

Oxford Area School District Science Scope and Sequence – Quarter 1:

Physics

3.2.12.B6

PATTERNS SCALE MODELS CONSTANCY/CHANGE Use Newton's laws of motion and gravitation to describe and predict the motion of objects ranging from atoms to the galaxies.

CC.3.6.11-12.B

CC.3.6.11-12.B. * Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
- Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic)

3.2.P.B1

Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.

CC.3.5.11-12.C.

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Oxford Area School Science Scope and Sequence – Quarter 2:

Physics

3.2.P.B1

Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.

3.2.P.B6.

PATTERNS SCALE MODELS CONSTANCY/CHANGE Use Newton's laws of motion and gravitation to describe and predict the motion of objects ranging from atoms to the galaxies.

3.2.P.B2

Explain the translation and simple harmonic motion of objects using conservation of energy and conservation of momentum. Describe the rotational motion of objects using the conservation of energy and conservation of angular momentum. Explain how gravitational, electrical, and magnetic forces and torques give rise to rotational motion.

CC.3.5.11-12.C.

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Oxford Area School District Science Scope and Sequence – Quarter 3:

Physics

3.2.P.B2

Explain the translation and simple harmonic motion of objects using conservation of energy and conservation of momentum. Describe the rotational motion of objects using the conservation of energy and conservation of angular momentum. Explain how gravitational, electrical, and magnetic forces and torques give rise to rotational motion.

CC.3.5.11-12.B

Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

3.2.P.B4

Explain how stationary and moving particles result in electricity and magnetism. Develop qualitative and quantitative understanding of current, voltage, resistance, and the connections among them. Explain how electrical induction is applied in technology.

CC.3.6.11-12.B.

CC.3.6.11-12.B. * Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
- Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic)

CC.3.5.11-12.C.

Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Oxford Area School District Science Scope and Sequence – Quarter 4:

Physics

3.2.P.B4

Explain how stationary and moving particles result in electricity and magnetism. Develop qualitative and quantitative understanding of current, voltage, resistance, and the connections among them. Explain how electrical induction is applied in technology.

3.2.P.B5

Explain how waves transfer energy without transferring matter. Explain how waves carry information from remote sources that can be detected and interpreted. Describe the causes of wave frequency, speed, and wave length.

3.2.P.B1

Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.

CC.3.5.11-12.B

Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

CC.3.6.11-12.B.

Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

- Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
- Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic)

<p>Big Idea: Objects that move in translational motion are described in terms of position, velocity, and acceleration.</p>			
<p>Essential Question: How can the motion of an object be described in a measurable and quantitative way?</p>			
Concepts	Competencies	Resources	Assessments
<p>S11.A.1.1.1: Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession).</p> <p>S11A.3.3.3: Analyze physical patterns of motion to make predictions or draw conclusions (e.g., solar system, tectonic plates, weather systems, atomic motion, waves).</p> <p>S11.C.3.1.4: Explain how electricity induces magnetism and how magnetism induces electricity as two aspects of a single electromagnetic force.</p> <p>S11.D.3.1.1: Describe planetary motion and the physical laws that explain planetary motion.</p> <p>3.2.P.B1: Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>.</p> <p>CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2</p> <p>CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3,</p>	<p>College Physics Textbook Kinematics and Vector Labs</p>	<p>Kinematics Test Kinematics Labs Class work and Homework</p> <p>Vector Test Vector Labs Class work and Homework</p>

	<p>A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2 CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4 Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1,</p>		
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	<p>A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.</p>		
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	<p>A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1, A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary: Position, velocity, acceleration</p>			

<p>Big Idea All forces arise from the interactions between different objects.</p>			
<p>Essential Question: What is a force?</p>			
<p>Concepts</p>	<p>Competencies</p>	<p>Resources</p>	<p>Assessments</p>
<p>S11.A.1.1.1: Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession). S11A.3.3.3: Analyze physical patterns of motion to make predictions or draw conclusions (e.g., solar system, tectonic plates, weather systems, atomic motion, waves). S11.C.3.1.4: Explain how electricity induces magnetism and how magnetism induces electricity as two aspects of a single electromagnetic force. S11.D.3.1.1: Describe planetary motion and the physical laws that explain planetary motion. 3.2.P.B1: Differentiate among translational motion,</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events,</p>	<p>College Physics Textbook Gravity Labs, Electricity Labs Apollo 13 and Reading</p>	<p>Gravity Test Gravity Lab Class work and Home work Electricity Test Electricity Labs Class work and Homework Magnetism Test Magnetism Labs Class work and Homework Vector Test Vector Labs Class work and Homework</p>

<p>simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.</p> <p>3.2.P.B4: Explain how stationary and moving particles result in electricity and magnetism. Develop qualitative and quantitative understanding of current, voltage, resistance, and the connections among them. Explain how electrical induction is applied in technology.</p>	<p>scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2 CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2,</p>		
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	<p>A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4 Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8</p>		
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	<p>Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13</p> <p>Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1</p> <p>Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2</p> <p>Summarize, represent, and interpret data on two categorical and quantitative variables. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1, A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3</p> <p>Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5</p> <p>Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary: Universal gravitation, electrostatic force</p>			

Big Idea: All changes in translational motion are due to forces.			
Essential Question: What causes the motion of an object to change?			
Concepts	Competencies	Resources	Assessments
<p>S11.A.1.1.1: Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession).</p> <p>S11A.3.3.3: Analyze physical patterns of motion to make predictions or draw conclusions (e.g., solar system, tectonic plates, weather systems, atomic motion, waves).</p> <p>S11.C.3.1.4: Explain how electricity induces magnetism and how magnetism induces electricity as two aspects of a single electromagnetic force.</p> <p>S11.D.3.1.1: Describe planetary motion and the physical laws that explain planetary motion.</p> <p>3.2.P.B1: Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.</p> <p>CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>.</p> <p>CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p> <p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2</p> <p>CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2</p>	<p>College Physics Textbook Statics Labs, Vector Labs</p>	<p>Statics Test Statics Labs Class work and Homework</p> <p>Dynamics Test Dynamics Labs Class work and Homework</p> <p>Vector Test Vector Labs Class work and Homework</p>

	<p>CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2</p> <p>CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4</p> <p>CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2</p> <p>CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2</p> <p>CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4</p> <p>Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3,</p>		
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	<p>A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1,</p>		
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	<p>A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary: Force, normal force, friction</p>			

<p>Big Idea: The rotational motion of objects is described in terms of angular position, angular velocity, and angular acceleration.</p>			
<p>Essential Question: How can rotational motion be described in a measurable and quantitative way?</p>			
Concepts	Competencies	Resources	Assessments
<p>3.2.P.B1: Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events,</p>	<p>College Physics Textbook Rotational Motion Lab</p>	<p>Rotational Motion Test Rotational Motion Labs Class work and Homework</p>

	<p>scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2 CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2,</p>		
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	<p>A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4 Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8</p>		
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	<p>Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13</p> <p>Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1</p> <p>Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2</p> <p>Summarize, represent, and interpret data on two categorical and quantitative variables. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1, A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3</p> <p>Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5</p> <p>Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary: Angular position, angular velocity, angular acceleration</p>			

Big Idea: All changes in rotational motion are due to torques.			
Essential Question: What causes changes in the rotational motion of an object?			
Concepts	Competencies	Resources	Assessments
3.2.P.B1: Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.	CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i> . CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2	College Physics Textbook Torque Lab	Torque Test Torque Labs Class work and Homework

	<p>CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2</p> <p>CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4</p> <p>CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2</p> <p>CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2</p> <p>CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4</p> <p>Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3,</p>		
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	<p>A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1,</p>		
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	<p>A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary Torque, lever arm</p>			

<p>Big Idea: Objects that move in simple harmonic motion can be described in terms of position, velocity, and acceleration and can result in the production of waves that travel through space.</p>			
<p>Essential Question: How can the periodic motion of objects be described?</p>			
Concepts	Competencies	Resources	Assessments
<p>3.2.P.B5: Explain how waves transfer energy without transferring matter. Explain how waves carry information from remote sources that can be detected and interpreted. Describe the causes of wave frequency, speed, and wave length.</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events,</p>	<p>College Physics Textbook Waves and Oscillation Labs</p>	<p>Wave Test Wave Labs Class work and Homework Oscillations Test Oscillations Labs Class work and Homework</p>

	<p>scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2 CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2,</p>		
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	<p>A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4 Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8</p>		
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	<p>Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13</p> <p>Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1</p> <p>Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2</p> <p>Summarize, represent, and interpret data on two categorical and quantitative variables. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1, A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3</p> <p>Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5</p> <p>Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary: Wavelength, frequency, period</p>			

<p>Big Idea: All simple harmonic motion can be explained using force and/or torque.</p>			
<p>Essential Question: What causes an object to oscillate instead of moving off in a straight line?</p>			
Concepts	Competencies	Resources	Assessments
<p>3.2.P.B1: Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3,</p>	<p>College Physics Textbook Oscillation, Rotational Motion and Torque Labs</p>	<p>Oscillations Test Oscillations Labs Class work and Homework</p> <p>Rotational Motion Test Rotational Motion Labs Class work and Homework</p> <p>Torque Test Torque Labs Class work and Homework</p>

	<p>A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2 CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2 CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.10 Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4 Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1,</p>		
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	<p>A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4 CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7 Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8 Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7 Apply trigonometric ratios to solve problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.</p>		
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	<p>A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1, A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
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Vocabulary:
 Tangential velocity, centripetal acceleration, tangential acceleration

Big Idea:
 All motion can be explained using the laws of the conservation of energy, the conservation of momentum, and/or the conservation of angular momentum.

Essential Question:
 How do an object’s mass distribution and interactions with other objects and forces at a distance influence the object’s motion?

Concepts	Competencies	Resources	Assessments
<p>S11.A.1.1.1: Compare and contrast scientific theories, scientific laws, and beliefs (e.g., the universal law of gravitation, how light travels, formation of moons, stages of ecological succession). S11A.3.3.3: Analyze physical patterns of motion to make predictions or draw conclusions (e.g., solar system, tectonic plates, weather systems, atomic motion, waves). S11.C.3.1.4: Explain how electricity induces magnetism and how magnetism induces electricity as two aspects of a single electromagnetic force. S11.D.3.1.1: Describe planetary motion and the physical</p>	<p>CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 11–12 texts and topics</i>. CC.3.5.11-12.H. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.</p>	<p>College Physics Textbook Energy/Work, Momentum, Rotational Motion Labs</p>	<p>Energy and Work Test Energy and Work Labs Class work and Homework</p> <p>Momentum Test Momentum Labs Class work and Homework</p> <p>Rotational Motion Test Rotational Motion Labs Class work and Homework</p>

<p>laws that explain planetary motion.</p> <p>3.2.P.B.1: Differentiate among translational motion, simple harmonic motion, and rotational motion in terms of position, velocity, and acceleration. Use force and mass to explain translational motion or simple harmonic motion of objects. Relate torque and rotational inertia to explain rotational motion.</p> <p>3.2.P.B2: Explain the translation and simple harmonic motion of objects using conservation of energy and conservation of momentum. Describe the rotational motion of objects using the conservation of energy and conservation of angular momentum. Explain how gravitational, electrical, and magnetic forces and torques give rise to rotational motion.</p>	<p>CC.3.6.11-12.B. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>CC.3.6.11-12.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.3.1.1, A2.2.3.1.2</p> <p>CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.2.1, A1.2.1.2.2, A2.2.2.1.1, A2.2.2.1.2</p> <p>CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.2.3.1.1, A2.2.3.1.2</p> <p>CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4</p> <p>CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.</p> <p>A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2</p> <p>CC.2.2.HS.D.9</p>		
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	<p>Use reasoning to solve equations and justify the solution method. A1.1.1.4.1, A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2 CC.2.2.HS.D.10</p> <p>Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.1.2.2.1, A1.1.2.2.2, A1.1.3.1.1, A1.1.3.1.2, A1.1.3.1.3, A1.1.3.2.1, A1.1.3.2.2, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4</p> <p>Graph and analyze functions and use their properties to make connections between the different representations. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.1, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4 CC.2.2.HS.C.3</p> <p>Write functions or sequences that model relationships between two quantities. A1.1.2.1.1, A1.1.2.1.2, A1.1.2.1.3, A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.1.3, A1.2.2.1.4, A2.1.3.1.1, A2.1.3.1.2, A2.1.3.1.3, A2.1.3.1.4, A2.1.3.2.1, A2.1.3.2.2, A2.2.1.1.1, A2.2.1.1.2, A2.2.1.1.3, A2.2.1.1.4, A2.2.2.1.1, A2.2.2.1.2, A2.2.2.1.3, A2.2.2.1.4 CC.2.2.HS.C.7</p> <p>Apply radian measure of an angle and the unit circle to analyze the trigonometric functions. CC.2.2.HS.C.8</p> <p>Choose trigonometric functions to model periodic phenomena and describe the properties of the graphs. CC.2.2.HS.C.9</p> <p>Prove the Pythagorean identity and use it to calculate trigonometric ratios. G.1.3.2.1, G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.7</p> <p>Apply trigonometric ratios to solve</p>		
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	<p>problems involving right triangles. G.2.1.1.1, G.2.1.1.2 CC.2.3.HS.A.8 Apply geometric theorems to verify properties of circles. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.3.2.1, G.2.2.3.1 CC.2.3.HS.A.13 Analyze relationships between two-dimensional and three-dimensional objects. G.1.1.1.1, G.1.1.1.2, G.1.1.1.3, G.1.1.1.4, G.1.2.1.1, G.1.2.1.2, G.1.2.1.3, G.1.2.1.4, G.1.2.1.5, G.2.3.2.1 CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable. A1.2.2.1.2, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables. A1.2.1.1.1, A1.2.1.1.2, A1.2.1.1.3, A1.2.1.2.1, A1.2.1.2.2, A1.2.2.2.1, A2.2.1.1.1, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data. A1.2.2.2.1, A1.2.3.1.1, A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.1.1, A2.2.3.1.2 CC.2.4.HS.B.5 Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. A1.2.3.2.1, A1.2.3.2.2, A1.2.3.2.3, A2.2.3.2.1, A2.2.3.2.2, A2.2.3.2.3</p>		
<p>Vocabulary: Kinetic energy, potential energy, momentum, angular momentum</p>			