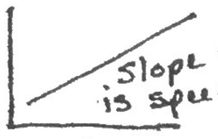
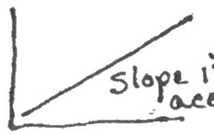
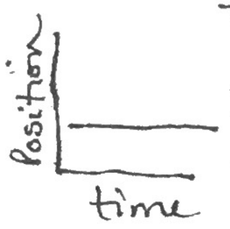
Chapter 4, 5 & 6 Review

Graphs of Motion

P  S 

slope is speed ✱ — time

slope is acceleration ✱ — time

ex: 

Acceleration

$a = \frac{V_2 - V_1}{\text{time}}$ (finish speed − start speed)

(m/s^2) If at rest, $V_1 = \varnothing$

Force = A push or pull; A change in motion

Weight = mass x gravity

$W = m \times g$

(N) (Kg) (9.8)

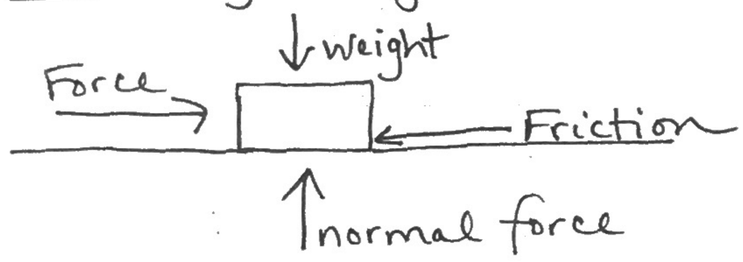
✱ Mass does not change!

Friction = A force that opposes motion

ex: shoes → cleats increase friction
oil/water → decrease friction

Equilibrium → object at rest (no motion) or object moving at constant velocity

Free Body Diagrams



Net force → need to know how to figure out net force & the direction an object is moving.

Newton's Laws

#1 – At rest stays at rest, in motion stays in motion at constant velocity unless acted upon by an outside force

#2 – $F = m \times a$ (Force = mass x acceleration)

$(N) = (Kg) \times (m/s^2)$

#3 – Every action has an equal and opposite reaction

$P = m \times V$

(Momentum = mass x velocity)

Chapter 7

$W = F \times d$ ★ Work is energy

(J) = (N) × (m) ★ Carrying or holding IS NOT Work!

or (Nm)

★ Force applied needs to be in direction of where it is moving

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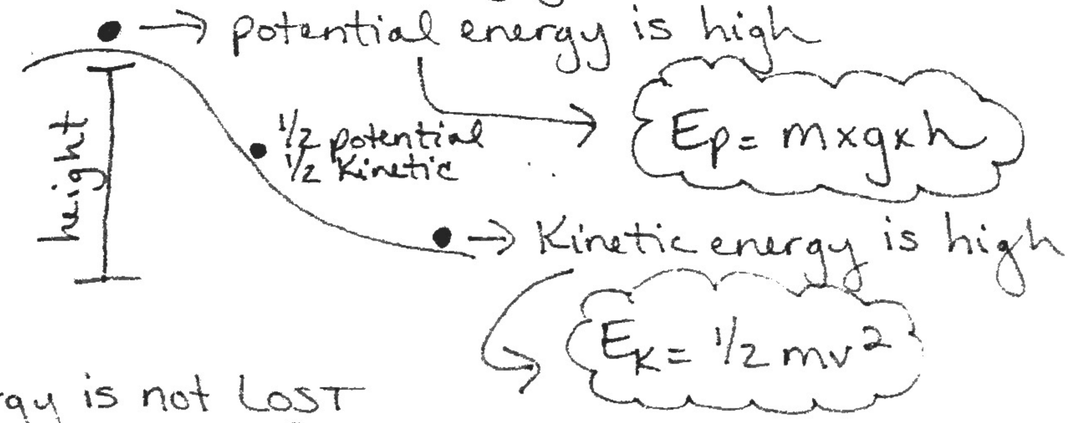
$P = \frac{W\ (J)}{t\ (s)}$ ★ Power is the rate at which you do work

(Watts)

$\%\ Effic. = \frac{Work\ Output}{Work\ Input} \times 100$

bigger # will be work input because you can never get more out than what is put in.

Conservation of Energy



★ Energy is not LOST but changes form

Chapter 16

Ohm's Law $I\ (amps) = \frac{V\ (volts)}{R\ (ohms)}$ or Ω

Need to Know, by looking at a circuit, what will work and what will not work.

Flow of charge → Always leaves + end (positive) and returns to − end. (negative)

Chapter 1, 2, 4 REVIEW

Measurement: A number and units Ex: 15m

American System ↓ Ex: inches, pounds

International Metric System ↓ (SI units) Ex: meters

Metric Conversions

K H D **B**ase D C M

↓

Decimal left ← meters Liters Grams → Decimal Right

Ex: Convert 500 mm → ____ meters

500. = .5 meters

Dimensional Analysis → want units to cancel.

Ex: 1800 seconds to hours

$$\frac{1800 \text{ seconds}}{1} \times \frac{1 \text{ min}}{60 \text{ sec}} \times \frac{1 \text{ hour}}{60 \text{ min}} = \text{____ hr}$$

Significant Digits

1. All non zeros = significant digits
2. Zeros between sig digs = significant
   Ex: 3C**C**4 Sandwich rule
3. Zeros right of decimal + right of sig dig = sig.
   Ex: 12.1**0** = 4 sig digs
4. Final zeros not significant
   Ex: 1400 → 2 sig digs

Multiplication / Division = # with least amount of sig digs wins!

Ex: 1.4 x 3.10
Answer must have only 2 sig digs

Addition / Subtraction = # with least amount of sig digs past decimal point wins!

Ex: 1.442 + 1.39
Answer can only have 2 numbers past decimal

Scientific Method

Variables: only one can change
Independent variable: you change
Dependent variable: The result of your change

* Difference between hypothesis, theory + Law*
  ↳ - Need to know this

Motion

(Speed or Velocity) $V = \frac{d \text{ (distance)}}{t \text{ (time)}}$

Velocity has a direction while Speed does not

Speed = 50 mph
Velocity = 50 mph west

Average Speed: $\frac{\text{Total Distance}}{\text{Total Time}}$

Instantaneous Speed: your speed in that moment!