inscribed polygons, increasing # of sides

Noted difference between very large finite numbers and infinity

Died when Romans conquered Syracuse

Developed ingenious defensive devices

Erastosthenes (276-194 BCE)

Accurately measured Earth circumference

Used geometry, wells in different latitudes

Hipparcus (190-120 BCE)

Greatest of ancient astronomers
Discovered precession
Identified stellar magnitudes
Credited with inventing trigonometry

Ptolemy (170-110 BCE)

Summarized Greek astronomy in his Algamest

Promoted a geocentric universe

Epicycles explained planetary motion

From Ptolemy to Newton

Aristotle's ideas (especially the idea of a geocentric universe) adopted by the Church

Little science pursued during the Dark Ages

Technology did develop

Navigation, clocks, gunpowder, Metallurgy, paper making

Printing press (1436)

Leonardo DaVinci