Name: _____

Class: _____

Due Date: _____

Vocabulary List for IB Physics

A.0 Math

- Fundamental units
  - Meters
  - Kilograms
  - Seconds
  - Amperes
  - Kelvin
  - Moles
  - Candela
- Significant figures
- Errors
  - Random error
  - Systematic error
- Accuracy
- Precision
- Standard deviation
- Uncertainties
  - Absolute uncertainty
  - Fractional uncertainty
  - Percent uncertainty
- Magnitude
- Vector
- Scalar

A.1 Kinematics

- Zero dimensions
- One dimension
- Two dimensions
- Three dimensions
- Four dimensions
- Horizontal
- Vertical
- Slope
- Position
- Distance
- Displacement
- Speed
- Velocity
- Average speed
- Average velocity
- Instantaneous speed
- Instantaneous velocity
- Acceleration
- Free fall
- Projectile motion

A.2 Forces and Momentum

- Directly proportional
- Inversely proportional
- Mass
- Force
- Inertia
- Newton's first law of motion
- Newton's second law of motion
- Types of forces
  - Force of gravity (weight)
  - Normal force
  - Force of friction
    - Static friction
      - Coefficient of static friction
    - Dynamic/kinetic friction
      - Coefficient of dynamic friction
  - Force of tension
  - Spring force
  - Buoyant force
  - Viscous drag force
- Free body diagram
- Smooth
- Rough
- Incline plane
- Pulley
- Coupled systems
- Newton's third law of motion
- Free fall
- Terminal velocity
- Impulse
- Momentum
- Law of conservation of momentum
- Elastic collision
- Inelastic collision
- Perfectly inelastic collision
- Centripetal force
- Centrifugal force
- Banked road

A.3 Work Energy Power

- Work
- Energy
- Kinetic energy
- Potential energy
- Gravitational potential energy
- Elastic potential energy
- Total mechanical energy
- Power
- Law of conservation of energy
- Work-energy theorem
- Sankey diagram
- Efficiency

A.4 Rigid Body Mechanics

- Rigid
- Translational motion
- Rotational motion
- Revolution
- Period
- Linear position
- Angular position
- Linear speed
- Angular speed
- Linear acceleration
- Angular acceleration
- Mass
- Moment of inertia
- Force
- Torque
- Newton’s second law of motion for linear motion
- Newton’s second law of motion for rotational motion
- Translational equilibrium
- Rotational equilibrium
- Power for linear motion
- Power for rotational motion
- Linear momentum
- Angular momentum
- Linear impulse
- Angular impulse
- Translational kinetic energy
- Rotational kinetic energy
- Law of conservation of linear momentum
- Law of conservation of angular momentum
- Point mass
- Disc
- Sphere
- Ladder

A.5 Galilean and Special Relativity

- Light year
- Observer
- Reference Frame
- Inertial reference frame
- Event
- Simultaneous events
- Galilean transformations
- Galilean relativity
- Two postulates of relativity
- Michaelson-Morley experiment conclusion
- Lorentz transformation equations
- Lorentz factor
- Time dilation
- Proper time interval
- Length contraction
- Proper length
- Twin paradox
- Space-time interval
- Proper time interval
- Proper length
- Relativity of simultaneity
- Spece-time diagram
- World line
- Muon decay

B.1 Thermal Energy Transfers

- Solid
- Fluid
- Liquid
- Gas
- Steam
- Mass
- Volume
- Density
- Diffusion
- Temperature
- Degrees Celsius
- Degrees Kelvin
- Absolute zero
- Boltzmann's constant
- Internal energy
- Thermal equilibrium
- Heat
- Phase change
- Melting
- Freezing
- Vaporization/boiling
- Condensation
- Specific heat capacity
- Latent heat of fusion
- Latent heat of vaporization
- Conduction
- Convection
- Radiation
- Thermal conductor
- Thermal insulator
- To absorb
- To reflect
- To emit
- Blackbody
- Emissivity
- Luminosity
- Intensity
- Stefan-Boltzmann constant
- Stefan-Boltzmann law

- Apparent brightness
- Wein’s displacement law

B.2 Greenhouse Effect

- Law of conservation of energy
- Emissivity
- Albedo
- Intensity
- Solar constant
- Greenhouse effect
- Enhanced greenhouse effect
- Major greenhouse gases

B.3 Gas Laws

- Force
- Area
- Pressure
- Volume
- Avogadro constant
- Mole
- Molar mass
- Atomic mass unit
- Ideal gas (characteristics?)
- Real gas (characteristics?)
- Boyle's law
- Charles' law
- Gay-Lussac's law
- Gas constant
- Ideal gas law
- Internal energy of an ideal monatomic gas

B.4 Thermodynamics

- Thermodynamics
- Closed system
- Isolated system
- Piston
- To compress
- To Expand
- Internal energy
- Work
- Heat
- First law of thermodynamics
- Isothermal process
- Isothermal compression
- Isothermal expansion
- Isotherms
- Thermal equilibrium
- Zeroth law of thermodynamics
- Isobaric process
- Isochoric/isovolumetric process
- Adiabatic process
- Entropy
- Microstate
- Second law of thermodynamics
- Clausius version of the second law of thermodynamics
- Kelvin version of the second law of thermodynamics
- Arrow of time
- Third law of thermodynamics
- Heat engine
- Heat pump
- Carnot cycle
- Efficiency of an engine for a Carnot engine
- Arrangements
- Probability

B.5 Current and Circuits

- Cross sectional area
- Radius
- Diameter
- Electric potential difference
- Voltage
- Charge
- Electric current (equation and units) and electron flow
- To flow
- Resistance
- Resistor
- Variable resistor
- Resistivity
- Ideal wire characteristic
- Nonideal wire characteristic
- Ohm's law
- Thermistor
- Light dependent resistor
- Potentiometer
- Non-ohmic
- Electric power (equations)
- To dissipate
- Electromotive force emf
- Kirchoff's loop rule
- Kirchoff's junction rule
- Resistors in series
- Resistors in parallel
- Ammeter
- Voltmeter
- Potential/voltage divider
- Internal resistance
- Terminal potential/voltage
- Dry cell
- Cell
- Open circuit voltage
- Voltage drop

C.1 Simple Harmonic Motion

- To displace
- To oscillate
- Oscillation
- Periodic
- Period
- Amplitude
- Frequency
- Hertz
- Wavelength
- Angular frequency
- Angular velocity
- Equilibrium
- Pendulum
- Pendulum bob
- Spring
- Hooke's law
- Spring constant
- Simple harmonic motion
- In phase
- Out of phase by 90 degrees
- Out of phase by 180 degrees

Additional HL Understandings

- Phase angle

C.2 Wave Model

- Wave
- Medium
- Vacuum
- Mechanical wave
- Electromagnetic wave
- ROY G BIV
- Longitudinal wave
  - Compression
  - Rarefaction
- Transverse wave
- Crest
- Trough
- Wavelength
- Period
- Frequency
- Intensity
- Pulse
- Decibels
- Pitch
- Loudness

C.3 Wave Phenomena

- Wavefront
- Ray
- Superposition
- Constructive interference
- Destructive interference
- To reflect
- Fixed end
- Free/Loose end
- Index of refraction *n*
- Refractive index
- Reflection
- Law of reflection
- Medium
- Refraction
- Snell's law
- Normal
- Dispersion
- Total internal reflection
- Critical angle
- Monochromatic light
- Diffraction
- Two source interference
- Slit width
- Two slit diffraction
- Central maximum

Additional HL Understandings

- One slit diffraction
- Multiple slit diffraction
- Single slit envelope
- Diffraction grating

C.4 Standing Waves and Resonance

- Traveling wave
- Standing wave
- Compression
- Rarefaction
- Node
- Antinode
- Fundamental frequency
- First harmonic
- Open-open pipe
- Open-closed pipe
- Closed-closed pipe
- Restoring force
- Free oscillation
- Damping
- Underdamping (light damping)
- Overdamped motion
- Critically damped motion
- Driving force
- Natural frequency
- Resonance
- Driving frequency

C.5 Doppler Effect

- Doppler effect
- Wavefront diagram
- Source
- Observer
- Stationary
- To emit
- To detect
- Redshift
- Blueshift
- Expanding universe

D.1 Gravitational Fields

- Kepler's three laws of orbital motion
- Newton's law of gravitation
- Satellite
- Altitude
- Centripetal
- Centripetal acceleration
- Gravitational field strength
- Gravitational field lines

Additional HL Understandings

- Gravitational potential energy
- Gravitational potential
- Gravitational equipotential surface
- Escape speed

D.2 Electric and Magnetic Fields

- Charge
- Positive charge
- Neutral charge
- Negative charge
- Electrical conductor
- Electrical insulator
- Neutron
- Proton
- Electron
- Law of conservation of charge
- Electrostatic force
- Coulomb's law
- Relative permittivity
- Charge is quantized
- Transferring charge by
  - Friction
  - Electrostatic induction
  - Contact
  - Grounding/Earthing
- Electric field lines
- Electric field strength (electrostatic field strength)
- Electric potential difference
- Voltage
- Electron-volt
- Parallel plates
- Magnetic force
- Hard magnet
- Soft magnet
- Magnetic field lines
- Magnetic north
- Geographic north
- Magnetic south
- Geographic south
- Magnetic monopole
- Solenoid

Additional HL Understandings

- Electric potential energy (electrostatic potential energy)
- Electric potential (electrostatic potential)

- Equipotential surface

D.3 Motion in Electromagnetic Fields

- Right hand rule for charged particles in a magnetic field
- Parallel current carrying wires

D.4 Induction

- Loop
- Induction
- Induce
- Electromotive force
- Flux
- Magnetic flux
- Faraday’s law
- Lenz’s law
- Self-induction

E.1 Structure of the Atom

- Thomson model of the atom
- Geiger-Marsden-Rutherford experiment
- Rutherford model of the atom
- Nucleon number A
- Atomic number Z
- Nucleon
- Nuclide
- Discrete
- Continuous
- Ground state
- Excited state
- Transition
- Absorption spectra
- Photon absorption
- Emission spectra
- Photon emission
- Electromagnetic wave

Additional HL Understandings

- Nuclear density
- Angular momentum
- Quantization of energy
- Electron ground state energy
- Excited state
- Energy levels of electron in a hydrogen atom
- Bohr model of the atom

E.2 Quantum Physics

- Photoelectric effect
- Photoelectron
- Critical/threshold frequency
- Work function (ionization potential)
- Intensity
- Photocurrent
- Stopping potential/voltage
- Anode
- Cathode
- Planck's constant
- DeBroglie hypothesis
- Wave-particle duality
- Compton effect
- Experiments where light behaves as a wave
- Experiments where light behaves as a particle

E.3 Radioactive Decay

- Isotope
- Chemical properties
- Physical properties
- Mass defect
- Binding energy
- Binding energy per nucleon curve
- Atomic mass unit
- Transmutation
- Mass difference
- Strong nuclear force
- Random
- Spontaneous
- Radioactive decay
- Alpha particle
- Helium nucleus
- Neutrino
- Antineutrino
- Positron
- Beta plus particle
- Beta plus decay
- Electron
- Beta minus particle
- Beta minus decay
- Gamma ray
- Gamma particle
- Gamma decay
- Ionization
- Ionizing ability
- To penetrate
- Penetrating power
- Half-life
- Activity
- Count rate
- Background radiation

Additional HL Understandings

- Continuous
- Discrete
- Decay constant λ

- Radioactive decay law equation

E.4 Fission

- Nuclear fission
- Chain reaction
- Critical mass
- Induced process
- Control rod
- Moderator
- Heat exchanger
- Fuel rod

E.5 Fusion and Stars

- Nuclear fusion
- Celestial
- Star
- Thermal gas pressure
- Radiation pressure
- Gravitational pressure
- Stellar equilibrium
- Main sequence star
- Sun
- Proton-proton cycle
- Apparent brightness b
- Luminosity L
- Perfect black body
- Wein's displacement law
- Absorption spectrum
- Main sequence stars
- Hertzsprung-Russell diagram
- Instability strip
- Red giant
- Red supergiant
- Dwarf star
- Electron degeneracy pressure
- White dwarf
- Supernova
- Evolutionary path
- Astronomical unit
- Light year
- Stellar parallax (parallax method)
- Parallax angle
- Arc second
- Parsec
- Stay awesome