Study Guide for Physics, 2nd semester, 2012

Physical Science, Chapters 1, 10, 11, 12, 13, 14, 16, and
pp. 831, 833 - 842
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Topics
What is Physical Science?

Scientific Method (5 Steps)

Scientific law, theory, hypothesis, observation

Details about Experiments (tests of hypotheses, using control groups, dependent/independent variables)

SI Units; reasons for SI system; meaningful measurements; SI prefixes

How to measure with balances, meter sticks, graduated cylinders, thermometers

Unit conversions and knowledge of conversion factors (1 km/1000 m, etc.)

Significant Figures and Rounding

Read and construct data tables and graphs (including time-distance graphs)

Calculate volume and density

Define, calculate and compare motion, velocity, acceleration, and force

Newton's 3 laws of motion and applications illustrating them

Forces, including friction, balanced, unbalanced, and net

Determine applications of gravity

Describe projectile and circular motion

Calculate momentum and describe the law of the conservation of momentum

Define, calculate, and compare work and power

Define and give examples of the 6 types of simple machines

Calculate efficiency and power of machines

Apply and calculate the mechanical advantage of different machines

Energy, Potential Energy, Kinetic Energy, Mechanical Energy

Law of Conservation of Energy, pendulums

Waves -transverse, compression, frequency and pitch; light, reflection, refraction, diffraction

Electricity -static electricity, circuits, resistance, power and energy, Ohm's law

Equations

$v = \frac{d}{t}$ $a = \frac{\Delta v}{t}$ $F = m \cdot a$ $P = \frac{W}{t}$ $p = m \cdot v$ $W = F \cdot d$

$\Delta v = v_f - v_i$ $MA = \frac{F_r}{F_e}$ $MA = \frac{d_e}{d_r}$ $MA = \frac{L_e}{L_r}$ $MA = \frac{r_w}{r_a}$

$\Delta T = T_f - T_i$ $MA = \frac{l}{h}$ $Efficiency = \frac{W_{out}}{W_{in}} \cdot 100\%$

$weight \ \ N \ = m \cdot g$ $W_{in} = W_{out}$ $F_e \cdot d_e = W_{in}$ $F_r \cdot d_r = W_{out}$

$ME = PE + KE$ $KE = \frac{1}{2} m \cdot v^2$ $PE = m \cdot g \cdot h$ $Q = m \cdot \Delta T \cdot C_p$

$I = \frac{V}{R}$ $P = I \cdot V$ $E = P \cdot t$ $v = \lambda \cdot f$

SI Units for the following:

length	velocity	mass	acceleration
temperature	force	time	momentum
volume	work	density	power
energy	frequency	specific heat	resistance
voltage	current		

Vocabulary

scientific law
theory
hypothesis
observation
independent variable
dependent variable
control
precision
accuracy

prefixes of units:
- nano-
- micro-
- milli-
- centi-
- kilo-
- mega-

density
mass
volume
displacement
motion
velocity
acceleration
inertia
friction
momentum
force
terminal velocity
freefall
air resistance
weight
projectile
centripetal acceleration
gravity
simple machine
ideal machine
compound machine
mechanical advantage
actual mechanical advantage
ideal mechanical advantage
effort force
effort arm (distance)
resistance force
resistance arm (distance)
fulcrum
lever
pulley

wheel and axle
inclined plane
screw
wedge
efficiency
work
power
energy
potential energy
kinetic energy
elastic potential energy
chemical potential energy
gravitational potential energy
wave
transverse wave
longitudinal (compression) wave
normal
frequency
wavelength
amplitude
compression
rarefaction
Doppler effect
pitch
opaque
translucent
transparent
reflection
refraction
interference
diffraction
current
voltage
resistance
amperes
potential difference
series circuit
parallel circuit
static electricity