# Exploring Physics Curriculum App
# NGSS and Math Common Core Alignment Study
# Alignment by Activity for eUnits 1-8

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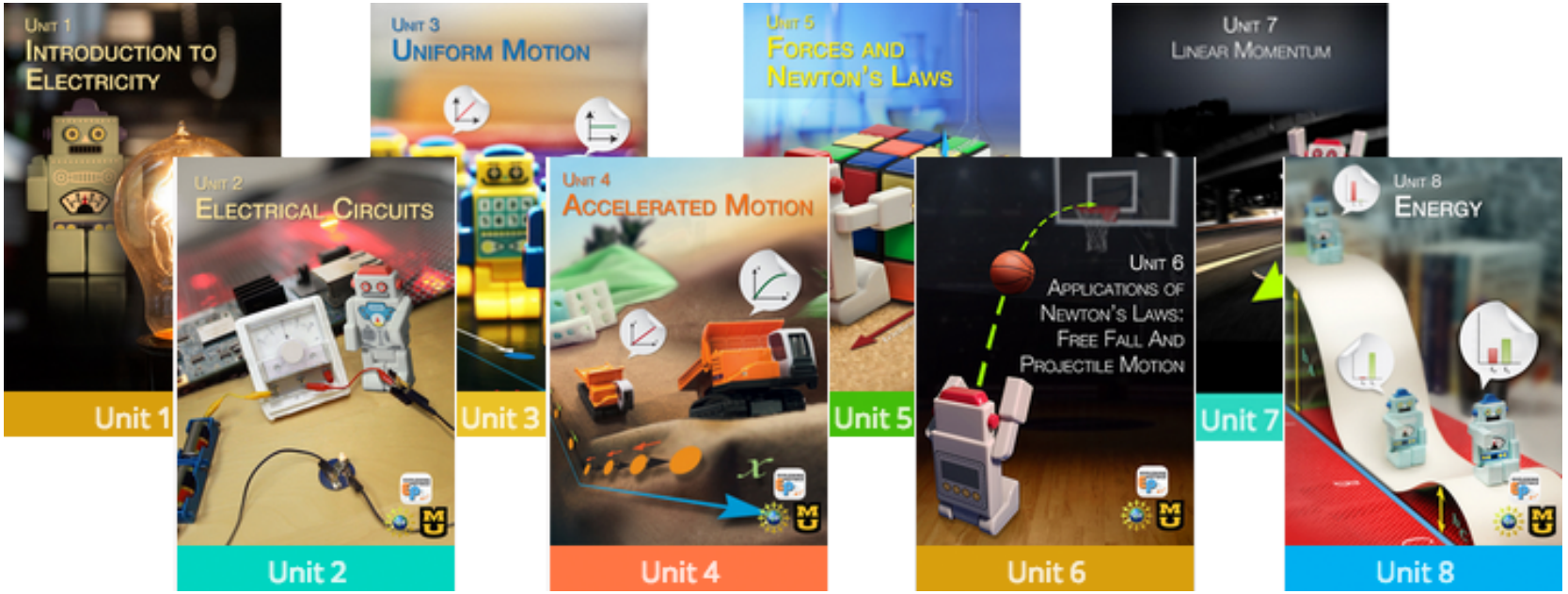

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# Exploring Physics Unit 1: Introduction to Electricity
## Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

*Exploring Physics, The Curriculum App* is an interactive inquiry- and modeling-based conceptual physics curriculum. It combines hands-on activities with a discussion-based pedagogy where students construct mental models of scientific concepts. The content covers a full year's conceptual physics curriculum for 9th grade through early college.

NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Getting Charged Lab | PS2.B.c, PS3.B.c | | | |
| Reading Page: What is Static Electricity? | PS1.A.a, PS2.B.c | SP8 | | |
| Getting Charged Lab - Revisited | PS2.B.c, PS3.B.c | | | |
| Practice 1.1: Electrical Charges | PS2.B.c | SP2 | | |
| A Bulb, A Battery and A Wire | | SP2 | | |
| Reading Page: Contact Points and Light Bulbs | | | | |
| Practice 1.2: The Bulb Challenge | | SP2 | | |
| Reading Page: Circuit Elements | | | | |
| Electrical Materials Lab | S3.A.d | SP3, SP4, SP6 | | |

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|---|---|---|---|---|
| The Buzzer and the Motor Lab | | SP2, SP6 | | |
| Practice 1.3.: Flow Challenge | | SP6 | | |
| Reading Page: What is Charge? | PS1.A.a, PS3.A.d | SP8 | | |
| What is Current? | | | | |
| Practice 1,4: Current through Devices | PS3.A.d | SP6 | | |
| Bulbs and Switches Lab | | SP2, SP6 | | |
| Reading Page: The Switch* | | | | |
| Practice 1.5: Circuits with a Switch | | SP6 | | |
| Electrical Elements Application Lab | | SP2, SP4 | | |
| The Everyday-Stuff Battery Lab | PS3.A.d | SP1, SP2, SP3, SP4, SP6 | | |
| Reading Page: How do Batteries Work? | PS3.A.d, PS3.B.c | SP8 | HSN.Q.A.2 | |
| Practice 1.6: Battery Challenge | PS3.A.d | SP6 | | |

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## Exploring Physics Unit 2: Electrical Circuits
## Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

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NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Current in Series Circuits Lab | PS3.A.d | SP2, SP3, SP4, SP6 | | |
| Reading Page: Current in Series Circuits | | SP8 | | |
| Practice 2.1: Comparing Currents in Circuits | PS3.A.d | SP6 | | |
| Resistance in Series Circuits Lab | PS3.B.c | SP2, SP5 | | MP2 |
| Reading Page: Resistors and Resistance | | SP8 | | |
| Practice 2.2: Circuit Challenge - Series Circuit Design | | | | MP1, MP2 |
| What Causes Resistance? Lab | | SP1, SP2, SP6 | HSS.ID.B.6 | MP1, MP2, MP4 |
| Reading Page: Resistance | | SP8 | HSA.CED.A.1 | |
| Practice 2.3: Calculating Resistance | | | HSA.CED.A.1, HSA.CED.A.4 HSA.REI.B.3 | MP1, MP6 |

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|---|---|---|---|---|
| Voltage in a Series Circuit Lab | PS3.B.c | SP2, SP6 | | MP1, MP2, MP4, MP6 |
| Reading Page: What is Voltage? | PS3.B.b | SP8 | | |
| Connecting Voltage, Current, & Resistance Lab | PS3.B.c | SP1, SP2, SP3, SP4, SP5, SP6 | HSS.ID.B.6 | MP1, MP2, MP4, MP6 |
| Reading Page: Ohm's Law | PS3.B.c | SP8 | | |
| Practice 2.4: Ohm's Law Problems | PS3.B.c | | HSA.CED.A.1,HSA.CED.A.4, HSA.REI.B.3, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.B.6.c, HSS.ID.C.7 | MP1, MP2, MP6 |
| Reading Page: Ohm's Law and Series Circuits | | SP8 | HSA.CED.A.4 | |
| Practice 2.5: Series Circuits and Graph Problems | PS3.B.c | SP6 | HSA.CED.A.1,HSA.CED.A.4, HSA.REI.B.3 | |
| Practice 2.6: Ohm's Law for Series Circuit | PS3.B.c | SP6 | HSA.CED.A.1, HSA.CED.A.4<br>HSA.REI.B.3 | MP1, MP2, MP6 |
| Parallel Circuit Lab | PS3.A.d | SP2, SP5, SP6 | | |
| Practice 2.7: Designing Series and Parallel Circuits | | | | |
| Current in a Parallel Circuit Lab | PS3.A.d | SP2, SP6 | | MP1, MP2, MP4 |
| Reading Page: Parallel Circuits | PS3.A.d, PS3.B.c | SP8 | | |
| Practice 2.8: Series and Parallel Circuits | | | | |
| Practice 2.9: Ohm's Law and Parallel Circuits | PS3.B.c | SP6 | HSA.CED.A.1,HSA.CED.A.4, HSA.REI.B.3 | MP1, MP2, MP6 |
| Batteries in Series and Parallel Lab | PS3A.d, PS3B.c | SP2, SP4, SP6 | | |

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|---|---|---|---|---|
| Reading Page: Batteries in Series & Parallel | PS3A.d | SP8 | | |
| Practice 2.10: Arranging Batteries | PS3B.c | SP6 | | |
| Resistance of a Parallel Circuit Lab | PS3.B.c | SP2 | HSA.CED.A.1, HSA.CED.A.4 | MP1, MP2 |
| Reading Page: The Resistance of a Parallel Circuit | PS3.B.c | SP8 | | |
| Practice 2.11: Resistance in Parallel Circuits | PS3.B.c | SP6 | | |
| Name That Circuit – Application Lab | | SP2, SP6 | | |
| Electrical Power Lab | PS3.B.c | SP2, SP3, SP6 | HSA.CED.A.1,HSA.REI.B.3 | MP4 |
| Reading Page: Power and Energy | PS3.B.c | SP8 | HSA.CED.A.4 | |
| Practice 2.12: Power and Energy Problems | PS3.B.c | | HSA.CED.A.1,HSA.REI.B.3 | MP6 |
| Reading Page: Direct and Alternating Current | | | | |
| Electrical Widgets Application Lab | | | | |

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## Exploring Physics Unit 3: Uniform Motion
## Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

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NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Bag of Cars Lab | | SP2, SP3, SP4, SP6 | | |
| Bubble Lab | | SP1, SP2, SP3, SP4, SP5, SP6 | HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7, | MP2, MP4 |
| Reading Page: Distance and Change in Position | | SP2, SP4, SP5, SP8 | HSA.CED.A.1 | |
| Practice 3.1: Position, Distance, and Change in Position | | SP2, SP4, SP5, SP6 | HSA.CED.A.1 | MP2 |
| Practice 3.2: Analyzing Position, Distance and Slope | | SP2, SP4, SP5, SP6 | HSA.CED.A.1, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP2, MP6 |
| Reading Page: Unit Conversion | | SP2, SP4, SP5, SP8 | HSN.Q.A.1 | MP6 |
| Practice 3.3: Finding Slope | | SP2, SP4, SP5, SP6, SP8 | HSA.CED.A.1, HSF.IF.B.6, HSS.ID.C.7 | MP2 |
| Practice 3.4: Motion with Constant Speed | | SP2, SP4, SP5, SP6 | HSA.CED.A.1, HSS.ID.B.6 | MP2 |

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|---|---|---|---|---|
| Battery Car Lab | | SP1, SP2, SP3, SP4, SP5, SP6 | HSN.Q.A.1,HSA.CED.A.1, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP1, MP2, MP4, MP6 |
| Reading Page: Motion Diagrams | | SP2, SP4, SP5, SP8 | | |
| Practice 3.5: Motion Diagrams | | SP2, SP4, SP5, SP6 | | |
| Student Summary Page - Slow and Fast | | | | |
| Reading Page: The Speed-Distance-Time Relation | | SP2, SP4, SP5, SP6, SP8 | HSN.Q.A.1, HSN.VM.A.3 | MP6 |
| Practice 3.6: Word Problems – Speed | | SP2, SP4, SP5, SP6 | HSN.Q.A.1, HSN.VM.A.3, HSA.CED.A.1,HSA.CED.A.4,<br>HSA.REI.B.3 | MP2, MP4 |
| Detecting Motion Lab | | SP2, SP3, SP4, SP5, SP6 | HSS.ID.B.6 | MP2, MP4, MP6 |
| Practice 3.7: Simulating Motion | | SP2, SP4, SP5, SP6 | | |
| Reading Page: Average Speed | | SP2, SP4, SP5, SP8 | HSA.CED.A.1 | MP2 |
| Practice 3.8: Average Speed | | SP2, SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1,<br>HSA.REI.B.3 | MP1, MP2 |
| Practice 3.9: Words and Graphs | | SP2, SP4, SP5, SP6 | HSN.VM.A.3 | MP2 |
| Motion of Two Bikers – Conceptual Lab | | SP2, SP3, SP4, SP5, SP6 | | MP2 |
| Reading Page: Calculating Displacement | | SP2, SP4, SP5, SP8 | HSA.CED.A.1 | MP2 |

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| Practice 3.10: Words, Graphs and Motion Diagrams | | SP2, SP4, SP5, SP6 | HSA.CED.A.1, HSS.ID.B.6 | MP2 |
| Practice 3.11: Equivalent Representations | | SP2, SP4, SP5, SP6 | HSA.CED.A.1 | MP2 |
| Student Summary Page: Comparing Positive and Negative | | | | |
| Toy Car Application Lab | | SP2, SP3, SP4, SP5, SP6 | | MP4 |

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## Exploring Physics Unit 4: Accelerated Motion
## Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

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NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Bag of Cars – Again | PS2.A.a | SP2, SP3, SP4, SP5, SP6 | | |
| Down the Ramp Lab: Part I | PS2.A.a | SP1, SP2, SP3, SP4, SP5, SP6 | HSA.CED.A.1, HSS.ID.B.6, HSS.ID.C.7 | MP1, MP4 |
| Reading Page: Motion Diagrams I | PS2.A.a | SP2, SP4, SP5, SP8 | | MP2 |
| Practice 4.1: Motion Diagrams with Changing Speed | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | | MP2 |
| Reading Page: Instantaneous Velocity: Geometric Method | PS2.A.a | SP2, SP4, SP5, SP8 | HSS.ID.C.7 | |
| Practice 4.2: Velocity of a Toy Car | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSF.IF.B.6, HSS.ID.C.7 | |
| Reading Page: Calculating a v-t graph for motion with changing speed | PS2.A.a | SP2, SP4, SP5, SP8 | HSN.VM.A.2, HSS.ID.C.7 | |
| Down the Ramp Lab: Part 2 | PS2.A.a | SP2, SP3, SP4, SP5 | HSA.CED.A.1, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP2, MP4 |

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| Practice 4.3: Analyze Uniform Acceleration Data I | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSN.VM.A.2, HSN.VM.A.3, HSS.ID.B.6, HSS.ID.C.7 | |
| Reading Page: Acceleration | PS2.A.a | SP2, SP4, SP5, SP8 | HSA.CED.A.2 | |
| Practice 4.4: Velocity and Acceleration | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSN.VM.A.3, HSF.IF.B.6, HSS.ID.C.7 | |
| Reading Page: Motion Diagrams II | PS2.A.a | SP2, SP4, SP5, SP8 | | MP2 |
| Practice 4.5: Motion Diagrams with Constant Acceleration | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | | MP2 |
| Reading Page: Positive and Negative Velocities | PS2.A.a | SP2, SP4, SP5, SP8 | HSS.ID.C.7 | |
| Reading Page: Correlating Graphs to Motion Diagrams | PS2.A.a | SP2, SP4, SP5, SP8 | | MP2 |
| Practice 4.6: Graphs and Motion Diagrams | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSF.IF.B.6, HSS.ID.C.7 | MP2 |
| Student Summary Page - Accelerated Motion | | | | |
| Practice 4.7: Motion Diagrams, x-t and v-t Graphs | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSN.VM.A.3 | MP2 |
| Motion Along an Incline - Photogate Lab | PS2.A.a | SP1, SP2, SP3, SP4, SP5, SP6 | HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP4 |
| Reading Page: How far do accelerating objects travel? | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSA.CED.A.2, HSA.REI.B.3 | |
| Practice 4.8: Distance traveled - Graphical Calculations | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSA.REI.B.3 | MP6 |
| Speeding Up and Slowing Down Lab | PS2.A.a | SP2, SP3, SP4, SP5 | HSF.IF.B.4, HSF.IF.B.6, HSS.ID.C.7 | |
| Practice 4.9: Up and Down the Ramp | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | | MP1, MP2 |

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|---|---|---|---|---|
| Practice 4.10: Simulating Accelerated Motion | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | | |
| Reading Page: Using Motion Equations | PS2.A.a | SP1, SP2, SP4, SP5, SP8 | HSA.CED.A.1, HSA.CED.A.2 | |
| Practice 4.11: Word Problems - Accelerated Motion | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSS. VM.A.2, HSN.VM.A.3, HSA.REI.B.3, HSF.IF.B.4 | MP1, MP2, MP6 |
| Reading Page: Using Motion Equations to Generate Graphs | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSA.CED.A.1, HSA.CED.A.2, HSF.IF.B4, HSS.ID.B6 | MP1, MP2, MP6 |
| Practice 4.12: Motion with Accleration - Data Tables and Graphs | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSS. VM.A.2, HSN.VM.A.3, HSA.REI.B.3, HSF.IF.B.4, HSS.ID.B6 | MP1, MP2, MP6 |
| Practice 4.13: Motion with Acceleration - Words & Graphs | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSS. VM.A.2, HSN.VM.A.3, HSA.REI.B.3, HSF.IF.B.4, HSS.ID.B6, HSS.ID.C7, | MP1, MP2, MP6 |
| Practice 4.14: Motion with Acceleration - Stacks of Graphs | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSF.IF.B4, HSF.IF.B6, HSF.IF.C7 | |
| Two Accelerating Objects - Conceptual Lab | PS2.A.a | SP2, SP3, SP4, SP5 | HSF.IF.B.4, HSF.IF.C.9, HSS.ID. C7, HSF.LE.A.1.b | |
| Student Summary Page - Uniform Motion Accelerated Motion | | | | |
| Testing Cars - Application Lab | PS2.A.a | SP2, SP3, SP4, SP5 | | |
| Framing Questions Revisited | | | | |
| Accelerated Motion Review | | | | |

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## Exploring Physics Unit 5: Forces and Newton's Laws.Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

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| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Exerting Forces Lab | | SP2, SP3, SP4 | | |
| Reading page: What is a force? | PS2.B.b, PS2.B.c | SP2, SP8 | | |
| Broom Ball – The Game Lab | | SP2, SP3, SP4 | | |
| Reading page: Drawing and Analyzing Forces | | SP2, SP4, SP5 | | |
| Practice 5.1: Force Challenge | | SP2, SP4, SP5 | | |
| The Normal Force Lab | | SP2, SP3, SP4, SP5 | | |
| The Force of Gravity Lab | PS2.B.a, PS2.B.b | SP1, SP2, SP3, SP4, SP5, SP6 | HSA.CED.A.2, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP4 |
| Reading Page: Measuring the Force of Gravity (Weight) | PS2.B.a, PS2.B.b | SP2, SP6, SP8 | HSN.Q.A.1 | |
| Practice 5.2: Force of Gravity and its Strength | PS2.B.a, PS2.B.b | SP4, SP5 | HSN.Q.A.1 | |

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|---|---|---|---|---|
| The Elastic Force Lab | | SP1, SP2, SP3, SP4, SP5, SP6 | HSA.CED.A.2, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP4 |
| Practice 5.3: Forces in springs | | SP4, SP5 | HSS.ID.B.6 | |
| Reading page: Drawing Force Diagrams | | SP2, SP8 | | |
| Practice 5.4: Force Diagrams | | SP2, SP4, SP5 | | MP2 |
| Newton's First Law Lab | | SP2, SP3, SP4, SP6 | | |
| Reading Page: Newton's First Law | | SP2, SP8 | | |
| Practice 5.5: Newton's First Law | | SP4, SP6 | | |
| Broom Ball Lab Revisited | | SP2, SP3, SP4 | | |
| Newton's Third Law Lab | | SP2, SP3, SP4, SP5 | | |
| Newton's Third Law Lab with Force Probes | | SP2, SP3, SP4, SP5, SP6 | | |
| Reading Page: Newton's Third Law | | SP2, SP8 | | |
| Practice 5.6: Identifying Pairs of Forces | | SP2, SP4, SP5, SP6 | | MP2 |
| Newton's Second Law Lab | | SP2, SP3, SP4, SP5, SP6 | | |
| Reading Page: Newton's Second Law | PS2.A.a | SP2, SP8 | HSA.CED.A.2 | |
| Practice 5.7: Newton's Second Law Problems | PS2.A.a | SP2, SP4, SP5, SP6 | HSA.CED.A.1, HSA.CED.A.4 | |
| Practice 5.8: Forces, Motion and Newton's Laws | | SP2, SP4, SP5 | | MP2 |

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## Exploring Physics Unit 6: Applications of Newton's Laws: Free Fall and Projectile Motion Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

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NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Free Fall Lab | PS2.A.a | SP1, SP2, SP3, SP4, SP5, SP6 | HSA.CED.A.1, HSA.CED.A.4, HSF.IF.B.6 , HSS.ID.B.6, HSS.ID.C.7 | MP1, MP2 |
| Reading Page: Free Fall | PS2.A.a | SP2, SP4, SP5, SP6, | HSA.CED.A.2 | |
| Practice 6.1: Motion of Falling Objects | PS2.A.a | SP5, SP6 | HSA.CED.A.1, HSA.REI.B.3, HSS.ID.B.6 | |
| Practice 6.2: Falling Objects - Word Problems | PS2.A.a | SP4, SP5, SP6 | HSN.VM.A.3, HSS.ID.B.6 | |
| Throw the Ball Upwards Lab | PS2.A.a | SP1, SP2, SP3, SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1, HSA.REI.B.3, HSF.IF.B.6, HSS.ID.A.3, HSS.ID.B.6, HSS.ID.C.7 | MP1, MP2, MP4 |

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|---|---|---|---|---|
| Reading Page: Up and Down Under Gravity | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSN.Q.A.1 | |
| Practice 6.3: What Goes Up, Must Come Down | PS2.A.a | SP5, SP6 | HSA.CED.A.1, HSA.REI.B.3, HSS.ID.B.6 | |
| Practice 6.4: What Goes Up, Must Come Down Word Problems | PS2.A.a | SP4, SP5, SP6 | HSA.REI.B.3, HSF.IF.B.6, HSS.ID.A.3, HSS.ID.B.6, HSS.ID.C.7 | MP1, MP2, MP6 |
| Practice 6.5: Simulating Motion Under Gravity | PS2.A.a | SP4, SP5, SP6 | HSN.VM.A.3, HSS.ID.B.6 | |
| Reading Page – Newtons Law of Universal Gravity | PS2.B.a | SP2, SP5 | HSA.CED.A.1, HSA.REI.B.3, HSS.ID.B.6 | |
| Practice 6.6: Gravity on other planets | PS2.B.a | SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1, HSA.REI.B.3, HSF.IF.B.6 , HSS.ID.A.3, HSS.ID.B.6, HSS.ID.C.7 | MP1, MP2, MP6 |
| Student Summary Page: Up and Down | | | | |
| Motion in Two Dimensions Lab | PS2.A.a | SP2, SP3, SP4, SP5, SP6 | | MP2 |
| Horizontally Launced Projectile Lab | PS2.A.a | SP2, SP3, SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1, HSS.ID.B.6, HSS.ID.B.6.c | MP4 |
| Reading Page: Motion in Two Dimensions - I | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | HSN.Q.A.1, HSN.VM.A.3, HSA.CED.A.2 | MP2 |
| Practice 6.7 Motion in 2 Dimensions | PS2.A.a | SP4, SP5, SP6 | HSA.CED.A.1, HSA.REI.B.3, HSS.ID.B.6 | MP2 |
| Practice 6.8: Motion in 2 Dimensions Word Problems | PS2.A.a | SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1, HSA.REI.B.3 | MP1, MP2 |
| Practice 6.9: Simulating Projectile Motion I | PS2.A.a | SP4, SP5, SP6 | HSA.CED.A.1, HSA.REI.B.3, HSS.ID.B.6 | MP2 |

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|---|---|---|---|---|
| Student Summary Page: Free Fall and Projectile Motion | | | | |
| Forces and Projectile Motion Conceptual Lab | PS2.A.a | SP4, SP5, SP6 | | MP2 |
| Hit theTarget Lab-Practicum | PS2.A.a | SP2, SP3, SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1 | MP4 |
| Student Summary Page: Comparing Free Fall to Projectile Motion | | | | |
| Launching Darts Lab | PS2.A.a | SP1, SP2, SP3, SP4, SP5, SP6 | HSS.ID.B.6 | |
| Reading Page: Motion in Two Dimensions, II | PS2.A.a | SP2, SP4, SP5, SP6, SP8 | | |
| Practice 6.10: Trajectory Challenge | PS2.A.a | SP4, SP5, SP6 | | |
| Practice 6.11: Simulating Projectile Motion II | PS2.A.a | SP4, SP5, SP6 | HSA.CED.A.1, HSA.REI.B.3 | |

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## Exploring Physics Unit 7: Linear Momentum

## Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

*Exploring Physics, The Curriculum App* is an interactive inquiry- and modeling-based conceptual physics curriculum. It combines hands-on activities with a discussion-based pedagogy where students construct mental models of scientific concepts. The content covers a full year's conceptual physics curriculum for 9th grade through early college.

NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Exploring Collisions Lab | PS2.A.b | SP2, SP3, SP4, SP5, SP6 | | MP1, MP2 |
| Reading Page: Impulse | PS2.A.b | SP4, SP5, SP6 | HSA.CED.A.2 | MP1, MP2 |
| Practice 7.1: Impulse | PS2.A.b | SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1, HSA.REI.B.3 | |
| Reading Page: Linear Momentum | PS2.A.b | SP2, SP4, SP5, SP6, SP8 | HSN.Q.A.1, HSA.CED.A.2 | |
| Practice 7.2: Calculating Linear Momentum | PS2.A.b | SP4, SP5, SP6 | HSA.CED.A.1 | |
| Connecting Impulse and Momentum Lab | PS2.A.b | SP2, SP4, SP5, SP6, SP8 | HSA.CED.A.2 | |
| Reading Page: Connecting Impulse and Change in Momentum | PS2.A.b | SP2, SP4, SP5, SP6, SP8 | HSA.CED.A.2 | |

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|---|---|---|---|---|
| Practice 7.3: Impulse and Change in Momentum | PS2.A.b | SP4, SP5, SP6 | HSA.CED.A.1, HSA.REI.B.3 | MP1, MP2, MP6 |
| Elastic and Inelastic Collisions Lab | PS2.A.b | SP2, SP3, SP4, SP5, SP6 | | |
| Reading Page: Types of Collisions | PS2.A.b | SP4, SP5, SP6 | HSA.CED.A.2 | |
| Momentum in Collisions Lab | PS2.A.b | SP2, SP3, SP4, SP5, SP6 | HSA.CED.A.1 | |
| Reading Page: Conservation of Linear Momentum | PS2.A.b | SP2, SP4, SP5, SP6, SP8 | HSA.CED.A.2 | |
| Practice 7.4: Applying Conservation of Momentum | PS2.A.b | SP4, SP5, SP6 | HSN.VM.A.3, HSA.CED.A.1, HSA.REI.B.3 | MP1, MP2, MP6 |

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www.exploringphysics.com

## Exploring Physics Unit 8: Energy
## Alignment by Activity with Next Generation Science Standards* Disciplinary Core Ideas and Mathematics Common Core Standards§

*Exploring Physics, The Curriculum App* is an interactive inquiry- and modeling-based conceptual physics curriculum. It combines hands-on activities with a discussion-based pedagogy where students construct mental models of scientific concepts. The content covers a full year's conceptual physics curriculum for 9th grade through early college.
NGSS alignment was conducted by the Biological Science Curriculum Study, BSCS, Colorado Springs, Co, http://www.bscs.org.

| Activity | NGSS Disciplinary Core Ideas (High School) | Science Practices | Math Common Core Standards | Math Practices |
|---|---|---|---|---|
| Exploring Energy – Lab | PS1.B.a, PS2.A.a, PS2.A.b, PS2.B.a, PS2.B.b, PS3.A.b, PS3.A.c, PS3.B.b, PS3.B.e, PS3.C.a, PS3.D.a | SP2, SP3 | | |
| Reading Page: Energy | PS3.A.a, PS3.B.a, PS3.B.b | | | |
| Practice 8.1. Physical systems, states, processes | PS1.B.a, PS2.A.a, PS2.A.b, PS2.B.a, PS2.B.b, PS3.A.b, PS3.A.c, PS3.B.b, PS3.B.e, PS3.C.a, PS3.D.a | SP2, SP3 | | |
| Reading Page: The Law of Conservation of Energy | PS3.A.a, PS3.B.a, PS3.B.b | | | |
| Exploring Energy Transformations Lab | PS2.A.c | SP2, SP3, SP6 | | |
| Reading Page: Using Pie Charts to Represent Energy Storage and Transformations | PS3.A.a, PS3.B.a, PS3.D.a | SP2, SP5, SP6 | HSA.SSE.B.3 | MP2 |

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| Practice 8.2. Energy Pie Charts | PS3.A.a, PS3.B.a, PS3.D.a | SP2, SP5, SP6 | HSA.SSE.B.3 | MP2 |
| Exploring Energy Transfers Lab | PS2.A.c | SP2, SP3, SP6 | | |
| Reading Page: Using Energy Bar Graphs to Represent Energy Transfers | PS3.A.a, PS3.B.a, PS3.D.a | SP2, SP5, SP6 | HSA.SSE.B.3 | MP2 |
| Practice 8.3. Energy Bar Graphs | PS3.A.a, PS3.B.a, PS3.D.a | SP2, SP5, SP6 | HSA.SSE.B.3 | MP2 |
| What is Work? Lab | | SP1, SP2, SP3, SP4, SP5, SP6 | HSN.Q.A.1, HSA.CED.A.2, HSA.REI.B.3, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.C.7 | MP1, MP2, MP4, MP6 |
| Reading Page: Work and Energy | | | HSN.Q.A.1 | |
| Practice 8.4. Calculating Work | | SP4, SP5 | HSA.CED.A.1 | MP1, MP2, MP6 |
| Relating Work to Change in Energy Conceptual Lab | | SP5 | HSA.SSE.A.1, HSA.CED.A.1, HSA.REI.B.3 | MP1, MP2, MP6 |
| Reading Page: Gravitational Potential Energy | PS3.B.c | SP5 | HSN.Q.A.1 | |
| Practice 8.5. Gravitational Potential Energy | PS3.B.c | SP2, SP5 | | MP2 |
| How much energy is stored in a spring? Elastic Potential Energy Lab | PS3.B.c | SP1, SP3, SP4, SP5, SP6 | HSA.CED.A.1, HSA.CED.A.2, HSA.REI.B.3, HSF.IF.B.4, HSF.IF.B.6 | MP2, MP4 |
| Reading Page: Elastic Potential Energy | PS3.B.c | | HSA.SSE.A.1.a, HSA.CED.A.2, HSA.REI.A.1 | |

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|---|---|---|---|---|
| Practice 8.6. Energy in Springs | PS3.B.c | SP2, SP4, SP5 | HSA.CED.A.1, HSA.REI.A.1, HSF.IF.B.4, HSS.ID.B.6 | MP1, MP2, MP6 |
| How much energy do we have when moving? Kinetic Energy Lab | PS3.B.c | SP2, SP3, SP4, SP5, SP6 | HSN.Q.A.1, HSA.SSE.A.1, HSA.SSE.A.1.a, HSA.CED.A.2, HSA.REI.A.1, HSF.IF.B.4, HSF.IF.B.6, HSS.ID.B.6, HSS.ID.B.6.c, HSS.ID.C.7 | MP4 |
| Reading Page: Kinetic Energy | PS3.B.c | | HSN.Q.A.1, HSA.CED.A.2 | |
| Practice 8.7. Kinetic Energy | PS3.B.c | | HSN.VM.A.3, HSA.CED.A.1, HSF.IF.B.4, HSS.ID.B.6 | MP1, MP2, MP6 |
| Practice 8.8. Conservation of Energy Problems | PS3.B.c | SP2 | HSN.VM.A.3, HSA.CED.A.1 | MP1, MP2, MP6 |
| Human Power Lab | | SP3, SP4, SP5, SP6 | HSN.Q.A.1, HSA.SSE.A.1, HSA.CED.A.1 | MP2, MP4 |
| Reading Page: Power | | | HSN.Q.A.1, HSA.SSE.A.1, HSA.CED.A.2 | |
| Practice 8.9. Power | | | HSA.CED.A.1 | MP2 |

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