Teacher's Edition

Grade 5 • Unit 3

Inspire Science

Earth's Interactive Systems

Mc Graw Hill Education

Performance Expectations at a Glance

In this unit, students will discover and practice the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts needed to perform the following Performance Expectations.

Performance Expectations	MODULE: **Earth's Water System**	MODULE: **Earth's Other Systems**
5-ESS2-1	●	●
5-ESS2-2	●	
5-ESS3-1	●	●
3–5-ETS1-1	●	●
3–5-ETS1-2	●	●
3–5-ETS1-3	●	●

Correlations by Module to the NGSS

MODULE: Earth's Water System

5-ESS2	Earth's Systems	
5-ESS2-1	**Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** *[Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]*	3, 4, 7, 11, 13, *14–15*, 26, 27, *28*, 29, *30–31*, 33, 34, 35, 36, 37, 39, *40–41*, 42–43, *44*, 45, 46–47, 49, 50, 51, 52, 53–58

SEP Science and Engineering Practices

Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model using an example to describe a scientific principle. (5-ESS2-1)	12, 13, *14–15*, 20, *40–41*, *44*, 46–47, 53–58

Inquiry activities are in Italics.

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DCI Disciplinary Core Ideas	
ESS2.A: Earth Materials and Systems • Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)	3, 4, 5, 7, *15*, 21, *24–25*, 26, 27, *28*, 29, *30–31*, 33, 34–36, 37, 39, *40–41*, 42–43, *44*, 45, 46–47, 48, 50–52, 53–58, 59 Teacher's Edition *only*: 2, 6
CCC Crosscutting Concepts	
Systems and System Models • A system can be described in terms of its components and their interactions. (5-ESS2-1)	4, 5, 12, 13, 18–19, 21, 26, 27, *28*, 29, *30–31*, 33, 34–36, 37, 39, *40–41*, 42–43, 44, 45–47, 48, 50–52, 53–58, 59

5-ESS2	Earth's Systems	
5-ESS2-2	**Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.** *[Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]*	*8–10*, 11, *14–15*, 18, 19, 20

SEP Science and Engineering Practices	
Using Mathematics and Computational Thinking Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. • Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)	*8–10*, 11, 12, 13, *14–15*, 18–19, 20 Teacher's Edition *only*: 57
DCI Disciplinary Core Ideas	
ESS2.C: The Roles of Water in Earth's Surface Processes • Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)	*8–10*, 11, 12, 13, *14–15*, 18–20
CCC Crosscutting Concepts	
Scale, Proportion, and Quantity • Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)	*40*, *44*, 48 Teacher's Edition *only*: 57

Inquiry activities are in Italics.

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5-ESS3	Earth and Human Activity	
5-ESS3-1	**Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**	16, 17, 26, 27, 29, *30–31*, 33, 34–36, 49, 53–58, 59
SEP Science and Engineering Practices		
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)		*8–10*, *14–15*, 18, *30–31*, 33, 34, 46–47, 50, 51, 52, 59
DCI Disciplinary Core Ideas		
ESS3.C: Human Impacts on Earth Systems • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)		16–17, 21, 22–23, *24–25*, 26, 27, *28*, 29, *30–31*, 32, 33, 34–35, 36, 49, 53–58, 59
CCC Crosscutting Concepts		
Systems and System Models • A system can be described in terms of its components and their interactions. (5-ESS3-1)		4, 5, 12, 13, 18–19, 21, 26, 27, 28, 29, *30–31*, 33, 34–36, 37, 39, *40–41*, 42–43, 44, 45–47, 48, 50–52, 53–58, 59

3–5-ETS1	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.**	4, 53–58
SEP Science and Engineering Practices		
Asking Questions and Defining Problems Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • 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. (3-5-ETS1-1) Obtaining, Evaluating, and Communicating Information		4, 53–58
DCI Disciplinary Core Ideas		
ETS1.A: Defining and Delimiting Engineering Problems • 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)		4, 53–58

Inquiry activities are in Italics.

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CCC Crosscutting Concepts	
Influence of Engineering, Technology, and Science on Society and the Natural World • People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)	4, 53–58

3–5-ETS1	Engineering Design	
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.**	*24–25*, 29 Teacher's Edition *only*: 58
SEP Science and Engineering Practices		
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)		4, 21, *30–31*, 33, 34, 36, 37, *44*, 50, 51, 52, 53–58, 59
DCI Disciplinary Core Ideas		
ETS1.B: Developing Possible Solutions • 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) • 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)		4, *24–25*, 53–58
CCC Crosscutting Concepts		
Influence of Engineering, Technology, and Science on Society and the Natural World • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS-2)		4, 49, 53–58

3–5-ETS1	Engineering Design	
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.**	*24–25*, *40–41*, 44, 53–58

Inquiry activities are in Italics.

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SEP Science and Engineering Practices	
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • 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. (3-5-ETS1-3)	*8–10*, 12, *14–15*, *24–25*, 27, *28*, *30–31*, *40–41*, 44, 53–58
DCI Disciplinary Core Ideas	
ETS1.B: Developing Possible Solutions • 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)	*24–25*, *44*, 53–58
CCSS Math Connections	
5.MD.A.1	8–10, *14–15*, 48
5.MD.5b	Teacher's Edition *only*: 57
6.RP.3	*10*, *14–15*, Teacher's Edition *only*: *42*, *48*
5.NF.2	*8-10*, *14–15*
ELD Connections	
ELD.PI.5.1	Teacher's Edition *only*: 11, 32, 34, 49, 50
ELD.PI.5.6	Teacher's Edition *only*: 55
CCSS ELA/Literacy Connections	
SL.5.1	21
SL.5.4	17, *30–31*
SL.5.5	*30–31*
ALSO INTEGRATES:	
CCC Cause and Effect	15, 30, 41
ELA W.5.8	11, 47
ELA L.5.4	12, 13, 26, 27, 29, 42, 45, Teacher's Edition *only*: 10, 22, 53, 57

Inquiry activities are in Italics.

Continued from previous page.

MODULE: Earth's Other Systems

5-ESS2	Earth's Systems	
5-ESS2-1	**Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** *[Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]*	62, *66–68*, 69, *76–77*, *86–87*, 100, *104–105*, 108, 115–118

SEP Science and Engineering Practices

Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model using an example to describe a scientific principle. (5-ESS2-1)	62, *66–68*, 69, *76–77*, *86–87*, 100, *104–105*, 108, 115–118

DCI Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems • Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)	63, *66–68*, 69, 70, 71, 72, 73, 74, 75, *76–77*, 80–81, 83, *86–87*, 88–89, 90–91, 92–93, *94–95*, *97*, 98–99, 101, *104–105*, 106, 107, *108*, 109, *110*, 112–113, 114, 115–118

5-ESS3	Earth and Human Activity	
5-ESS3-1	**Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**	101, 103, *104–105*, 106, 107, *108*, *110*, 112–114, 115–118, 119

SEP Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)	69, 74, 78, 80–82, 92–93, *94–95*, 96, 97, 98–100, *104–105*, 106, *108*, 109, *110*, 112–114, 115–118, 119

Inquiry activities are in Italics.

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DCI Disciplinary Core Ideas	
ESS3.C: Human Impacts on Earth Systems • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)	62, *76–77*, *104–105*, 106, 107, 108, 109, *110*, 112–114
CCC Crosscutting Concepts	
Systems and System Models • A system can be described in terms of its components and their interactions. (5-ESS3-1)	63, *66–68*, 69, 70, 80, 81, 83, 88–89, 90–91, 92–93, *94–95*, *97*, 98, 99, 100, 109, *110*, 112, 113, 115–118
Connections to Nature of Science **Science Addresses Questions About the Natural and Material World.** • Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)	Teacher's Edition *only*: 109

3–5-ETS1	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.**	*110*, 115–118
SEP Science and Engineering Practices		
Asking Questions and Defining Problems Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • 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. (3-5-ETS1-1)		62, 82, 109, 110, 114, 115–118
DCI Disciplinary Core Ideas		
ETS1.A: Defining and Delimiting Engineering Problems • 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)		115–118

Inquiry activities are in Italics.

3–5-ETS1	Engineering Design	
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.**	110 Teacher's Edition *only*: 118
SEP Science and Engineering Practices		
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)		63, 66–68, 69, *76–77*, 78, 80, 81, 83, 92–93, *94–95*, *97*, 98, 99, 100, 101, *104–105*, 108, *110*, 112
DCI Disciplinary Core Ideas		
ETS1.B: Developing Possible Solutions • 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) • 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)		83, *110*, 115–118
CCC Crosscutting Concepts		
Influence of Engineering, Technology, and Science on Society and the Natural World • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3 -5-ETS-2)		62, 115–118

3–5-ETS1	Engineering Design	
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.**	66–68, 76–77, 83, 104–105, 115–118
SEP Science and Engineering Practices		
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • 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. (3-5-ETS1-3)		62, *66–68*, 69, *76–77*, *86–87*, *104–105*, *110*, 115–118

Inquiry activities are in Italics.

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DCI Disciplinary Core Ideas	
ETS1.B: Developing Possible Solutions • 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)	83, *110*, 115–118
ETS1.C: Optimizing the Design Solution • 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)	Teacher's Edition *only*: 118
CCSS Math Connections	
5.G.A.2	*76–77*
MP.2	*97*
MP.6	*76*
ELD Connections	
ELD.PI.5.1	Teacher's Edition *only*: 69, 78, 80, 98, 112, 117
ELD.PI.5.6	Teacher's Edition *only*: 92, 111
CCSS ELA/Literacy Connections	
SL.5.1	65, *92–93*
SL.5.4	*92–93*
ALSO INTEGRATES:	
SEP Using Mathematics and Computational Thinking	76–77, 108
CCC Cause and Effect	110
MP.4	Teacher's Edition *only*: 76
ELA L.5.4	70, 73, 74, 88, 89, 92, 106, 107, Teacher's Edition *only*: 71, 75, 84, 116, 117

Inquiry activities are in Italics.