

Grade 4 Science

Understands and is able to apply core ideas to make sense of science phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1 & S2	Student demonstrates limited progress towards understanding and applying core ideas related to physical science, life science, and earth/space science to make sense of phenomena.	Student demonstrates progress towards understanding and applying core ideas related to physical science, life science, and earth/space science to make sense of phenomena.	Student demonstrates an understanding and application of core ideas related to physical science, life science, and earth/space science to make sense of phenomena. 3* Student is consistently and independently able to apply their understanding of core ideas in science to demonstrate a deeper understanding of phenomena.
<i>Evidence</i>	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
<i>What to look for</i>	Students' evidence of core ideas (foundational science knowledge) span across three units of study: 4-PS3A.1: The faster a given object is moving, the more energy it possesses. (4-PS3-1) 4-PS3A.2: Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) 4-PS3B.1: Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2), (4-PS3-3) 4-PS3B.2: Light also transfers energy from place to place. (4-PS3-2) 4-PS3B.3: Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2), (4-PS3-4)		

4-PS3C.1: When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)

4-PS3D.1: The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)

4-PS4A.1: Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach.

4-PS4A.2: Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

4-PS4B.1: An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)

4-PS4C.1: Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)

4-LS1A.1: Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

4-LS1D.1: Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)

4-ESS1C.1: Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

4-ESS2A.1: Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

4-ESS2B.1: The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)

4-ESS2E.1: Living things affect the physical characteristics of their regions. (4-ESS2-1)

4-ESS3A.1: Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)

(3,4)-ESS3B.1: A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1), (4-ESS3-2)

Understands and is able to apply crosscutting concepts to make sense of science phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1 & S2	Student demonstrates limited progress towards understanding and applying crosscutting concepts to make sense of science phenomena.	Student demonstrates progress towards understanding and applying crosscutting concepts to make sense of science phenomena.	Student demonstrates an understanding and application of crosscutting concepts to make sense of science phenomena. 3* Student is consistently and independently able to apply their understanding of crosscutting concepts to demonstrate a deeper understanding of science phenomena.
Evidence	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
What to look for	Students demonstrate a working knowledge about the following elements of crosscutting concepts: (While these elements are relevant across all units, each unit brings to focus a couple crosscutting concepts.) PATTERNS: (1) Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products. (2) Patterns of change can be used to make predictions. (3) Patterns can be used as evidence to support an explanation. CAUSE AND EFFECT: (1) Cause and effect relationships are routinely identified, tested, and used to explain change. (2) Events that occur together with regularity might or might not be a cause and effect relationship. SCALE, PROPORTION AND QUANTITY: (1) Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods. (2) Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. SYSTEMS AND SYSTEM MODELS: (1) A system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. (2) A system can be described in terms of its components and their interactions. ENERGY AND MATTER: (1) Matter is made of particles. (2) Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight of the substances does not change. This is what is meant by conservation of matter. Matter is		

	transported into, out of, and within systems. (3) Energy can be transferred in various ways and between objects. STRUCTURE AND FUNCTION: (1) Different materials have different substructures, which can sometimes be observed. (2) Substructures have shapes and parts that serve functions. STABILITY AND CHANGE: (1) Change is measured in terms of differences over time and may occur at different rates. (2) Some systems appear stable, but over long periods of time will eventually change.
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Understands and is able to apply practices to gather data and information about science phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1 & S2	Student demonstrates limited progress towards an understanding and application of asking questions, planning and carrying out investigations, obtaining and evaluating information, analyzing data, and using math to gather data and information about science phenomena.	Student demonstrates progress towards an understanding and application of asking questions, planning and carrying out investigations, obtaining and evaluating information, analyzing data, and using math to gather data and information about science phenomena.	Student demonstrates an understanding and application of asking questions, planning and carrying out investigations, obtaining and evaluating information, analyzing data, and using math to gather data and information about science phenomena. 3* Student is consistently and independently able to apply their understanding of science practices (noted above) to demonstrate a deeper understanding of gathering data and information about phenomena.
Evidence	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
What to look for	Students interact with the elements of the <i>practices</i> in the following ways: -Ask questions about what would happen if a variable is changed. -Identify scientific (testable) and non-scientific (non-testable) questions. -Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. -Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. -Evaluate appropriate methods and/or tools for collecting data. -Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence. -Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices. -Combine information in written text with that contained in corresponding tables, diagrams, and/or charts to support the engagement in other scientific and/or engineering practices. -Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.		

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| | <ul style="list-style-type: none">-Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.-Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.-Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.-Organize simple data sets to reveal patterns that suggest relationships.-Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems. |
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Understands and is able to apply practices to make sense of science phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1 & S2	Student demonstrates limited progress towards an understanding and application of analyzing data, developing and using models, constructing explanations, and engaging in argument from evidence to make sense of science phenomena.	Student demonstrates progress towards an understanding and application of analyzing data, developing and using models, constructing explanations, and engaging in argument from evidence to make sense of science phenomena.	Student demonstrates an understanding and application of analyzing data, developing and using models, constructing explanations, and engaging in argument from evidence to make sense of science phenomena. 3* Student is consistently and independently able to apply their understanding of science practices (noted above) to demonstrate a deeper understanding of making sense of science phenomena.
Evidence	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
What to look for	Students interact with the elements of the <i>practices</i> in the following ways: -Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships. -Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation. -Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings. -Identify limitations of models. -Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. -Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. -Develop and/or use models to describe and/or predict phenomena. -Construct an explanation of observed relationships (e.g., the distribution of plants in the backyard). -Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem. -Identify the evidence that supports particular points in an explanation. -Compare and refine arguments based on an evaluation of the evidence presented. -Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation.		

	-Respectfully provide and receive critiques from peers about a proposed procedure, explanation or model.by citing relevant evidence and posing specific questions. -Construct and/or support an argument with evidence, data, and/or a model. -Use data to evaluate claims about cause and effect.
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Understands and is able to apply practices to communicate explanations of science phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1 & S2	Student demonstrates limited progress towards an understanding and application of communicating information, constructing explanations, using models, and engaging in argument from evidence to communicate explanations of science phenomena.	Student demonstrates progress towards an understanding and application of communicating information, constructing explanations, using models, and engaging in argument from evidence to communicate explanations of science phenomena.	Student demonstrates an understanding and application of communicating information, constructing explanations, using models, and engaging in argument from evidence to communicate explanations of science phenomena. 3* Student is consistently and independently able to apply their understanding of science practices (noted above) to demonstrate a deeper understanding of communicating explanations of phenomena.
Evidence	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
What to look for	<i>Students interact with the elements of the practices in the following ways:</i> -Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts. -Construct an explanation of observed relationships (e.g., the distribution of plants in the backyard). -Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem. -Identify the evidence that supports particular points in an explanation. -Identify limitations of models. -Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. -Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. -Develop and/or use models to describe and/or predict phenomena. -Compare and refine arguments based on an evaluation of the evidence presented. -Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation. -Respectfully provide and receive critiques from peers about a proposed procedure, explanation or model.by citing relevant evidence and posing specific questions. -Construct and/or support an argument with evidence, data, and/or a model. -Use data to evaluate claims about cause and effect.		

Understands and is able to define problems and design solutions for engineering phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1 & S2	Student demonstrates limited progress towards defining problems and designing solutions for engineering phenomena.	Student demonstrates progress towards defining problems and designing solutions for engineering phenomena.	Student demonstrates an understanding and application of defining problems and designing solutions for engineering phenomena. 3* Student is consistently and independently able to apply their understanding of defining problems and designing solutions to demonstrate a deeper understanding of engineering phenomena.
Evidence	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
What to look for	These are the engineering design core ideas students should understand and apply: (3-5)-ETS1A.1: Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1), (secondary to 4-PS3-4) (3-5)-ETS1B.1: Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2) (3-5)-ETS1B.2: At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) (3-5)-ETS1B.3: Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) (3-5)-ETS1B.4: Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)		

(3-5)-ETS1C.1: Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3), (secondary to 4-PS4-3)

Students interact with the elements of the *practices* in the following ways:

- Use prior knowledge to describe problems that can be solved.
- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
- Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Make predictions about what would happen if a variable changes.
- Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.
- Analyze data to refine a problem statement or the design of a proposed object, tool, or process.
- Use data to evaluate and refine design solutions.
- Create and/or use graphs and/or charts generated from simple algorithms to compare alternative solutions to an engineering problem.
- Apply scientific ideas to solve design problems.
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.

Revised for 26-27

Understands and is able to apply core ideas to make sense of science phenomena			
Semester	Not Yet Meeting 1	Developing 2	Meeting 3
S1	Student demonstrates limited progress towards understanding and applying core ideas related to physical science (unit 1) to make sense of phenomena.	Student demonstrates progress towards understanding and applying core ideas related to physical science (unit 1) to make sense of phenomena.	Student demonstrates an understanding and application of core ideas related to physical science (unit 1) to make sense of phenomena. 3* Student is consistently and independently able to apply their understanding of core ideas in

			science to demonstrate a deeper understanding of phenomena.
S2	Student demonstrates limited progress towards understanding and applying core ideas related to life science and earth/space science (units 2&3) to make sense of phenomena.	Student demonstrates progress towards understanding and applying core ideas related to life science and earth/space science (units 2&3) to make sense of phenomena.	Student demonstrates an understanding and application of core ideas related to life science and earth/space science (units 2&3) to make sense of phenomena. 3* Student is consistently and independently able to apply their understanding of core ideas in science to demonstrate a deeper understanding of phenomena.
<i>Evidence</i>	Evidence may include ongoing informal assessment of 3D performance tasks provided during instruction (<i>observation of student participation, group work samples</i>), formal 3D assessments at the end of investigations (<i>individual student work samples</i>), and 3D summative assessments at the end of a unit.		
<i>What to look for</i>	<i>Students' evidence of core ideas (foundational science knowledge) span across three units of study:</i> 4-PS3A.1: The faster a given object is moving, the more energy it possesses. (4-PS3-1) (Unit 1) 4-PS3A.2: Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) (Unit 1) 4-PS3B.1: Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2), (4-PS3-3) (Unit 1) 4-PS3B.2: Light also transfers energy from place to place. (4-PS3-2) (Unit 1) 4-PS3B.3: Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2), (4-PS3-4) (Unit 1) 4-PS3C.1: When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3) (Unit 1) 4-PS3D.1: The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4) (Unit 1)		

4-PS4A.1: Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach.

4-PS4A.2: Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) **(Unit 1)**

4-PS4B.1: An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) **(Unit 1)**

4-PS4C.1: Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3) **(Unit 1)**

4-LS1A.1: Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) **(Unit 3)**

4-LS1D.1: Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2) **(Unit 3)**

4-ESS1C.1: Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1) **(Unit 2)**

4-ESS2A.1: Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1) **(Unit 2)**

4-ESS2B.1: The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2) **(Unit 2)**

4-ESS2E.1: Living things affect the physical characteristics of their regions. (4-ESS2-1) **(Unit 2)**

4-ESS3A.1: Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1) **(Unit 2)**

(3,4)-ESS3B.1: A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1), (4-ESS3-2) **(Unit 2)**