***Physics 20 Topic Checklist***

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| **Topics** | **How well do you know them?** | | |
| Well  | Sort of  | What?  |
| **Kinematics** (L1-13 in “Class notes, examples, and practice questions” on D2L) | | | |
| Average speed *(distance, speed, and time)* |  |  |  |
| Displacement *(distance versus displacement, scalar versus vector)* |  |  |  |
| Velocity graph analysis *(uniform motion position vs. time and velocity vs. time graphs, slope and area underneath)* |  |  |  |
| Graphing motion *(shapes of graphs)* |  |  |  |
| Acceleration graph analysis *(non-uniform motion graphs, tangent lines to get slope, area underneath)* |  |  |  |
| Acceleration *(change in velocity and time, acceleration due to gravity)* |  |  |  |
| Acceleration and Displacement *(the four uniform acceleration kinematics equations [get three variables, ignore the fourth, find the fifth], helicopter problems)* |  |  |  |
| Vector addition *(tip to tail, using trigonometry, adding vertical and horizontal components)* |  |  |  |
| Vector addition components *(splitting vectors into vertical and horizontal components, then adding them up using the Pythagorean theorem)* |  |  |  |
| Relative motion *(reference frames, wind and water currents)* |  |  |  |
| Projectiles *(Pew, pew!)* |  |  |  |
| **Dynamics** (L14-18) | | | |
| Dynamics conceptual change *(Newton’s laws, types of forces)* |  |  |  |
| Dynamics problem solving *(net forces, free body diagrams)* |  |  |  |
| Friction *(static and kinetic, calculating coefficients)* |  |  |  |
| Elevators and inclines *(elevator/rocket problems, inclined planes)* |  |  |  |
| Systems *(pulley problems)* |  |  |  |
| **Uniform Circular Motion and Gravity** (L19-23) | | | |
| Uniform circular motion *(centripetal acceleration and force, centripetal forces, period and frequency)* |  |  |  |
| Vertical uniform circular motion *(minimum speed at top, maximum force [tension, normal force] at bottom)* |  |  |  |
| Universal gravitation *(the equation, relationship between strength of gravity and distance and mass)* |  |  |  |
| Gravitational field strength *(calculating g)* |  |  |  |
| Orbits and satellites *(solving for speed or period starting with , Kepler’s laws)* |  |  |  |
| **Simple Harmonic Motion and Energy** (L24-25, 30-32) | | | |
| Simple harmonic motion – pendulums *(equation for period, dependent on length and g)* |  |  |  |
| Simple harmonic motion – springs *(spring force, equation for period, dependent on spring constant and mass)* |  |  |  |
| Energy, work, and power *(calculating kinetic energy, potential [gravitational] energy, mechanical energy, work as product of force, distance, and cosine of angle between force and displacement, work as change in energy, net work as sum of all work due to different forces)* |  |  |  |
| Conservation of energy *(initial total energy = final total energy, identifying energy at beginning and end [or in and out energies, if that is easier to think about])* |  |  |  |
| Simple harmonic motion dynamics and energy *(forces on pendulum, mechanical energy of pendulum, forces on spring, potential spring energy, mechanical energy of spring)* |  |  |  |
| **Waves** (L26-29) | | | |
| Waves in one dimention *(transverse vs. longitudinal, pulses, period, frequency, amplitude, phase, wavelength, universal wave equation, reflections, interference)* |  |  |  |
| Waves in two dimensions *(reflection)* |  |  |  |
| Resonance and sound *(strings, open and closed air columns, resonant lengths, fundatmentals, overtones, harmonics, length/wavelength equations)* |  |  |  |
| Doppler effect *(Wee-oo, wee-oo!)* |  |  |  |