

Physics, Mr. Player
Midterm Review

- Galileo's concept of "physics"
- Identifying functions in nature
 - Linear
 - Exponential
 - Square root
 - Rational
 - Sine
- Creating linear functions from plotted data
 - Independent vs dependent variables
 - Trend lines
 - Understanding error bars
 - Calculating standard deviation
 - Causation vs correlation
- Trigonometric Functions
 - Sine, arcsine
 - Cosine, arccosine
 - Tangent, arctangent
- Calculating components & resultants
- Electrostatics
 - Subatomic particles
 - Quarks
 - Ions
 - Cations
 - Anions
 - Charging/ionization
 - By friction
 - By contact
 - By induction
 - Examples (electrostatic spray painting, chitin-based cosmetics)
- Coulomb's Law
 - Calculating force between two charges
 - Charges of electron, neutron, and proton in Coulombs
 - Electrical proportionality constant
- Material types
 - Conductors
 - Insulators
 - Semiconductors
 - Superconductors
- Ground
 - Outlets
- Electric Fields
 - Force fields
 - Electric field lines/ Magnetic field lines
 - Positive negative charge interactions
 - Calculating and summing (finding resultant)
- Force vs work vs energy
- Mechanical energy
 - Kinetic energy
 - Potential energy

- Calculations
 - Electrical potential energy
 - Electrical potential/ potential difference (voltage)
 - Common electrical potentials
 - Capacitance
 - Charge
 - Capacitor plate area and distance
 - Voltage
 - Current (Ohm's Law & charge/time)
 - Amperage/feeling
 - Electric safety
 - Resistance
 - Resistance & capacitance in series/parallel or mixed
- Electrical components
 - (leads, terminals, wire)
 - Batteries
 - AC & DC current sources
 - AC adaptors
 - Capacitors
 - Applications
 - How they work
 - Diodes
 - Applications
 - LEDs
 - How they work
 - TV remotes
 - Advantages over light bulbs
 - Potentiometers
 - Applications
 - How they work
 - Switches
 - Closed vs open
 - How they work
- "Kitty on a wire" situations (Ohm's Law)
- Van de Graaff generators
- Electromagnetic induction
 - 3 main factors/ magnetic field lines
 - Faraday's Law
- Circuit symbols
 - Wire
 - Switch
 - Battery
 - AC source
 - Capacitor
 - Resistor
 - Ground
 - Potentiometer
 - Diode
 - LED
 - Transformer
- Reading schematics
 - Series vs parallel
- Units/Variables
- Labs (force/mass relationship, blood splatter, spire height determination, electromagnetic induction, etc.)