Net Force F_{net} N or $kg\,m/s^2$ The sum of all forces on an object

UNIT 3: CONCEPT AND TERM LIST

	Variable	Units	Notes or Definition
Applied Force	F_A	N or $kg\,m/s^2$	Push or pull from a source such as a person
Centripetal acceleration	a_c	m/s^2	Change in direction of velocity for object moving in circle; points to center
Centripetal force	F_c	N or $kg\,m/s^2$	Force causing circular path; points to center $F_c = ma_c$ or $F_c = mv^2/r$
Circumference	C	m	length of 1 revolution $C = 2\pi r$
Coefficient of friction	μ	——	$\mu = \frac{F_f}{F_N}$ Static μ for object at rest or starting Kinetic μ for moving object $\mu_K < \mu_S$
Distance between two masses	r	m	r is inverse square to F_g if r x2 $F_g \div 4$ F_g inverse square root to r if F_g x9 r $\div \sqrt{9}$ or 3
Frictional Force	F_f	N or $kg\,m/s^2$	always opposes motion can be found by summing axis x, y or II or $F_f = \mu F_N = \mu F_g \cos\theta = \mu mg \sin\theta$
Horizontal Force Component	F_{Ax}	N or $kg\,m/s^2$	$F_{Ax} = F_A \cos\theta$ $F_{Ax} = F_A$ when applied level (horizontal) $\theta = 0$
Impulse $J = F_{net} t$	J	$F_{Net}\,t$	A force that acts ~~to change~~ over time to change momentum $J = \Delta p = m\Delta v$
Momentum $p = mv$	p (lower case)	kg m/s or Ns	mass x velocity. A change in momentum requires the application of a net force
Normal Force	F_N	N or $kg\,m/s^2$	$F_N = mg\cos\theta$ or $F_g \cos\theta$ Force $\perp$ due to surface when $\theta = 0$ (horizontal surface) $F_N = F_g = mg$
Radius	r	m	distance from center to path on circle
Spring constant	k	N/m	$k = \frac{F_s}{x}$ elasticity of spring low k easy to stretch, high k hard to stretch
Spring Force	F_s	N or $kg\,m/s^2$	$F_s = kx$ The force needed to stretch a spring in a vertical field $F_s = F_g$ so $kx = mg$
Universal gravitational constant	G	$N\,m^2/kg^2$	$F_g = G\frac{m_1 m_2}{r^2}$ $G = 6.67 \times 10^{-11}\,N\,m^2/kg^2$
Vertical Force Component	F_{Ay}	N or $kg\,m/s^2$	$F_{Ay} = F_A \sin\theta$
Weight	F_g	N or $kg\,m/s^2$	$F_g = mg$ use where we know "g" or the force of the Earth's field on object.
Force of Universal Gravitation	F_g	N or $kg\,m/s^2$	$F_g = G\frac{m_1 m_2}{r^2}$ Used when distance is large (ie two planetary objects or distance between Earth and object is large) or between two masses neither of which involves a known "g"

acceleration due to gravity Gravitational Field Strength g N/kg or m/s^2

UNIT 3: VOCABULARY

Direct Relationship	Equation format: $y = mx$	Graph: 	Description: Whatever happens to "x" happens to "y"
Direct Square Relationship	Equation format: $y = mx^2$	Graph: 	Description: Whatever happens to "x" that squared happens to "y"
Inverse Relationship	Equation format: $y = m/x$	Graph: 	Description: Whatever happens to x, the opposite happens to "y"
Inverse square Relationship	Equation format: $y = m/x^2$	Graph: 	Description: Whatever happent to x, the opposite square happens to "y"
Conserved Quantity	A value that doesn't change before & after an event Ex momentum is a conserved quantity $P_{before} = P_{after}$		
Equilibrant	The force equal and opposite in direction to resultant		
Equilibrium	When all forces are balanced $F_{net} = 0$ so $a = 0$ constant speed or rest		
Force	Push or pull. The sum of all forces is F_{net} All forces are measured in Newtons $1N = 1kg\,m/s^2$		
Free Body Diagram	Diagram in which vectors are summarized by Forces		
Fundamental force	Forces that cannot be reduced. Come from nature of universe Strong, Weak, EM & gravity		
Inclined Plane (ramp)	$\Sigma F_{\parallel} = F_{g\parallel} + F_A + F_f$ ($F_{g\parallel} = mg\sin\theta$) $\Sigma F_{\perp} = 0 = F_{g\perp} + F_N = 0$ ($F_N = F_{g\perp} = mg\cos\theta$) Cross off any forces that aren't present		
Inertia	Inertia is a resistance to change in motion In quantitative problems - Inertia is mass		
Kinetic Friction	$F_f = \mu_K F_N$ for an object in motion		
Recoil	The "push back" when an object is launched forward $P_{before} = P_{after}$ $0 = m_1v_1 + m_2v_2$ $-m_2v_2 = m_1v_1$		
Resultant	The sum of 2 or more vectors		
Static friction	$F_f = \mu_S F_N$ for an object at rest or that is being started		
Tangential velocity 	The velocity of an object at any point in a circular path. If the force disappeared the object would follow line tangent to circle		