# Physical Science 92A

Physics terms to know for End of Course Test (EOCT)

www.doe.k12.ga.us/curriculum/testing/eoct/asp

**Scientific Processes:**

Safety Procedures: general practices, Fume hood,
Steps to scientific process:
Background information→ Hypothesis→ experimentation→ observations→ conclusion
Hypothesis:
Accuracy and Precision as it relates to Measurements
Quantity of measurements and metric units: length, mass, time, temperature, volume
Metric prefixes
Variables:
Inference:→
Independent variable:
Dependent variable:
On graphs: know where to place IV and DV
Know how to interpret the data from a graph: indirect, direct, no relationship
Control variables in experiments
Theory
Laws

**Energy Forms and Transformations**

Law of Conservation of Energy
Potential Energy
Kinetic Energy
Heat
Temperature
Specific heat
$Q = m\ c\ \Delta T$ ( heat lost or gained = mass x specific heat x change in temperature Units: joule= kg x J/kg °C x °C
Melting/freezing point
Boiling/condensation points
States of Matter: solid, liquid, and gas
Conduction of heat
Convection of heat
Radiation of heat

**Force and Mass**

Major forces of universe: gravity, nuclear, and electromagnetic force.
Friction:
Three types of friction forces: sliding, rolling, and fluid or static.
Force
Velocity
Acceleration
Acceleration of a free falling object:
Speed
Newton's three laws: applied to every day situations
First law: law of inertia
Second Law: equation law: F = m x a
Third law: Action forces → Reaction Forces; equal and opposite
Law of momentum: p = m x v
Net force: balanced forces , unbalanced forces
Relationship between force, mass, and acceleration
Gravitational Forces: relationship between distance and mass
Gravity: a force how it influences falling bodies

Mass:
Weight:
Work:
Energy:
Sources of energy: Nuclear, solar, fossil, geothermal, wind, waters (hydroelectric)
Mechanical Advantage:

**Equations for Problems**:

**F= m x a** ( Force = mass x acceleration ) ( newtons (N) = kilograms (kg) x meters/second squared ( $m/s^2$)

**v = d/t** ( velocity = distance / time ) units: ( m/s = m/s)

**A = Δv/ t** (Acceleration = change in velocity / time) units: ( $m/s^2$= m/s/ s )

**W = F x d** (work = Force x distance) units: ( joules (J) = N x m )

**P = W/t** ( Power = Work / time) units: ( watt (W) = J/s

**p = m x v** ( momentum = mass x velocity) units: (kg ·m/s = kg x m/s)

**MA = $F_o$ / $F_i$ or MA = $D_i$ /$D_o$** ( force or distance)
(sometimes input is called effort and written like ($F_e$ or $D_e$)
and output force is called resistance and written like ($F_r$ or $D_r$))

**Efficiency of machine = $W_o$ / $W_I$ x 100 %** Work ouput / work input x 100 % units : percent

**Waves**

Waves
Longitudinal: sound
Transverse: light
Period
Cycle
Frequency
Wavelength
Amplitude
Crest and trough
Music vs. Noise
Pitch
Loudness
echo
Electromagnetic Spectrum and components compare frequency and wavelength
Reflection
Refraction
Interference
Diffraction
Speed of sound in different mediums
Doppler effect
Problems: $v = f/\lambda$ ( velocity = frequency / wavelength) (unit: m/s = Hz /m)

**Electricity and magnetism**

Electricity
Static:
Induction:
Conduction:
Circuits:
Alternating Current
Direct Current:
Voltage
Resistance
Current
Simple series circuit
Parallel series circuit
Electromagnetism
Ohms Law: $V = IxR$ voltage = current x resistance ( units: volts = amps x ohms)
Problems: $R = V/I$ resistance = voltage / current (units: ohms = volts/ amps)

**Matter and its Properties**

Mixtures
Pure substances
Homogenous mixtures
Heterogeneous mixtures
Atoms
Elements
Suspensions
Colloids
Physical characteristics
Chemical characteristics
Physical properties
Chemical properties

**Atomic structure:**

Electron cloud and nucleus
Three main particles: location, charge, and mass
Atomic number: how to determine
Mass number: how to determine
Neutron number: how to determine
Isotopes
Energy levels: Maximum number of electrons in each level
Valence electrons: significance
Why atoms combine: octet rule
Ion vs. atom: how do they differ
How does an atom become positive and negative charged
Radioactivity: nucleus break down produces 3 types of radiation: Alpha, beta, and gamma
Alpha is weakest; gamma is strongest (Electromagnetic Spectrum)
Half-life: the time it takes one-half of samples of radioactive material to decay
Nuclear reactions: fission or fusion

Fission is when the nucleus is bombarded with neutrons. Occurs with elements that have an atomic number of 90 or higher.
Fusion is when two nuclei bombard each other and form one nucleus: High energy released occurs at extremely high temperatures such as in stars.

**Periodic Chart**

How is it arranged
Location of metals, non-metals, metalloids, alkali, alkaline, halogens, noble gases
Families of groups have in common
Noble gas family: reactivity
Rows of elements: energy levels
Importance of group number: valence electron and oxidation number
Where are the most reactive elements located in a family of metals and non-metals?
What will atoms do with electrons to be stable if a metal and if a non-metal

**Naming (Nomenclature) compounds**

Chemical formula
Diatomic molecules
Bonds are of two types: ionic (transfer of electrons) and covalent (sharing electrons)
Binary compound
Polyatomic ions
Endings of -ide, and -ate,
Why do compounds form?
Transition elements: roman numerals
How do you recognize an acid, a base, and organic and inorganic compounds?

**Chemical Equations and Reactions**

Reactants
Products
Law of Conservation of Mass or Atoms
Balancing process
Mole: a unit that represents a very very large number of $6.023 \times 10^{23}$ atoms
Types of chemical reactions
- Synthesis ( addition)
- Decomposition
- Single displacement
- Double displacement

Exothermic reactions: products have less energy than reactants, energy is **released**
Endothermic reactions: products have more energy than reactants, energy is **absorbed**

**Organic compounds:**

List examples of organic compounds: fuels ( petroleum), plastics, carbohydrates, fats, oils,
How do you recognize an organic: what elements are always present?
Why can carbon combine with so many different elements
Name the ways carbon can combine with other carbon atoms.
Isomers
Hydrocarbon compounds
Saturated vs. un-satuarated hydrocarbons
Naming organic compounds: endings of : - ane, -ene, -ynes, anol
Prefixes: meth, eth, prop, but, pent, hex, hept, oct, non, dec
Functional groups: - OH attached is an alcohol
Polymer: define: examples: proteins, DNA, lipids,