

**PENINSULA SCHOOL DISTRICT
Science Curriculum
Eighth Grade**



Process / Investigation Terms

accuracy

compare

contrast

controlled variable (kept the same)

description

evidence

factor

hypothesis

interpret

interpretation

issue

manipulated (changed) variable

meter stick

opinion

pattern

phenomena

phenomenon

relationship

reliable

report

summarize

unexpected

valid

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
1.1 Properties: Understand how properties are used to identify, describe, and categorize substances, materials, and objects and how characteristics are used to categorize living things, <i>continued</i>			
1.1.4	<p>Understand that energy is a property of matter, objects, and systems and comes in many forms (i.e., heat [thermal] energy, sound energy, light energy, electrical energy, kinetic energy, potential energy, and chemical energy) W</p> <ul style="list-style-type: none"> • Describe the forms of energy present in matter, objects, and systems (i.e., heat [thermal] energy, sound energy, light energy, kinetic energy, potential energy, and chemical energy) • Describe the form of energy stored in a part of a system (i.e., energy can be stored in many forms, “stored energy” is not a form of energy) • Compare the potential and kinetic energy within a system at various locations or times (i.e., kinetic energy is an object’s energy of motion; potential energy is an object’s energy of position) <p>charge convection particle circuit Kinetic energy potential energy conduction Heat (thermal) energy radiation</p>	<p>Physical Science</p> <ul style="list-style-type: none"> • Chapter 13, Section 1, pg. 408-413 • Chapter 14, Section 1, pg. 434-438 	
1.1.5	*		
1.1.6	*		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
1.2 Structures: Understand how components, structures, organizations, and interconnections describe systems			
1.2.1	Analyze how the parts of a system interconnect and influence each other W <ul style="list-style-type: none"> Describe the interactions and influences between two or more simple systems 		
1.2.2	Understand how various factors affect energy transfers and that energy can be transformed from one form of energy to another W <ul style="list-style-type: none"> Describe how an increase in one type of energy of an object or system results in a decrease in other types of energy within that object or system (e.g., a falling object's potential energy decreases while its kinetic energy increases) Explain the transfer and transformations of energy within a system (e.g., conduction and convection of heat [thermal] energy) conduction heat (thermal)energy kinetic energy convection potential energy frictional force	Physical Science <ul style="list-style-type: none"> Chapter 13, Section 2, pg. 416-421 Chapter 13, Section 3, pg. 422-425 Chapter 14, Section 2, pg. 439-445 Chapter 14, Section 3, pg. 449-454 Chapter 16, Section 1, pg. 532-537 Chapter 16, Section 2, pg. 538-546 	
1.2.3	Understand that all matter is made of particles called atoms and that atoms may combine to form molecules and that atoms and molecules can form mixtures W <ul style="list-style-type: none"> Describe how atoms may be combined in various ways and ratios to form molecules Describe the different atoms and molecules in mixtures (e.g., dissolving carbon dioxide in water produces a type of mixture [solution] of CO₂ and H₂O molecules) atom neutrons chemical molecule mixture solution (chemical compound electron reaction protons nucleus transfer carbon dioxide pH insoluble	Physical Science <ul style="list-style-type: none"> Chapter 1, Section 3, pg. 31-35 Chapter 6, Section 1, pg. 179-183 	
1.2.4	*		

* Not formally addressed at this grade level

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1.2 Structures: Understand how components, structures, organizations, and interconnections describe systems, <i>continued</i>			
1.2.5	<p>Understand the structure of the solar system W</p> <ul style="list-style-type: none"> • Describe how the earth orbits the sun and the moon orbits the earth • Describe the sun (i.e., a medium-size star, the largest body in our solar system, major source of energy for phenomena on earth's surface) • Describe how planets, asteroids, and comets orbit the sun • Describe meteors (e.g., planetary and comet debris that collides with earth) • Compare the relationships among the components of the solar system (e.g., composition, size, atmosphere, gravity, distance from the sun, number of moons) <p>atmosphere telescope lunar carbon dioxide reflection sphere phases of the moon sphere core relative position reflect nitrogen relative speed radiation pressure solar system eclipse element</p>	<p>Earth Science</p> <ul style="list-style-type: none"> • Chapter 19, Section 4, pg. 659-664 • Chapter 20, Section 1, pg. 668-675 • Chapter 20, Section 2, pg. 676-680 • Chapter 20, Section 3, pg. 682-689 • Chapter 20, Section 4, pg. 690-697 • Chapter 20, Section 5, pg. 700-703 	
1.2.6	*		
1.2.7	*		
1.2.8	*		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
1.3 Changes: Understand how interactions within and among systems cause changes in matter and energy			
1.3.1	<p>Understand factors that affect the strength and direction of forces W</p> <ul style="list-style-type: none"> Observe and describe factors that affect the strength of forces (e.g., an object with a greater mass has a greater gravitational force [weight]; certain types of magnets have greater magnetic forces; a larger muscle can pull with a greater force) Describe how forces acting on an object may balance each other (e.g., the downward force of gravity on an object sitting on a table is balanced by an upward force from the table) Measure and describe how a simple machine can change the strength and/or direction of a force (i.e., levers and pulleys) Describe pressure as a force (e.g., pressure increases result in greater forces acting on objects going deeper in a body of water) <p>pressure transfer leverage force magnetism transmit frictional</p>	<p>Physical Science</p> <ul style="list-style-type: none"> Chapter 10, Section 1, pg. 310-317 Chapter 11, Section 1, pg. 344-351 Chapter 11, Section 3, pg. 358-364 Chapter 12, Section 2, pg. 378-383 Chapter 12, Section 3, pg. 386-396 	
1.3.2	<p>Understand how balanced and unbalanced forces can change the motion of objects W</p> <ul style="list-style-type: none"> Describe how an unbalanced force changes the speed and/or direction of motion of different objects moving along a straight line – Newton’s second law of motion (e.g., a larger unbalanced force is needed to equally change the motion of more massive objects) Describe how frictional forces act to stop the motion of objects Investigate and describe the balanced and unbalanced forces acting on an object (e.g., a model car speeding up on a table has both an unbalanced force pulling it forward and a gravitational force pulling it down balanced by the table pushing upward) Investigate and describe pressure differences that result in unbalanced forces moving objects (e.g., pressure differences cause forces that move air masses, move blood through the heart, cause volcanic eruptions) <p>pressure transfer leverage force magnetism transmit frictional</p>	<p>Physical Science</p> <ul style="list-style-type: none"> Chapter 10, Section 2, pg. 320-322 Chapter 10, Section 3, pg. 323-329 Chapter 11, Section 2, pg. 354-357 	

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
1.3 Changes: Understand how interactions within and among systems cause changes in matter and energy, <i>continued</i>			
1.3.3	<p>Understand that matter is conserved during physical and chemical changes W</p> <ul style="list-style-type: none"> Observe and describe evidence of physical and chemical changes of matter (e.g., change of state, size, shape, temperature, color, gas production, solid formation, light) Observe and describe that substances undergoing physical changes produce matter with the same chemical properties as the original substance and the same total mass (e.g., tearing paper, freezing water, breaking wood, sugar dissolving in water) Observe and describe that substances may react chemically to form new substances with different chemical properties and the same total mass (e.g., baking soda and vinegar; light stick mass before, during, and after reaction) <p>Co₂ reaction solution (chemical) chemical heat (thermal) energy energy compound phenomenon / soluble pH phenomena insoluble state of matter</p>	<p>Physical Science</p> <ul style="list-style-type: none"> Chapter 2, Section1, pg. 44-61 Chapter 2, Section 4, pg. 64-69 Chapter 5, Section1, pg. 142-149 Chapter 5, Section2, pg. 152-156 	
1.3.4	*		
1.3.5	*		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
1.3 Changes: Understand how interactions within and among systems cause changes in matter and energy, <i>continued</i>			
1.3.6	<p>Analyze the relationship between weather and climate and how ocean currents and global atmospheric circulation affect weather and climate W</p> <ul style="list-style-type: none"> • Compare weather and climate • Explain the effect of the water cycle on weather (e.g., cloud formation, storms) • Explain how ocean currents influence the atmosphere in terms of weather and climate • Explain the causes of atmospheric circulation and oceanic currents (e.g., prevailing winds are the result of hot tropical regions, cold polar regions, and earth's spin) <p>* Continues to be taught in 8th grade until the 2007-2008 school year at which time it will be part of the 6th grade curriculum</p>		
1.3.7	<p>Understand the effects of the regular and predictable motions of planets and moons in the solar system W</p> <ul style="list-style-type: none"> • Describe the causes of seasonal changes on earth and other planets (i.e., earth's tilt causes different parts of earth to point toward the sun at different times of the year) • Describe the effects of the position of the sun and moon on earth phenomena (i.e., moon phases, solar and lunar eclipses, shadows on earth, tides) • Describe how the spin of earth and other planets accounts for the length of a day on those planets • Describe how earth's and other planets' orbits around the sun account for the length of a year on those planets <p>atmosphere lunar telescope sphere phases of the moon magnetic pole eclipse radiation magnetism solar system subsystem Heat (thermal) evolution relative position energy)</p>	<p>Earth Science</p> <ul style="list-style-type: none"> • Chapter 19, Section 1, pg. 634-643 • Chapter 19, Section 2, pg. 646-651 	

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
1.3 Changes: Understand how interactions within and among systems cause changes in matter and energy, <i>continued</i>			
1.3.8	*		
1.3.9	*		
1.3.10	*		

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2. Inquiry: The student knows and applies the skills, processes, and nature of scientific inquiry.
(Essential Academic Learning Requirement)

Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
2.1 Investigating systems: Develop the knowledge and skills necessary to do scientific inquiry			
2.1.1	Understand how to generate a question that can be answered through scientific investigation W <ul style="list-style-type: none"> • Generate multiple questions based on observations • Generate a question that can be investigated scientifically • Generate a new question that can be investigated with the same materials and/or data as a given investigation 		
2.1.2	Understand how to plan and conduct scientific investigations W <ul style="list-style-type: none"> • Make predictions (hypothesize) and give reasons • Generate a logical plan for, and conduct, a scientific controlled investigation with the following attributes: <ul style="list-style-type: none"> √ Prediction (hypothesis) √ Appropriate materials, tools, and available computer technology √ Controlled variables (kept the same) √ One manipulated (changed) variable √ Responding (dependent) variable √ Gather, record, and organize data using appropriate units, charts, and/or graphs √ Multiple trials • Generate a logical plan for a simple field investigation with the following attributes: <ul style="list-style-type: none"> √ Identify multiple variables √ Select observable or measurable variables related to the investigative question • Identify and explain safety requirements that would be needed in the investigation 		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
2.1 Investigating systems: Develop the knowledge and skills necessary to do scientific inquiry, <i>continued</i>			
2.1.3	<p>Apply understanding of how to construct a scientific explanation using evidence and inferential logic W</p> <ul style="list-style-type: none"> • Generate a scientific conclusion including supporting data from an investigation using inferential logic (e.g., chewing gum loses more mass than bubble gum after being chewed for 5 minutes; chewing gum lost 2.00 grams while bubble gum only lost 1.47 grams) • Describe a reason for a given conclusion using evidence from an investigation • Generate a scientific explanation of an observed phenomenon using given data • Predict what logically might occur if an investigation lasted longer or changed • Describe the difference between evidence (data) and conclusions 		
2.1.4	<p>Analyze how models are used to investigate objects, systems, and processes W</p> <ul style="list-style-type: none"> • Compare models or computer simulations of phenomena • Explain how models or computer simulations are used to investigate and predict the behavior of objects, events, systems, or processes • Create a model or computer simulation to investigate and predict the behavior of objects, events, systems, or processes (e.g., phases of the moon using a solar system model) • Explain the advantages and limitations of investigating with a model 		
2.1.5	<p>Apply understanding of how to report investigations and explanations of objects, events, systems, and processes W</p> <ul style="list-style-type: none"> • Report observations of scientific investigations without making inferences • Summarize an investigation by describing: <ul style="list-style-type: none"> √ Reasons for selecting the investigative plan √ Materials used in the investigation √ Observations, data, results √ Explanations and conclusions in written, mathematical, oral, and information technology presentation formats √ Ramifications of investigations √ Safety procedures used • Describe the difference between an objective summary of data and an inference made from data 		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
2.2 Nature of science: Understand the nature of scientific inquiry			
2.2.1	Apply curiosity, honesty, skepticism, and openness when considering explanations and conducting investigations W <ul style="list-style-type: none"> • Explain why an honest response to questionable results, conclusions, or explanations is important to the scientific enterprise • Describe a flaw in a claim or a conclusion (i.e., limited data, flawed procedure, or overgeneralization) • Describe how scientists accurately and honestly record, report, and share observations and measurements without bias • Explain why honest acknowledgement of the contributions of others and information sources are necessary 		
2.2.2	Understand that scientific theories explain facts using inferential logic W <ul style="list-style-type: none"> • Describe how a principle or theory logically explains a given set of facts • Describe how new facts or evidence may result in the modification or rejection of a theory (e.g., caloric theory of heat, theory of acquired characteristics) 		
2.2.3	Analyze inconsistent results from scientific investigations to determine how the results can be explained W <ul style="list-style-type: none"> • Compare two or more similar investigations and explain why different results were produced (e.g., insufficient data could be interpreted as inconsistent results) • Explain whether sufficient information has been obtained to make a conclusion • Explain why the results from a single investigation or demonstration are not sufficient to describe a phenomenon 		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
2.2 Nature of science: Understand the nature of scientific inquiry, <i>continued</i>			
2.2.4	<p>Understand how to make the results of scientific investigations reliable and how to make the methods of investigation valid W</p> <ul style="list-style-type: none"> • Describe how the method of an investigation ensures reliable results (e.g., multiple trials ensure more reliable results) • Describe how to increase the reliability of the results of an investigation (e.g., repeating an investigation exactly the same way increases the reliability of the results) • Describe how the method of an investigation is valid (i.e., validity means that the investigation answered the investigative question with confidence; the manipulated variable caused the change in the responding or dependent variable) • Describe the purpose of the steps and materials of an investigation's procedure in terms of the validity of the investigation • Modify an investigation to improve the validity of the investigation and explain how the modifications improved the validity (e.g., more controlled variables, more accurate measuring techniques, greater sample size) 		
2.2.5	<p>Understand that increased comprehension of systems leads to new inquiry W</p> <ul style="list-style-type: none"> • Describe how scientific inquiry results in new facts, evidence, unexpected findings, ideas, and explanations • Describe how results of scientific inquiry may change our understanding of the systems of the natural and constructed world • Describe how increased understanding of systems leads to new questions to be investigated • Describe how new ideas need repeated inquiries before acceptance • Describe how new investigative questions arise at the completion of scientific inquiry 		

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3. Application: The student knows and applies science concepts and skills to develop solutions to human problems in societal contexts. (Essential Academic Learning Requirement)

Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
3.1 Designing solutions: Apply knowledge and skills of science and technology to design solutions to human problems or meet challenges			
3.1.1	<p>Analyze common problems or challenges in which scientific design can be or has been used to design solutions W</p> <ul style="list-style-type: none"> • Describe how science and technology could be used to solve all or part of a human problem and vice versa (e.g., understanding erosion can be used to solve some flooding problems) • Describe the scientific concept, principle, or process used in a solution to a human problem (e.g., understanding of the relationship between electricity and magnetism has been used to make electric motors and generators) • Explain how to scientifically gather information to develop a solution (e.g., collect data by measuring all the factors and establish which are the most important to solve the problem) • Describe an appropriate question that could lead to a possible solution to a problem 		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
3.1 Designing solutions: Apply knowledge and skills of science and technology to design solutions to human problems or meet challenges, <i>continued</i>			
3.1.2	<p>Apply the scientific design process to develop and implement solutions to problems or challenges W</p> <ul style="list-style-type: none"> • Propose, implement, and document a scientific design process used to solve a problem or challenge <ul style="list-style-type: none"> √ Define the problem √ Scientifically gather information and collect measurable data √ Explore ideas √ Make a plan √ List steps to do the plan √ Scientifically test solution √ Document the scientific design process • Explain possible solutions to the problem (e.g., use pulleys instead of levers to lift a heavy object) • Explain the reason(s) for the effectiveness of a solution to a problem or challenge 		
3.1.3	<p>Analyze multiple solutions to a problem or challenge</p> <ul style="list-style-type: none"> • Describe the criteria to evaluate an acceptable solution to the problem or challenge • Describe the reason(s) for the effectiveness of a solution to a problem or challenge using scientific concepts and principles • Describe the consequences of the solution to the problem or challenge (e.g., using rocks on the edge of a stream to prevent erosion may destroy habitat) • Describe how to change a system to solve a problem or improve a solution to a problem • Compare the effectiveness of different solutions to a problem or challenge based on criteria, using scientific concepts and principles 		

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Benchmark 1 Eighth Grade	A Peninsula Eighth Grade Student will: from the Grade Level Expectations (GLEs)	Instructional Materials and Resources	Assessment Strategies and Resources
3.2 Science, Technology, and Society: Analyze how science and technology are human endeavors, interrelated to each other, society, the workplace, and the environment			
3.2.1	Analyze how science and technology have been developed, used, and affected by many diverse individuals, cultures, and societies throughout human history <ul style="list-style-type: none"> • Explain how the contributions of diverse individuals have led to the development of science and technology • Explain how science and technology have affected individuals, cultures, and societies throughout human history 		
3.2.2	Analyze scientific inquiry and scientific design and understand how science supports technological development and vice versa <ul style="list-style-type: none"> • Describe how scientific investigations and scientific research support technology (e.g., investigation into materials led to Gore-tex and Kevlar) • Describe how technology supports scientific investigations and research (e.g., microscopes led to the discovery of unicellular organisms) • Describe how a scientifically designed solution to a human problem can lead to new tools that generate further inquiry (e.g., microscopes, telescopes, and computers) • Compare the processes of scientific inquiry and scientific design in terms of activities, results, and/or influence on individuals and/or society 		

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3.2 Science, Technology, and Society: Analyze how science and technology are human endeavors, interrelated to each other, society, \ the workplace, and the environment, <i>continued</i>			
3.2.3	Analyze the use of science, mathematics, and technology within occupational/career areas of interest <ul style="list-style-type: none"> • Examine scientific, mathematical, and technological knowledge and skills used in an occupation/career • Research occupations/careers that require knowledge of science, mathematics, and technology 		
3.2.4	Analyze how human societies' use of natural resources affects the quality of life and the health of ecosystems W <ul style="list-style-type: none"> • Discriminate between renewable and nonrenewable resources in an ecosystem • Explain the effects that the conservation of natural resources has on the quality of life and the health of ecosystems • Explain the effects of various human activities on the health of an ecosystem and/or the ability of organisms to survive in that ecosystem (e.g., consumption of natural resources; waste management; urban growth; land use decisions; pesticide, herbicide, or fertilizer use) 		