

# Curriculum Map - Regents Physics

Month	Content	Skills	Assessment
September	<ul style="list-style-type: none"> <li>• Math review / use of graphing calculator</li> </ul>	<ul style="list-style-type: none"> <li>• use of Metric system</li> <li>• metric / English conversions</li> <li>• Trig. of triangles</li> <li>• SOH, CAH, TOA</li> <li>• Sig. digits</li> <li>• use of exponents</li> <li>• solving for variables in an equation</li> <li>• graphing skills</li> </ul>	<ul style="list-style-type: none"> <li>• test</li> <li>• lab activities (Measuring Height Indirectly Book Jump Lab)</li> <li>• worksheets</li> </ul>
	<ul style="list-style-type: none"> <li>• Simple motion, velocity, acceleration, accel. due to gravity (integrate with pendulum behavior)</li> </ul>	<ul style="list-style-type: none"> <li>• use and interpretation of mathematical analysis &amp; motion / time graphs</li> </ul>	<ul style="list-style-type: none"> <li>• lab activities</li> <li>• Design own exper. to determine "g".</li> <li>• homework problems</li> <li>• Use CBL motion detectors to evaluate motion.</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Engineering &amp; Design</li> </ul>	<ul style="list-style-type: none"> <li>• essential considerations in design of any product</li> </ul>	<ul style="list-style-type: none"> <li>• tower building activity</li> </ul>
October	<ul style="list-style-type: none"> <li>• Vectors</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate ability to combine vectors graphically &amp; algebraically.</li> <li>• Demonstrate ability to resolve any vector into 2 components.</li> </ul>	<ul style="list-style-type: none"> <li>• Determine weight of apple using vector analysis.</li> <li>• force board lab</li> <li>• homework problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Circular motion</li> </ul>	<ul style="list-style-type: none"> <li>• Be able to identify forces involved and calculate centripetal force &amp; acceleration.</li> </ul>	<ul style="list-style-type: none"> <li>• lab activity - centripetal force</li> <li>• homework problems</li> <li>• test</li> </ul>

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October (cont.)	<ul style="list-style-type: none"> <li>• Projectile motion</li> </ul>	<ul style="list-style-type: none"> <li>• Use algebra to solve sets of equations relating the vertical &amp; horizontal components of 2D motion.</li> </ul>	<ul style="list-style-type: none"> <li>• Design experiment to determine launch angle that produces longest horizontal range. (using stomp rockets)</li> <li>• lab activity to determine where a projectile will land on floor (marble as trajectory)</li> <li>• analysis of projectile path lab</li> <li>• practice problems</li> <li>• test</li> </ul>
November	<ul style="list-style-type: none"> <li>• Natural forces that cause motion</li> </ul>	<ul style="list-style-type: none"> <li>• Understand 4 natural forces.</li> <li>• Draw free body diagrams.</li> <li>• Calculate gravitational field strength.</li> <li>• Use Newton's Law of Gravitation.</li> <li>• Understand Hooke's Law.</li> </ul>	<ul style="list-style-type: none"> <li>• lab activities (Hooke's Law)</li> <li>• practice problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Newton's 3 Laws of Motion</li> </ul>	<ul style="list-style-type: none"> <li>• Understand &amp; be able to use calc. (<math>F = ma</math>, impulse &amp; momentum)</li> </ul>	<ul style="list-style-type: none"> <li>• Design &amp; race own action/reaction vehicle.</li> <li>• lab activities (inertia, force &amp; acc.)</li> <li>• practice problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Engineering &amp; Design (cont'd.)</li> </ul>	<ul style="list-style-type: none"> <li>• Reinforce planning pieces for design.</li> </ul>	<ul style="list-style-type: none"> <li>• vehicle competition (Build &amp; design a vehicle to go farthest distance.)</li> </ul>
	<ul style="list-style-type: none"> <li>• Friction</li> </ul>	<ul style="list-style-type: none"> <li>• Understand how friction affects motion.</li> <li>• familiarity w/ types of friction (kinetic vs. static)</li> <li>• measurement &amp; calculation of friction</li> </ul>	<ul style="list-style-type: none"> <li>• lab (measure coefficient of friction)</li> <li>• homework</li> <li>• test</li> </ul>

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December	<ul style="list-style-type: none"> <li>• Work, power, energy (PE &amp; KE), conservation of energy</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiate between &amp; calculate each.</li> </ul>	<ul style="list-style-type: none"> <li>• lab activities (COR, human horsepower, pendulum lab)</li> <li>• practice problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Fluids (optional topic, if time allows)</li> </ul>	<ul style="list-style-type: none"> <li>• Understand basic principles of fluid behavior. (Pascal, Bernoulli, Archimedes, Non-Newtonian fluids)</li> </ul>	<ul style="list-style-type: none"> <li>• This is a research unit done by student teams.</li> <li>• student presentations which include an explanation, calculation, &amp; demonstration are given to class.</li> </ul>
January	<ul style="list-style-type: none"> <li>• Wave behavior</li> </ul>	<ul style="list-style-type: none"> <li>• Understand &amp; demonstrate characteristics &amp; behavior of transverse &amp; longitudinal waves.</li> <li>• Calculate period, frequency.</li> </ul>	<ul style="list-style-type: none"> <li>• lab - (slinkies)</li> <li>• Observe &amp; evaluate behavior of each type of wave (lab activity).</li> <li>• homework problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Sound waves</li> </ul>	<ul style="list-style-type: none"> <li>• Understand what sound is.</li> <li>• human hearing</li> <li>• Understand physics of musical sounds.</li> <li>• Understand sound phenomena (doppler effect, sonic booms, resonance).</li> </ul>	<ul style="list-style-type: none"> <li>• voice pattern lab (w/ microphone)</li> <li>• Use CBL microphones to analyze musical sounds (lab activity).</li> <li>• discussion questions</li> <li>• homework</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Engineering &amp; Design (Build on skills learned previously)</li> </ul>	<ul style="list-style-type: none"> <li>• Accurately plan &amp; build boat.</li> </ul>	<ul style="list-style-type: none"> <li>• competition - build boat that holds most weight (determined by ration of: <math>\frac{\text{weight of boat}}{\text{weight held}}</math>)</li> </ul>

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February	<ul style="list-style-type: none"> <li>• Electromagnetic waves</li> </ul>	<ul style="list-style-type: none"> <li>• To differentiate between EM waves (radio, microwaves, infrared, visible, ultraviolet, x-rays, gamma, &amp; cosmic waves) (Speaker: Pat Dunshee)</li> </ul>	<ul style="list-style-type: none"> <li>• discussion</li> <li>• homework</li> </ul>
	<ul style="list-style-type: none"> <li>• Behavior of electromagnetic waves (continues into March)</li> </ul>	<ul style="list-style-type: none"> <li>• Understand &amp; differentiate between reflection, refraction, polarization, diffraction.</li> <li>• Do all associated calculations.</li> <li>• Understand total interval reflection. (fiber optics / telecommunications) (speakers: Eric Turner / Pat Dunshee)</li> </ul>	<ul style="list-style-type: none"> <li>• lab activities to observe all behaviors</li> <li>Law of Reflection (Snell's Law)</li> <li>• Use laser as a measuring tool. (Measure # of grooves on a CD.)</li> <li>• homework problems</li> <li>• test</li> </ul>
March	<ul style="list-style-type: none"> <li>• Wave behavior (continued from February)</li> </ul>		
	<ul style="list-style-type: none"> <li>• Static electricity</li> </ul>	<ul style="list-style-type: none"> <li>• Understand characteristics of static versus current electricity &amp; be able to relate knowledge to everyday happenings. (lightning, shocks, etc.)</li> <li>• Do calculations using Coulomb's Law, electric fields.</li> <li>• Observe &amp; diagram electric fields.</li> </ul>	<ul style="list-style-type: none"> <li>• lab activities (Coulomb's Law w/ balloons, static behaviors)</li> <li>• homework problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Culminating student presentations on research projects (Students researched how physics interacts with some personal area of interest.)</li> </ul>	<ul style="list-style-type: none"> <li>• Relate to class how physics controls (dictates) why something works the way it does. (e.g.: the physics of Baseball, Aerodynamics of Vehicles, Physics of Rainbows, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• class members grade each other</li> </ul>

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March (cont'd.)	<ul style="list-style-type: none"> <li>• Current electricity</li> </ul>	<ul style="list-style-type: none"> <li>• Understand voltage, current, &amp; resistance of series &amp; parallel circuits.</li> <li>• Do appropriate calculations.</li> <li>• List factors affecting resistance.</li> <li>• Understand purpose of fuse / circuit breaker.</li> </ul>	<ul style="list-style-type: none"> <li>• lab activities to measure V, I, &amp; R in circuits (Ohm's Law, series circuits)</li> <li>• test fuse</li> <li>• homework problems</li> <li>• test</li> </ul>
April	<ul style="list-style-type: none"> <li>• Electrical power &amp; energy</li> </ul>	<ul style="list-style-type: none"> <li>• Identify factors affecting electrical bills.</li> <li>• Calculate energy usage &amp; cost of appliances.</li> </ul>	<ul style="list-style-type: none"> <li>• practice problems</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Magnetism/electro-magnetism</li> </ul>	<ul style="list-style-type: none"> <li>• Understand &amp; map magnetic fields.</li> <li>• Domain Theory</li> <li>• relationship between electricity &amp; magnetism</li> <li>• electromagnetism (including transformers)</li> <li>• Do appropriate calculations.</li> <li>• Use 3 left hand rules.</li> </ul>	<ul style="list-style-type: none"> <li>• Design an electromagnet to be as strong as possible.</li> <li>• lab activities (mapping, magnetic fields)</li> <li>• homework discussion questions</li> <li>• test</li> </ul>

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May	<ul style="list-style-type: none"> <li>• 20th Century Physics (Quantum Theory, Photoelectric Effect)</li> </ul>	<ul style="list-style-type: none"> <li>• Explain &amp; do appropriate calc. for each.</li> </ul>	<ul style="list-style-type: none"> <li>• homework discussion questions</li> <li>• math problems</li> </ul>
	<ul style="list-style-type: none"> <li>• Contributions of Rutherford, Millikan, Bohr, Heisenberg, Compton, de Broglie, Einstein, Hawkings</li> </ul>	<ul style="list-style-type: none"> <li>• Understand contributions to science of each.</li> </ul>	<ul style="list-style-type: none"> <li>• homework</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Cosmology (origins &amp; workings of universe) (optional topic if time allows)</li> </ul>	<ul style="list-style-type: none"> <li>• Understand what we know about our universe today. (Big Bang Theory, Star evolution, space exploration, Black Holes)</li> </ul>	<ul style="list-style-type: none"> <li>• This is an extra unit (not part of Regents Syllabus) which is mainly designed to answer many student questions. It takes the form of a lecture/discussion. No grades are given. (It usually takes 3-5 days.)</li> </ul>
	<ul style="list-style-type: none"> <li>• Standard Model of Atom</li> </ul>	<ul style="list-style-type: none"> <li>• Understand structure of atom including subatomic particles. (leptons &amp; baryons)</li> </ul>	<ul style="list-style-type: none"> <li>• worksheet on interactive web site (<a href="http://www.particleadventure.com">www.particleadventure.com</a>)</li> <li>• lab activity (Quantum model)</li> <li>• test</li> </ul>
	<ul style="list-style-type: none"> <li>• Start Regents review.</li> </ul>		
June	<ul style="list-style-type: none"> <li>• Regents review</li> </ul>		