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To the

Minnesota 2019 Academic Standards in Science Grade 8

Prepared by Savvas Learning Company, formerly Pearson K12 Learning

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To the
Minnesota K-12 Academic Standards in Science, Grade 8

Introduction

This document demonstrates how the ***Minnesota Elevate Science: Life, Earth, and Physical ©2021*** program supports the Minnesota Academic Standards in Science, Grades 6-8. Correlation page references are to the Student and Teacher's Editions and cited at the page level.

Savvas is proud to introduce ***Elevate Science*** Middle Grades – where exploration is the heart of science! Designed to address the rigors of new science standards, students will experience science up close and personal, using real-world, relevant phenomena to solve project-based problems. Our newest program prepares students for the challenges of tomorrow, building strong reasoning skills and critical thinking strategies as they engage in explorations, formulate claims, and gather and analyze data that promote evidence-based arguments. The blended print and digital curriculum cover all Next Generation Science Standards at every grade level.

Elevate Science helps teachers transform learning, promote innovation, and manage their classroom.

Transform science classrooms by immersing students in active, three-dimensional learning.
Elevate Science engages students with real-world tasks, open-ended Quests, uDemonstrate performance-based labs, and in the engineering/design process with uEngineer It! investigations.

- A new 3-D learning model enhances best practices.
- Engineering-focused features infuse STEM learning.
- Phenomena-based activities put students at the heart of a Quest for knowledge.

Innovate learning by focusing on 21st century skills.
Students are encouraged to think, collaborate, and innovate! With ***Elevate Science***, students explore STEM careers, experience engineering activities, and discover our scientific and technological world. The content, strategies, and resources of Elevate Science equip the science classroom for scientific inquiry and science and engineering practices.

- Problem-based learning Quests put students on a journey of discovery.
- STEM connections help integrate curriculum.
- Coding and innovation engage students and build 21st century skills.

Manage the classroom with confidence.
Teachers will lead their class in asking questions and engaging in argumentation. Evidence-based assessments provide new options for monitoring student understanding.

- Professional development offers practical point-of-use support.
- Embedded standards in the program allow for easy integration.
- ELL and differentiated instruction strategies help instructors reach every learner.
- Interdisciplinary connections relate science to other subjects.

Designed for today's classroom, preparing students for tomorrow's world. ***Elevate Science*** promises to:

- Elevate thinking.
- Elevate learning.
- Elevate teaching.

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PS: Matter and its Interactions	
8P.1.1.1.1 Ask questions about locations of common elements on the periodic table to note patterns in the properties of similarly grouped elements. (P: 1, CC: 1, CI: PS1) Emphasis is on the similar properties within columns of the periodic table. Examples of questions that students may think to ask may include how are the properties of elements in a column similar and different.	**SE/TE:** Question It!, 362 See supporting content: Using the Periodic Table, 349-351 Math Toolbox: Applying the Periodic Table, Questions 1-3, 351 Periods in the Periodic Table, 352-353 Groups in the Periodic Table, 354-356 Lesson 2 Check, 357 Metals, 362-363 Nonmetals, 364 Evidence-Based Assessment, 388-389
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PS: Matter and its Interactions	
8P.1.2.1.1 Plan and conduct an investigation of changes in pure substances when thermal energy is added or removed and relate those changes to particle motion. (P: 3, CC: 2, CI: PS1) Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs.	**SE/TE:** Quest Kickoff: How can you use solids, liquids and gases to lift a car?, 44-45 Hands-On Lab, 62 Hands-On Lab, 69 Quest Findings, 81 uDemonstrate Lab: Melting Ice, 82-85
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8P.1.2.1.3 Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. (P: 3, CC: 2, CI: PS2) Examples of this phenomenon may include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations may include first-hand experiences or simulations.	**SE/TE:** Quest Kick-Off, 238-239 uConnect Lab, 239A-239B Virtual Lab, 254 Interactivity, 256 Topic Review and Assess, 280-281 uDemonstrate Lab: Planetary Detective, 282-285

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PS: Energy	
8P.1.2.1.4 Plan and conduct an investigation to determine how the temperature of a substance is affected by the transfer of energy, the amount of mass, and the type of matter. (P: 3, CC: 2, CI: PS 3) Emphasis is on conceptualizing temperature as the average kinetic energy of a substance's particles. Examples of investigations may include comparing final water temperatures after different masses of ice melt in equal volumes of water with the same initial temperature, and temperature changes of different materials with the same mass as they heat or cool in the environment.	**SE/TE:** Hands-on Lab, 136 uConnect Lab, 139A-139B Hands-on Lab, 142 Interactivity, 145 Hands-on Lab, 150 Literacy Connection: Conduct Research Projects, 153 Hands-on Lab, 160 Quest Findings, 169 uDemonstrate Lab: Testing Thermal Conductivity, 170-173
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PS: Energy	
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PS: Waves and their Applications	
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PS: Energy	
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3.0 Developing possible explanations of phenomena or designing solutions to engineering problems	
3.1 Developing and using models	
3.1.1 Students will be able to develop, revise, and use models to represent their understanding of phenomena or systems as they develop questions, predictions and/or explanations and communicate ideas to others.	
PS: Matter and its Interactions	
8P.3.1.1.1 Develop models to describe the atomic composition of simple molecules and crystals. (P: 2, CC: 3, CI: PS1) Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules may include ammonia and methane. Examples of crystal structures may include sodium chloride or quartz, pyrite or diamonds. Does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or crystal structure.	**SE/TE:** uConnect Lab, 3A-3B Hands-On Lab, 4 Molecules, Hands-On Lab, 9 Model It!: Molecules and Atoms, 9 Evidence-Based Assessment, 36-37 Model It! Models of an Atom, 339 Hands-On Lab, 340 Lesson Check, 343 Model It!, 370 Figure 8: Nonpolar and Polar Molecules, 374 Review and Assess, 386 uDemonstrate Lab: Shedding Light on Ions, 390-393
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PS: Energy	
8P.3.1.1.3 Develop and revise a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (P: 2, CC: 5, CI: PS3) Emphasis is on relative amounts potential energy and not on calculations of potential energy. Examples of objects within systems interacting at varying distances may include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models may include representations, diagrams, pictures, and written descriptions of systems.	**SE/TE:** uConnect Lab: What would make a card jump?, 89A-89B Hands-on Lab: Energy, Magnetism, and Electricity, 104 Interactivity, 105 Hands-on Lab, 106 Model It!: Conservation in Demolition, 121 Topic Review and Assess, 128 Evidence-Based Assessment, 130-131 uDemonstrate Lab: 3, 2, 1...Liftoff!, 132-135 Quest Kick-Off, 238-239 Question It!, 242 Figure 9, 247 Lesson Check, 248 Interactivity, 256 Review and Assess, 278 uDemonstrate Lab: Planetary Detective, 282-285 Model It!: Develop Models, 487 Topic Review and Assess, 490-491 uDemonstrate Lab: Stopping on a Dime, 494-497

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PS: Waves and their Applications	
8P.3.1.1.4 Develop and use a model to qualitatively describe that waves are reflected, absorbed, or transmitted through various materials. (P: 2, CC: 4, CI: PS4) Emphasis is on both light and mechanical waves. Examples of models may include drawings, simulations, a storyboard/diagram and written descriptions.	**SE/TE:** uConnect Lab: What are waves?, 177A-177B Figure 6, 194 Quest Check-In, 196 Interactivity: Virtual Optics, 196 uEngineer It!: Say "Cheese!", 197 Model It!: Develop Models, 201 Lesson 3 Check, 207 Model It!: Polarizing Glasses, 211 Quest Check-In, 216 Hands-On Lab: Light Interacting with Matter, 222 Model It!: Fun with Mirrors, 224 Quest Check-In, 227 Evidence-Based Assessment, 230-231 uDemonstrate Lab: Making Waves, 232-235

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3.2 Constructing explanations and designing solutions	
3.2.1 Students will be able to apply scientific principles and empirical evidence (primary or secondary) to explain the causes of phenomena or identify weaknesses in explanations developed by the students or others.	
PS: Matter and its Interactions	
8P.3.2.1.1 Construct an explanation based on evidence and scientific principles of a common phenomenon that can be explained by the motions of molecules. (P: 6, CC: 3, CI: PS1) Emphasis of the core idea is that the movement of small particles (atoms or molecules) can explain the behavior of macroscopic phenomena. Examples of phenomena may include expansion of balloons, diffusion of odors, and pressure changes in gases due to heating and cooling.	**SE/TE:** Interactivity, 52 Lesson 1 Check, 54 Changes of State Between Liquid and Gas, 60-62 Interactivity, 63 Lesson 2 Check, 64 Connect It!, 66 Figure2, 68 Reading Check, 68 Reading Check, 70 Model It!, 71 Math Toolbox: Graphing Boyle's Law, 72 How Pistons Work, 74 Lesson Check, 75 Case Study: Rising to the Occasion: Charles' Law in the Oven!, 76-77 Topic Review and Assess, 78-79 Evidence-Based Assessment, 80-81 uDemonstrate Lab: Melting Ice, 82-85 It's All Connected: Glassblowing, 147 Thermal Expansion, 161 Lesson Check, 165 Evidence-Based Assessment, 168-169

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3.2.2 Students will be able to use their understanding of scientific principles and the engineering design process to design solutions that meet established criteria and constraints.*	
8P.3.2.2.1 Construct, test and modify a device that either releases or absorbs thermal energy by chemical processes.* (P: 6, CC: 5, CI: PS1, ETS1) Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of chemical reactions include dissolving ammonium chloride or calcium chloride in water.	**SE/TE:** Quest Kickoff: How can you design and build hot packs and cold packs?, 396-397 Changes in Energy, 414 Quest Check-In, 418 It's All Connected: The Art of Chemical Change, 419 Quest Check-In, 427 Quest Findings, 441
PS: Motion and Stability: Forces and Interactions	
8P.3.2.2.2 Design a solution to a problem involving the motion of two colliding objects using Newton's 3rd Law.* (P: 6, CC: 4, CI: PS2, ETS1)Examples of practical problems may include the impact of one dimensional collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.	**SE/TE:** Quest Kickoff: How can you take the crash out of a collision?, 448-449 Quest Check-In, 457 Hands-on Lab: uInvestigate: Newton Scooters, 475 Interactivity, 478 uEngineer It!: Generating Energy From Potholes, 479 Quest Findings, 493 uDemonstrate Lab: Stopping on a Dime, 494-497
PS: Energy	
8P.3.2.2. Design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* (P: 6, CC: 5, CI: PS3, ETS1) Emphasis is on using scientific principles to design the device. Examples of devices may include an insulated box, a solar cooker, and a foam cup.	**SE/TE:** uEngineer It!: Prosthetics on the Move, 107 Quest Kickoff: How can you keep hot water from cooling down?, 138-139 uEngineer It!: Shockwave to the Future, 155 Quest Check-In, 165 uDemonstrate Lab: Testing Thermal Conductivity, 170-173

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4.0 Communicating reasons, arguments and ideas to others	
4.1 Arguing from evidence	
4.1.1 Students will be able to engage in argument from evidence for the explanations the students construct, defend and revise their interpretations when presented with new evidence, critically evaluate the scientific arguments of others, and present counter arguments.	
PS: Motion and Stability: Forces and Interactions	
8P.4.1.1.1 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (P: 7, CC: 3, CI: PS2) Examples of evidence for arguments may include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system. Not included are Newton's Law of Gravitation or Kepler's Laws.	**SE/TE:** Connect It!, 480 Write Arguments, 482 Literacy Connection: Write Arguments, 485 Lesson Check, 488 Evidence-Based Assessment, 492-493 uDemonstrate Lab: Stopping on a Dime, 494-497

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8P.4.1.1.2 Compare and evaluate evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. (P: 7, CC: 5, CI: PS3) Examples of empirical evidence used in the students' arguments may include the temperature or motion of an object before and after an energy transfer.	**SE/TE:** The Essential Question, 87 Quest Kickoff: How can you build a complicated machine to do something simple?, 88-89 uConnect Lab: What would make a card jump?, 89A-89B Energy at the Cookout, Figure 4, 114-115 Quest Check-In, 116 Connect It!, 118 Energy Changes Form, 119-121 Lesson 4 Check, 125 Quest Check-In, 125 Case Study: U.S. Energy Consumption, 126-127 Topic Review and Assess, 129 Evidence-Based Assessment, 130-131 uDemonstrate Lab: 3, 2, 1.....Liftoff!, 132-135 Heat Flow, Figure 2, 150-151 Heat Transfer, Figure 3, 152 Question It!, 153 Lesson Check, 154 uEngineer It!: Shockwave to the Future, 155 Case Study: Earth Power, 156-157 Expansion Joints, Figure 3, 161 Plan It!: Materials for Airplanes, 164 Lesson Check, 165 Evidence-Based Assessment, 168-169
4.2.1 Students will be able to read and interpret multiple sources to obtain information, evaluate the merit and validity of claims and design solutions, and communicate information, ideas, and evidence in a variety of formats.	
PS: Matter and its Interactions	
8P.4.2.1.1 Gather and evaluate information from multiple sources to describe that synthetic materials come from natural resources and impact society. (P: 8, CC: 6, CI: PS1) Emphasis of the practice is to synthesize information from multiple appropriate sources and assess the credibility, accuracy and possible bias of each publication. Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials may include plastic, medicines, foods, and alternative fuels.	**SE/TE:** Interactivity, 430 Accidental Synthetics, Figure 2, 431 TE Only: Focus on Mastery: Evaluate Information, 431 The Impact of Synthetic Materials, 433-434 Lesson Check, 435 Case Study: Is Plastic Really So Fantastic?, 436-437 Topic Review and Assess, 439

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PS: Waves and their Applications	
8P.4.2.1.2 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.** (P: 8, CC: 6, CI: PS4) Emphasis of the practice is on using information to support and clarify claims. Emphasis of the core idea is on understanding that waves (encoded both analog and digitally) can be used for communication purposes. Examples of encoding and transmitting information may include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.	**SE/TE:** Quest Kickoff: What is the best way to record sound for my scenario?, 288-289 uConnect Lab: Continuous or Discrete?, 289A-289B uEngineer It!: A Life-Saving Mistake, 299 Electromagnetic Signals, 303 Analog and Digital Signals, 304-306 Interactivity, 305 Lesson 2 Check, 309 Quest Check-In, 309 Case Study: Super Ultra High Definition!, 310-311 Interactivity, 314 Math Toolbox: Digital Data Explosion, 315 Roger That!, Figure 3, 316-317 Advantages of Digital Signals, 318-319 Lesson 3 Check, 320 Quest Check-In, 320 Extraordinary Science: Beam Me Up!, 321 Topic Review and Assess, 322-323 Evidence-Based Assessment, 324-325 Quest Findings, 325 uDemonstrate Lab: Over and Out, 326-329