

Grade 4 Science Common Core Pacing Guide

Target Standard	“I Can” Statement	Vocabulary	Time Frame
Forms of Energy			
4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.	I can use evidence to explain how the speed and energy of an object are related.	Speed Energy Observation	Trimester 1
4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	I can observe how energy can be transferred from one place to another.	Light Heat electricity electric current	Trimester 1
4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.	I can ask questions and make predictions about what will happen when objects collide.	Collision prediction	Trimester 1
4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. *	I can build something that converts energy from one form to another.	Energy conversion Design Scientific evidence	Trimester 1
4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	I can find information to describe where energy and fuel come from and how their use affects the environment.	Hydroelectric energy Formation Evaluate Wind energy Solar energy	Trimester 2
Engineering Design			
3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	I can plan and conduct a well-designed investigation and use scientific skills to help me learn and problem solve like a scientist and an engineer. (summary) *I can define a simple design problem reflecting a need or a want. (3-5-ETS1-1) *I can generate and compare multiple possible solutions to a problem. (3-5-ETS1-2) *I can plan and carry out fair tests to identify parts of a model or prototype that can be improved. (3-5-ETS1-3)	Investigation Methods Observation Hypothesis Variable(s) -independent, dependent, controlled variable	Trimester 1, 2, 3
The 8 Scientific and Engineering Practices			
Scientists observe something they want to study and use scientific inquiry to plan and conduct their study. They use science process skills as tools to help them gather, organize, analyze, and present their information like an engineer does.	8 Practices 1-Asking questions (scientist) and defining problems (engineer): *Ask questions about what would happen if a variable is changed. *Identify testable and non-testable questions. *Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect. 2-Developing and using models:	Procedure Materials Test/experiment Reasonable Outcomes Models Solution(s) Data (gather and record) Argument from evidence: -Citing relevant evidenced and posing specific questions Conclusion	Trimester 1, 2, 3

	<p>*Build and revise simple models to represent, describe, or predict events and design solution.</p> <p>3-Planning and carrying out investigations:</p> <p>*Design and conduct investigations collaboratively that control variables and provide evidence, in the form of observations and/or data, to support explanations or design solutions.</p> <p>*Evaluate appropriate methods and/or tools for collecting data.</p> <p>4-Analyze and Interpret Data:</p> <p>*Participate in quantitative approaches to collecting data and conduct multiple trials of qualitative observations, in order to make sense of phenomena, as well as evaluate and refine design solutions.</p> <p>5- Use mathematics and computational thinking:</p> <p>*Decide if qualitative or quantitative data are best to determine whether a proposed object or tool meets criteria for success.</p> <ul style="list-style-type: none">• Create and/or use graphs and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem. <p>6-Constructing explanations (scientist) and designing solutions (engineer)</p> <p>*Identify and use appropriate evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.</p> <p>* Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.</p> <p>7-Engaging in argument from evidence</p> <p>*Construct, compare, and refine arguments based on an evaluation of the evidence and data presented</p> <ul style="list-style-type: none">• Respectfully provide and receive critiques from peers by citing relevant evidence and posing specific questions. <p>8-Obtaining, evaluating, and communicating information</p> <p>*Evaluate the merit and accuracy of ideas and methods.</p> <ul style="list-style-type: none">• Read and comprehend grade-appropriate complex texts and/or other reliable media in order to obtain and combine information from books and/or other reliable media to form written and/or oral explanations of phenomena or solutions to a design problem. <p>Source: NGSS Appendix F (2013)-Science and Engineering Practices</p>		
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Assessments/Projects Observation notes Ramp investigation Science journal Domino investigation Circuits Data graphing		Resources Brainpop Informational texts	
Waves: Waves and Information			
4-PS4-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	I can use waves to move an object.	Wave Amplitude Wavelength Crest Trough Mechanical wave Sound Vibration pitch	Trimester 1
4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information. *	I can come up with multiple solutions that use patterns to transfer information. I can compare my solutions	Morse Code transmit	Trimester 1
Engineering Design 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. 3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	I can plan and conduct a well-designed investigation and use scientific skills to help me learn and problem solve like a scientist and an engineer. (summary) *I can define a simple design problem reflecting a need or a want. (3-5-ETS1-1) *I can generate and compare multiple possible solutions to a problem. (3-5-ETS1-2) *I can plan and carry out fair tests to identify parts of a model or prototype that can be improved. (3-5-ETS1-3)	Investigation Methods Observation Hypothesis Variable(s) -independent, dependent, controlled variable	Trimester 1, 2, 3
The 8 Scientific and Engineering Practices Scientists observe something they want to study and use scientific inquiry to plan and conduct their study. They use science process skills as tools to help them gather, organize, analyze, and present their information like an engineer does.	8 Practices 1-Asking questions (scientist) and defining problems (engineer): *Ask questions about what would happen if a variable is changed. *Identify testable and non-testable questions. *Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect. 2-Developing and using models:	Procedure Materials Test/experiment Reasonable Outcomes Models Solution(s) Data (gather and record) Argument from evidence: -Citing relevant evidenced and posing specific questions Conclusion	Trimester 1, 2, 3

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Assessments/Projects/Experiments Science journal Observation notes Morse Code Bead Necklace Morse Code Name Tags Tin Can Phone Experiment Hanger Experiment Ruler/Rubber Band Experiment Water/Marble experiment		Resources Informational Texts Readworks.org Boyslife.com (code games) Bill Nye PBSkids.org Readinga-z United streaming Nrich.maths.org	
Earth's Systems: Processes that Shape the Earth			
4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. ** 4-ESS1-1 MI Identify evidence from patterns in rock formations and fossils in rock layers to support possible explanations of Michigan's geological changes over time.	I can find evidence from patterns in rock formations and fossils to explain changes in a landscape over time. I can find information to describe where energy and fuel come from and how their use affects the environment.	Landscape Fossil Canyon Research Marine science shells	Trimester 2
4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation**	I can observe and/or measure the effects of weathering and the rate of erosion.	Measurements Map Erosion Wind erosion Water erosion Ice erosion Glacier Topographic map	Trimester 2
4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.	I can use maps to talk about Earth's features.	Interpret data Analyze data	Trimester 2
4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. * ** 4-ESS3-2 MI Generate and compare multiple solutions to reduce the impacts of natural Earth processes on Michigan's people and places.	I can come up with solutions to reduce the impacts of Earth processes on humans.	Fossil fuel Renewable energy Solar panel Wind turbine Natural disaster Earth's processes Air pollution	Trimester 2
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Structure, Function, and Information Processing			
4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	I can build a model to show how light allows objects to be seen.	Model reflect	Trimester 3
4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	I can prove that the structures of plants and animals support survival, growth, behavior, and reproduction.	Survival Growth Reproduction Internal structures External structure	Trimester 3
4-LS1-2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	I can show and explain how animals receive, process, and respond to information.	senses	Trimester 3
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Assessments/Projects Observation notes Science journal Light model Diagrams Human body cutout		Resources Informational texts United streaming	