

2013 1401 Required Topics – Young (drafted 8/29/13)

Required topics in bold red

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Chapter 0 Mathematics Review

- 0.1 Exponents
- 0.2 Scientific Notation and Powers of 10
- 0.3 Algebra
- 0.4 Direct, Inverse, and Inverse-Square Relationships
- 0.5 Logarithmic and Exponential Functions
- 0.6 Areas and Volumes
- 0.7 Plane Geometry and Trigonometry (trig can be done with vectors)

Chapter 1 Models, Measurements, and Vectors

- 1.1 Introduction**
- 1.2 Idealized Models**
- 1.3 Standards and Units**
- 1.4 Unit Consistency and Conversions**
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Chapter 4 Newton's Laws of Motion

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- 5.5 Forces in Nature

Chapter 6 Circular Motion and Gravitation

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Chapter 7 Work and Energy

- 7.1 An Overview of Energy**
- 7.2 Work**
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Chapter 8 Momentum

Note: 2D momentum is not required.

- 8.1 Momentum**
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- 8.4 Elastic Collisions**
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- 8.6 Center of Mass**
- 8.7 Motion of the Center of Mass
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Chapter 9 Rotational Motion

- 9.1 Angular Velocity and Angular Acceleration**
- 9.2 Rotation with Constant Angular Acceleration**
- 9.3 Relationship between Linear and Angular Quantities**
- 9.4 Kinetic Energy of Rotation and Moment of Inertia**
- 9.5 Rotation about a Moving Axis**

Chapter 10 Dynamics of Rotational Motion

- 10.1 Torque**
- 10.2 Torque and Angular Acceleration**

- 10.3 Work and Power in Rotational Motion**
- 10.4 Angular Momentum**
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- 10.6 Equilibrium of a Rigid Body**
- 10.7 Vector Nature of Angular Quantities

Chapter 11 Elasticity and Periodic Motion

- 11.1 Stress, Strain, and Elastic Deformations**
- 11.2 Periodic Motion**
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- 11.4 Equations of Simple Harmonic Motion**
- 11.5 The Simple Pendulum**
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Chapter 12 Mechanical Waves and Sound

- 12.1 Mechanical Waves**
- 12.2 Periodic Mechanical Waves**
- 12.3 Wave Speeds**
- 12.4 Mathematical Description of a Wave**
- 12.5 Reflections and Superposition**
- 12.6 Standing Waves and Normal Modes**
- 12.7 Longitudinal Standing Waves**
- 12.8 Interference**
- 12.9 Sound and Hearing**
- 12.10 Sound Intensity**
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- 12.12 The Doppler Effect**
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- 14.1 Temperature and Thermal Equilibrium**
- 14.2 Temperature Scales**
- 14.3 Thermal Expansion**
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- 14.5 Phase Changes**
- 14.6 Calorimetry**
- 14.7 Heat Transfer**
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Chapter 15 Thermal Properties of Matter

- 15.1 The Mole and Avogadro's Number
- 15.2 Equations of State
- 15.3 Kinetic Theory of an Ideal Gas
- 15.4 Heat Capacities

15.5 The First Law of Thermodynamics

Only part of this lengthy section is required: pgs 493-494; 498-mid-499

- 15.6 Thermodynamic Processes
- 15.7 Properties of an Ideal Gas

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- 16.1 Directions of Thermodynamic Processes**
- 16.2 Heat Engines**
- 16.3 Internal Combustion Engines
- 16.4 Refrigerators
- 16.5 The Second Law of Thermodynamics**
- 16.6 The Carnot Engine: The Most Efficient Heat Engine
- 16.7 Entropy**
- 16.8 The Kelvin Temperature Scale
- 16.9 Energy Resources: A Case Study in Thermodynamics