

**Science  
Physics**

**Unit 3: Rotational Motion**

<p><b>Essential Understandings</b></p>	<ul style="list-style-type: none"> <li>▪ Causation: Nothing “just happens.” Everything is caused.</li> <li>▪ Interrelatedness: Everything in the universe is connected to everything else in the universe.</li> <li>▪ Dynamism: Everything is changing in some way all the time.</li> <li>▪ Entropy: Change has direction. Generally, simple precedes complex. Generally, order changes toward disorder.</li> <li>▪ Uniformitarianism: The way the universe works today is the way it worked yesterday and the way it will work tomorrow.</li> </ul>
<p><b>Essential Questions</b></p>	<ul style="list-style-type: none"> <li>▪ How does torque affect the motion of objects?</li> <li>▪ How are linear speed and tangential speed related?</li> <li>▪ Why do objects in equilibrium move or fail to move?</li> </ul>
<p><b>Essential Knowledge</b></p>	<ul style="list-style-type: none"> <li>▪ Centripetal forces act toward the center of motion for objects following a curved path.</li> <li>▪ Centrifugal forces have no action-reaction pairs.</li> <li>▪ Torque transfers energy.</li> <li>▪ Center of gravity is the average center for all the mass of an object without regard to the physical boundaries of the object.</li> </ul>
<p><b>Vocabulary</b></p>	<ul style="list-style-type: none"> <li>▪ <u>Terms:</u> <ul style="list-style-type: none"> <li>○ centrifugal force, centripetal force, linear speed, rotational speed, tangential speed, revolution, rotation, axis, center of gravity, center of mass, neutral equilibrium, stable equilibrium, unstable equilibrium, torque, frame of reference</li> </ul> </li> </ul>
<p><b>Essential Skills</b></p>	<ul style="list-style-type: none"> <li>▪ Use mathematics to calculate rotational speed.</li> <li>▪ Use mathematics to calculate tangential speed.</li> <li>▪ Analyze free-body diagrams to identify torques.</li> <li>▪ Determine the state of rotational equilibrium of objects.</li> </ul>
<p><b>Related Maine Learning Results</b></p>	<p><u>Science and Technology</u>  D. The Physical Setting  D4. Force and Motion  Students understand that the laws of force and motion are the same across the universe.  b. Explain and apply the ideas of relative motion and frame of reference.  f. Describe kinetic energy (the energy of motion), potential energy (dependent on relative position), and energy contained by a field (including electromagnetic waves) and apply these understandings to energy problems.</p>
<p><b>Sample Lessons And Activities</b></p>	<ul style="list-style-type: none"> <li>▪ Word problem worksheets</li> <li>▪ Motion Labs, i.e., constant velocity, acceleration</li> <li>▪ Lectures</li> <li>▪ Rotational motion demonstrations</li> <li>▪ Rotational motion Videos</li> </ul>

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<b>Sample Classroom Assessment Methods</b>	<ul style="list-style-type: none"><li>▪ Chapter tests</li><li>▪ Motion quizzes</li><li>▪ Laboratory reports</li></ul>
<b>Sample Resources</b>	<ul style="list-style-type: none"><li>▪ <u>Publications:</u><ul style="list-style-type: none"><li>○ <u>Physical Science</u> - Glencoe</li><li>○ MARVEL Data bases</li><li>○ GALE Resource Data bases</li></ul></li><li>▪ <u>Videos:</u><ul style="list-style-type: none"><li>○ <u>The Mechanical Universe</u></li><li>○ <u>ESPN Sports Figures</u></li></ul></li></ul>