

Nelson Physics 11

Unit 1: Forces and Motion

Are You Ready?

Chapter 1: Motion

- 1.1 Motion in Our Lives
 - Activity 1.1.1 Calibrating a Ticker-Tape Timer
- 1.2 Uniform Motion
- 1.3 Two-Dimensional Motion
- 1.4 Uniform Acceleration
 - Investigation 1.4.1 Attempting Uniform Acceleration
- 1.5 Acceleration Near Earth's Surface
 - Investigation 1.5.1 Acceleration Due to Gravity
- 1.6 Solving Uniform Acceleration Problems
 - Activity 1.6.1 Human Reaction Time

Chapter 1 Summary

Chapter 1 Review

Chapter 2: Forces and Newton's Laws of Motion

- 2.1 Forces in Nature
 - Activity 2.1.1 Forces on Springs
- 2.2 Newton's First Law of Motion
- 2.3 Investigating Force, Mass, and Acceleration
 - Investigation 2.3.1 The Relationship Involving Acceleration, Resultant Force, and Mass
- 2.4 Newton's Second Law of Motion
- 2.5 Newton's Third Law of Motion

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Chapter 2 Summary

Chapter 2 Review

Chapter 3: Gravitational Force and Friction

- 3.1 Gravitational Force on Earth's Surface
- 3.2 Universal Gravitation
- 3.3 The Effects of Friction
 - Investigation 3.3.1 Factors that Affect Friction
- 3.4 Analyzing Motion with Friction
 - Lab Exercise 3.4.1 Determining Coefficients of Friction

Chapter 3 Summary

Chapter 3 Review

Unit 1 Performance Task Motion and Space Exploration

Unit 1 Review

Unit 2: Energy, Work, and Power

Are You Ready?

Chapter 4: Energy, Heat, Work, and Power

- 4.1 Energy and Energy Transformations
- 4.2 Work
- 4.3 Mechanical Energy
- 4.4 The Law of Conservation of Energy and Efficiency
 - Investigation 4.4.1 Testing the Law of Conservation of Energy
 - Investigation 4.4.2 The Efficiency of a Ramp
- 4.5 Thermal Energy and Heat
 - Activity 4.5.1 Determining Specific Heat Capacity
- 4.6 Power
 - Activity 4.6.1 Student Power

Chapter 4 Summary

Chapter 4 Review

Chapter 5: Using Energy in Our Society

- 5.1 The Consumption of Energy
- 5.2 Energy Transformation Technologies
 - Lab Exercise 5.2.1 Determining Waste Energy
- 5.3 Energy Resources
- 5.4 Using Energy Wisely

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Chapter 5 Summary

Chapter 5 Review

Unit 2 Performance Task Energy Cost-Benefit Analysis

Unit 2 Review

Unit 3: Waves and Sound

Are You Ready?

Chapter 6: Vibrations and Waves

- 6.1 Vibrations
- 6.2 Wave Motion
 - Investigation 6.2.1 Wave Transmission: Pulses on a Coiled Spring
- 6.3 Wave Equation
- 6.4 Transmission and Reflection
- 6.5 Waves in Two Dimensions
- 6.6 Interference of Waves
- 6.7 Standing Waves
- 6.8 Interference of Waves in Two Dimensions

Chapter 6 Summary

Chapter 6 Review

Chapter 7: Properties of Sound Waves

- 7.1 What Is Sound?
- 7.2 Production and Transmission of Sound Energy
- 7.3 The Speed of Sound
 - Activity 7.3.1 Measuring the Speed of Sound Outside
- 7.4 The Intensity of Sound
- 7.5 The Human Ear
- 7.6 The Reflection of Sound Waves
- 7.7 Diffraction and Refraction of Sound Waves
- 7.8 The Interference of Sound Waves
 - Investigation 7.8.1 Interference in Sound Waves from a Tuning Fork and Two Loudspeakers
- 7.9 Beat Frequency
 - Activity 7.9.1 Beats of Nearly Identical Tuning Forks
- 7.10 The Doppler Effect and Supersonic Travel

Chapter 7 Summary

Chapter 7 Review

Chapter 8: Music, Musical Instruments, and Acoustics

- 8.1 Music and Musical Scales
- 8.2 Vibrating Strings
- 8.3 Modes of Vibrations—Quality of Sound
- 8.4 Mechanical Resonance
- 8.5 Resonance in Air Columns
 - Investigation 8.5.1 Resonance in Closed Air Columns
 - Investigation 8.5.2 Speed of Sound in a Closed Air Column
- 8.6 Musical Instruments
 - Activity 8.6.1 Waveforms of Stringed Instruments
- 8.7 Electrical Instruments and Audio Reproductions
- 8.8 Electronic Musical Instruments
- 8.9 Acoustics
 - Activity 8.9.1 Reverberation Time

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Chapter 8 Summary

Chapter 8 Review

Unit 3 Performance Task Sound Quality Testing

Unit 3 Review

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Unit 4: Light and Geometric Optics

Are You Ready?

Chapter 9: Light Rays, Reflection, and Refraction

- 9.1 What Is Light?
- 9.2 Reflection and the Formation of Images
- 9.3 The Refraction of Light
- 9.4 Index of Refraction
- 9.5 Laws of Refraction
 - Activity 9.5.1 Reflection and Refraction at Curved Surfaces
 - Investigation 9.5.2 Refraction of Light—Air into Glass
- 9.6 Total Internal Reflection
 - Activity 9.6.1 Critical Angle
- 9.7 Applications of Refraction
 - Activity 9.7.1 Modelling Atmospheric Refraction

Chapter 9 Summary

Chapter 9 Review

Chapter 10: Lenses and the Eye

- 10.1 Refraction in Lenses
- 10.2 Images Formed by Lenses
- 10.3 The Thin Lens Equation
 - Investigation 10.3.1 Predicting the Location of Images Produced by a Converging Lens
- 10.4 The Human Eye and Vision
- 10.5 Vision Problems and Their Treatment
- 10.6 Lens Aberrations, Limitations, and Their Solutions

Chapter 10 Summary

Chapter 10 Review

Chapter 11: Optical Instruments

- 11.1 Lens Cameras and Photography
 - Activity 11.1.1 Dissection of a Disposable Camera
- 11.2 The Microscope
 - Investigation 11.2.1 A Two-Lens Microscope
- 11.3 The Telescope
 - Activity 11.3.1 Model Telescopes
- 11.4 The Optics of Other Devices
 - Activity 11.4.1 Optics of an Overhead Projector
- 11.5 Construction of Optical Instruments
 - Activity 11.5.1 Construct an Optical Instrument

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Chapter 11 Summary

Chapter 11 Review

Unit 4 Performance Task Constructing an Optical Device

Unit 4 Review

Unit 5: Electricity and Magnetism

Are You Ready?

Chapter 12: Electricity

- 12.1 Electrostatics
 - Activity 12.1.1 Electric Charges and Forces
 - Activity 12.1.2 Charging by Induction
- 12.2 Electric Fields and Electric Charge
 - Lab Exercise 12.2.1 Investigating Data from Millikan's Oil Drop Experiment
- 12.3 Electric Current
- 12.4 Electric Potential
- 12.5 Kirchhoff's Laws for Electric Circuits
 - Activity 12.5.1 Series and Parallel Circuits
- 12.6 Electric Resistance
- 12.7 Power in Electric Circuits

Chapter 12 Summary

Chapter 12 Review

Chapter 13: Electromagnetism

- 13.1 Magnetic Force and Fields
 - Activity 13.1.1 Magnetic Fields
- 13.2 Magnetic Materials
- 13.3 Oersted's Discovery
 - Activity 13.3.1 Magnetic Field of a Straight Conductor
- 13.4 The Magnetic Field of a Coil or Solenoid
 - Activity 13.4.1 Magnetic Field of a Coil
- 13.5 Conductor in a Magnetic Field—The Motor Principle
 - Investigation 13.5.1 The Motor Principle
- 13.6 Applications of the Motor Principle

Chapter 13 Summary

Chapter 13 Review

Chapter 14: Electromagnetic Induction

- 14.1 Faraday's Discovery
 - Activity 14.1.1 Inducing Current in a Coiled Conductor
 - Activity 14.1.2 Factors Affecting Induction
- 14.2 Direction of Induced Current
 - Activity 14.2.1 The Direction of Induced Current
- 14.3 Electric Generators: AC and DC
- 14.4 The Transformer
 - Investigation 14.4.1 Transformers (Teacher Demonstration)
- 14.5 Distribution of Electrical Energy

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Chapter 14 Summary

Chapter 14 Review

Unit 5 Performance Task Technology Trade Show

Unit 5 Review

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- Appendix B Safety Skills
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