Physics 112/111 - Student Checklist

Name: _____

"Most students can hit the target if they can see it clearly and it stays still for them."

- Rick Stiggens

Unit 1 - Kinematics

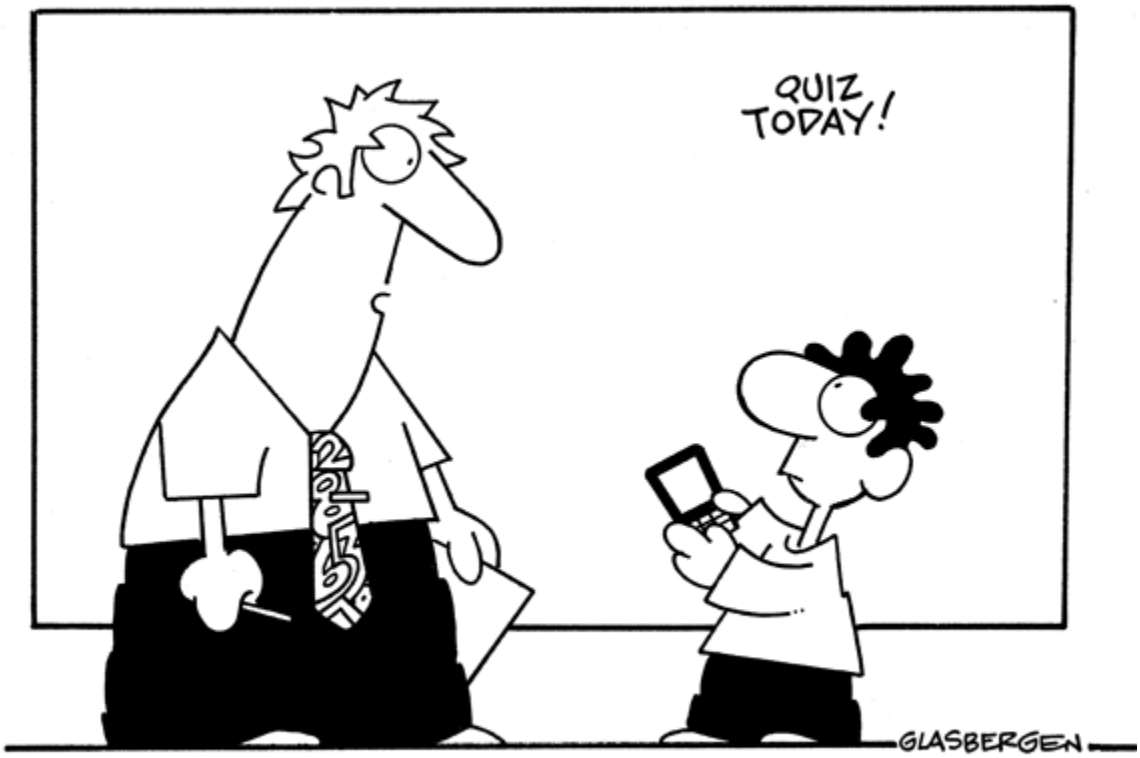
	Essential Outcomes		
1	I can state the seven fundamental SI units.		
2	I can distinguish between base and derived units.		
3	I can demonstrate the ability to use scientific notation.		
4	I can identify and use common metric prefixes.		
5	I can perform metric conversions.		
6	I can distinguish between accuracy and precision.		
7	I can use significant digits correctly when recording measured data.		
8	I can demonstrate the ability to manipulate algebraic equations (ie. rearrange equations).		
9	I can define kinematics.		
10	I can define the two types of motion (ie. uniform motion and uniformly accelerated motion).		
11	I can identify the frame of reference for a given motion.		

	Essential Outcomes		
12	I can distinguish between fixed and moving frames of reference.		
13	I can define vector and scalar quantities.		
14	I can list examples of vector and scalar quantities.		
15	I can represent vector quantities graphically.		
16	I can add two or more vectors graphically (ie. tip-to-tail method) to find their resultant.		
17	I can add two or more vectors mathematically (Law of Pythagoras and trig ratios) to find their resultant.		
18	I can tell from the shape of a position-time graph whether the magnitude of an object's velocity is increasing, decreasing or constant.		
19	I can determine the direction of motion of an object from its position-time graph.		
20	I can tell from the shape of a velocity-time graph whether the magnitude of an object's velocity is increasing, decreasing or constant.		
21	I can determine the direction of motion of an object from its velocity-time graph.		
22	I can calculate slope.		
23	I can calculate the area of rectangles and triangles.		
24	I can analyze graphically the relationship among displacement, velocity and time.		
25	I can analyze mathematically the relationship among time, velocity, displacement and acceleration (ie. use kinematic equations to solve problems).		
L1	I can derive the kinematic equations from a v/t graph for uniform acceleration.		
26	I can define free fall.		
27	I can state the acceleration due to gravity (Earth).		
28	I know what quantity the variable "g" represents.		

Unit 2: Dynamics

	Essential Outcomes		
1	I can define dynamics.		
2	I can define force.		
3	I can identify the forces acting on an object in a given situation.		
4	I can differentiate between mass and weight.		
5	I can calculate the weight of an object.		
6	I can differentiate between static friction and kinetic friction.		
7	I can calculate the force of friction using the coefficient of friction and normal force.		
8	I can draw free body diagrams.		
9	I can state Newton's First Law of Motion - The Law of Inertia		
10	I can define inertia.		
11	I can define terminal velocity.		
12	I can solve problems involving objects at rest or moving at constant velocity.		
13	I can state Newton's Second Law of Motion - The Law of Force and Acceleration.		
14	I can define net force.		
15	I can write net force equations.		
16	I can solve problems involving objects that are uniformly accelerating.		
L1	I can solve Atwood's Machine and Fletcher's Trolley problems.		
17	I can state Newton's Third Law of Motion - The Law of Action-Reaction.		
18	I can state the requirements for an action-reaction pair of forces.		
19	I can use symbols to represent an action-reaction pair of forces (ie. $_{A}F_{B} = -\ _{B}F_{A}$).		

	Essential Outcomes		
20	I can define momentum.		
21	I can define impulse.		
22	I can show how impulse is related to change in momentum (using Newton's Second Law of Motion).		
23	I can explain the relationship between average force and time interval for a fixed impulse.		
24	I can apply the Impulse-Change in Momentum Theorem		



"You have to attend classes. You can't just follow me on Twitter."

Unit 3: Work, Power and Energy

	Essential Outcomes		
1	I can analyze quantitatively the relationships among force, distance and work.		
2	I can identify three cases in which no work is done.		
3	I can differentiate between positive and negative work.		
4	I can define kinetic energy.		
5	I can define gravitational potential energy.		
6	I can define reference level.		
7	I can explain and apply Hooke's Law.		
8	I can define elastic potential energy.		
9	I can define kinetic energy.		
10	I can relate energy transformations to work done (Work-Energy Theorems).		
11	I can define mechanical energy.		
12	I can state the Law of Conservation of Energy.		
13	I can solve problems using the Law of Conservation of Energy (ie. roller coasters, hills, pendulums).		
14	I can analyze quantitatively the relationships among work, time and power.		
15	I can determine the percent efficiency of energy transformation.		
L1	I can calculate the efficiency of simple machines.		

Unit 4: Waves

	Essential Outcomes		
1	I can describe the production, characteristics and behaviours of longitudinal and transverse mechanical waves.		
2	I can describe how energy input affects the appearance/behavior of a wave.		
3	I can apply the universal wave equation to explain and predict the behavior of waves.		
4	I can apply the law of reflection to predict wave behavior.		
5	I can apply the law of refraction to predict wave behavior.		
6	I can explain qualitatively and quantitatively the phenomena of wave interference, diffraction, reflection, refraction and the Doppler effect.		
7	I can describe how sound is produced and transmitted		
L1	I can solve problems involving Young's experiment.		
8	I can list the factors on which the speed of sound depends.		
9	I can produce beats (physically) and explain the phenomenon.		
10	I can explain how standing waves are produced in closed and open pipes.		

	Essential Outcomes		
11	I can use the phenomenon of resonance in pipes to calculate the speed of sound in air.		
12	I can explain the phenomenon of the sonic boom, describe the problems it causes and explain how such problems can be minimized.		