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: **The Water Cycle**	Module: **Weather and Climate**
MS-ESS2-4	●	
MS-ESS2-5		●
MS-ESS2-6		●

Correlations by Module to the NGSS

MODULE: The Water Cycle

MS-ESS2	**Earth's Systems**	
MS-ESS2-4.	**Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.** [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [*Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.*]	39–42, 43
SEP Science and Engineering Practices		
Developing and Using Models* Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop a model to describe unobservable mechanisms. (MS-ESS2-4) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		10, 13, 15, 18, 20, 33, 39–42, 43
DCI Disciplinary Core Ideas		
ESS2.C: The Roles of Water in Earth's Surface Processes • Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4)		10, *11–12,* 13–15, *16–17,* 18–22, 28, *28,* 29–30, *30–31,* 33–35, *35,* 35A–35B, 36–38, 39–42, 43
• Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4)		*11–12,* 13–15, *16–17,* 18–21, 28, *28,* 29–30, *30–31,* 33–35, *35,* 36–37, 39–42, 43

Labs and investigations are in italics.

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CCC Crosscutting Concepts	
Energy and Matter • Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4)	*11–12,* 13–15, *16–17,* 18, 20–21, 28, 37, 39–42, 43

ALSO INTEGRATES:	
SEP Asking Questions and Defining Problems	43
SEP Developing and Using Models	25, *30–31, 35*
SEP Planning and Carrying Out Investigations	*16–17*, 39–42, 43
SEP Analyzing and Interpreting Data	*11–12, 16–17, 30–31, 35,* 39–42
SEP Constructing Explanations and Designing Solutions	8–9, *11–12, 16–17* , 26–27, *28, 30–31,* 35B, 43
SEP Obtaining, Evaluating, and Communicating Information	29, 32, 39–42
DCI ETS1.B: Developing Possible Solutions	22
DCI LS2.A: Interdependent Relationships in Ecosystems	34
DCI LS2.B: Cycle of Matter and Energy Transfer in Ecosystems	14
DCI PS1.A: Structure and Properties of Matter	13, 18
DCI PS2.B: Types of Interactions	35
DCI PS3.A: Definitions of Energy	Lab *What happens to temperature during a phase change?* (online)
DCI PS3.D: Energy in Chemical Processes and Everyday Life	14
DCI PS4.B: Electromagnetic Radiation	19
CCC Cause and Effect	*11–12,* 29, 33
CCC Systems and System Models	10, 21–22
CCC Stability and Change	29
CCSS ELA RST.6–8.1	8–9, 26–27, 29
CCSS ELA RST.6–8.3	*11–12*
CCSS ELA RST.6 -8.10	19, 29, 32, 35A–35B
CCSS ELA SL.6.1	3, 29
CCSS ELA SL.8.5	39–42

MODULE: Weather and Climate

MS-ESS2	Earth's Systems	
MS-ESS2-5.	**Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.** [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [*Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations*.]	*119–123,* 155–160, 161

SEP Science and Engineering Practices	
Planning and Carrying Out Investigations Planning and carrying out investigations in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. • Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (MS-ESS2-5)	*119–123,* 155–160, 161

DCI Disciplinary Core Ideas	
ESS2.C: The Roles of Water in Earth's Surface Processes • The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS-ESS2-5)	*104–105, 106–107, 107–108,* 109, *111–112,* 112, *113–114,* 115, *116–117,* 118, *119–123,* 124, 126–128, *139–141,* 141–142, *143–144,* 145–146, *147–149,* 150, 151A–151B, 152–154, 155–160, 161
ESS2.D: Weather and Climate • Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5)	119, *119–123,* 124, 127–128, 155–160
CCC Crosscutting Concepts	
Cause and Effect* • Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5) * Other aspects of this CCC are integrated throughout this module and are listed in the *Also Integrates* section.	61–62, 70, *78, 80, 84–85, 113–114, 116–117,* 126–128, 146, 153–154, 155–160, Lab *Predicting Whale Sightings Based on Upwelling* (online)

Labs and investigations are in italics.

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CCSS ELA/Literacy Connections	
ELA RST.6–8.1	50–51, 74–75, 100–101, 109, 132–133, 146, Literacy Skill Handbook (online)
ELA RST.6–8.9	109, Literacy Skill Handbook (online)
ELA WHST.6–8.8	*104–105,* 109, *119–123*, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	*117*, Math Skill Handbook (online)
Math 6.NS.C.5	*117,* Math Skill Handbook (online)

MS-ESS2	**Earth's Systems**	
MS-ESS2-6.	**Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.** [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [*Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.*]	155–160, 161

SEP Science and Engineering Practices	
Developing and Using Models* Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop and use a model to describe phenomena. (MS-ESS2-6) * Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.	53, *54–55, 58–60,* 62, 77, *78, 84–85,* 86, 88, 142, 155–160, 161
DCI Disciplinary Core Ideas	
ESS2.C: The Roles of Water in Earth's Surface Processes • Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)	*84–85,* 86, 88, *92,* 92, 94, 161

Labs and investigations are in italics.

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ESS2.D: Weather and Climate • Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)	*54–55,* 55, *56–57,* 58, *58–60,* 60–62, *63–65,* 65–70, *78,* 79, *79, 80–81,* 81, 83, *89–90,* 91, *92,* 94–96, 104, *104–105, 106–107, 107–108,* 109, *110,* 111, *111–112,* 112, *113–114,* 115, *113–117,* 118, 126–128, *135–136,* 137, *139–141,* 141–142, *143–144,* 145–146, *147–149,* 150, *150*, 151, 152–154, 155–160, 161
• The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)	*56–57,* 58, *58–60,* 91, *92,* 96, *106–107, 107–108,* 128, *143–144,* 145–146, 151, 152–154, 155–160, 161
CCC Crosscutting Concepts	
Systems and System Models • Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6)	*52, 53, 54–55, 56–57,* 58–60, 68–69, 77, *78,* 81, *82,* 86, *87,* 88, 94–95, *106–107, 142*, 155–160
CCSS ELA/Literacy Connections	
ELA SL.8.5	155–160, Literacy Skill Handbook (online)

ALSO INTEGRATES:	
SEP Asking Questions and Defining Problems	161
SEP Developing and Using Models	*52, 56–57, 76–77, 82, 87, 106–107*
SEP Analyzing and Interpreting Data	49, *54–55, 56–57, 58–60, 63–65,* 69, *84–85, 89–90,* 91, 95, *106–107, 111–112, 113–117, 119–123,* 126–127, *135–136, 139–141, 143–144, 147–149, 150,* 151A–151B, 153
SEP Using Mathematics and Computational Thinking	*117*
SEP Constructing Explanations and Designing Solutions	50–51, *54–55,* 61–62, 66, 70, 74–75, *82, 84–85, 87, 89–90*, 96, 100–101, *113–114, 116–117, 119–123*, 124, 128, 132–133, *135–136, 139–141, 143–144, 147–149,* 151, 155–160, 161
SEP Obtaining, Evaluating, and Communicating Information	93, 109, *119–123,* 146, 152, 155–160
Connections to Nature of Science Scientific Investigations Use a Variety of Methods	67, 93, 125

Labs and investigations are in italics.

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DCI ETS1.C: Optimizing the Design Solution	155–160
DCI LS2.A: Interdependent Relationships in Ecosystems	141, 150
DCI LS2.B: Cycle of Matter and Energy Transfer in Ecosystems	65, 88, 150
DCI PS1.A: Structure and Properties of Matter	141
DCI PS3.B: Conservation of Energy and Energy Transfer	53, 60, 79, 88, 145
CCC Patterns	45, *79,* 83, 91, 92, 95, *107–108, 111–112, 119–123,* 134, *135–136,* 141, 146, *147–149, 150,* 155–160, 161
CCC Cause and Effect	*76–77,* 83, 86, *87,* 88, 94–96, *139–141,* 146, 161
CCC Energy and Matter	*52,* 53, *54–55,* 55, *56–57,* 58, *58–60,* 60, 61–62, *63–65,* 68–70, 78–79, *79,* 88, 91, 92, *92, 135–136,* 137, 141, *143–144,* 145, 150, 153, 155–160, 161
CCC Stability and Change	67, 109, 118, 146, Investigation *Local Reflectivity* (online)
Connections to Nature of Science Science is a Way of Knowing	81, 109
CCSS ELA RST.6–8.3	*54–55, 56–57, 58–60, 63–65, 84–85, 106–107, 119–123*
CCSS ELA SL.6.1	45, 67, 131, 146

Labs and investigations are in italics.