SAMPLE ITEMS

3–5 MAP Growth Science for use with Next Generation Science Standards

Test Purpose

The *MAP® Growth™ 3–5 Science for use with Next Generation Science Standards* (NGSS) assessment is a growth measure as students develop an understanding of the multidimensional NGSS Performance Expectations (PEs). The test does not provide a summative or diagnostic measure of a student's proficiency in the NGSS PEs or the dimensions of the PEs. The results can be used as a growth measure of student understanding of the NGSS as well as indications of students' strengths in the disciplinary instructional areas of the test. Taking this interim adaptive assessment allows students to gauge their growth throughout the school year and from year to year.

Multidimensional Items, Alignment, Learning Statements, and the Learning Continuum Report

The test includes multidimensional items that align to the NGSS dimensions: **Disciplinary Core Ideas (DCIs)**, **Science and Engineering Practices (SEPs)**, and **Crosscutting Concepts (CCCs)**. Some items are evidence of growth in the three dimensions of PEs appropriate for an elementary school interim test, and other items are evidence in growth in different combinations of the dimensions. All items provide measures of growth toward students' understanding of the **DCIs**, **SEPs**, and/or **CCCs** of NGSS. Over time, more and more of the item pool will include items aligned to all three dimensions of the NGSS PEs.

All items are rated for their alignment to the **DCIs**, **SEPs**, and **CCCs** as cited from *A Framework for K-12 Science Education* (2012 NRC). This process includes writing multidimensional Learning Statements before hand-aligning items to the NGSS PEs. These Learning Statements populate the Learning Continuum reports and give teachers information about how students are performing in the PEs and dimensions of the NGSS.

The information about sample items in this document is color-coded for the dimensions.

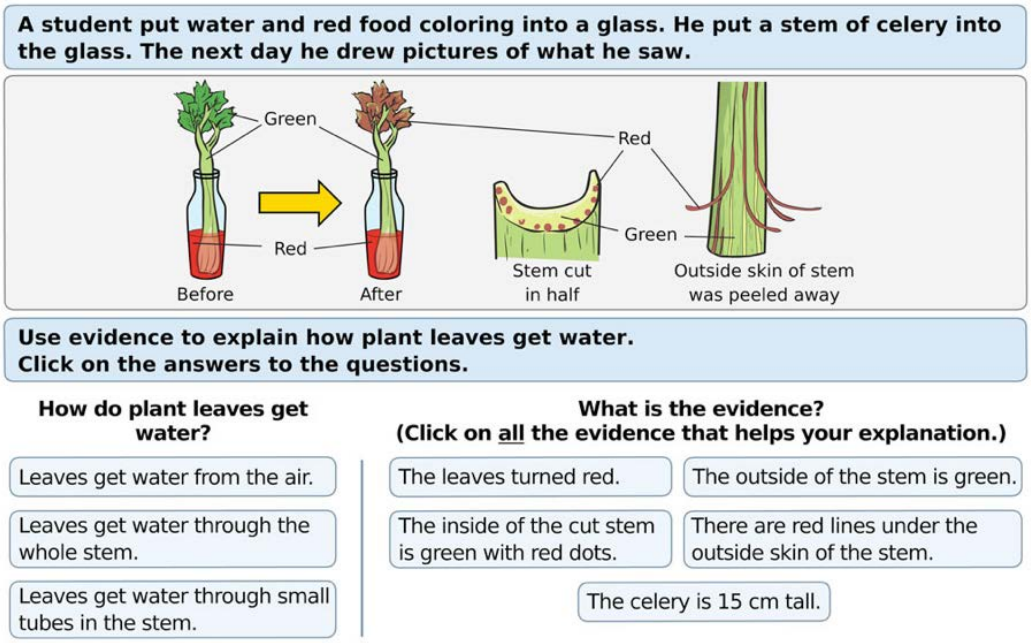
Test Blueprint

The blueprint for the *MAP Growth 3–5 Science for use with NGSS* has three Instructional Areas: Life Sciences, Physical Sciences, and Earth and Space Sciences—all with embedded Engineering Design. The subareas are derived from the **DCIs**. In this sample set, Heredity and Biological Evolution are combined into one subarea as are Energy and Waves. In the years to come, these combinations may change as more items calibrate, as more item types are developed, and as partners request different test structures. Some items in this set are aligned to selected middle school PEs. The inclusion of these related PEs in the 3–5 blueprint provides an extension of grades 3–5 core ideas and a means of assessing the growth of high-achieving students.

Instructional Area: Life Sciences

Subarea: From Molecules to Organisms: Structures and Processes

	DCI+	SEP**	CCC**
ALIGNS PE 4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.**	Structure and Function	Engaging in Argument from Evidence	Systems and System Models
NWEA Learning Statement: Develops an argument that internal structures of plants support the survival of plants **Item RIT:** 202 **Item DOK:** 2	Structure and Function	Engaging in Argument from Evidence	Systems and System Models



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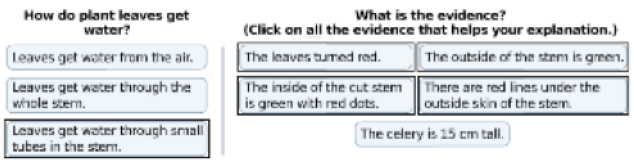


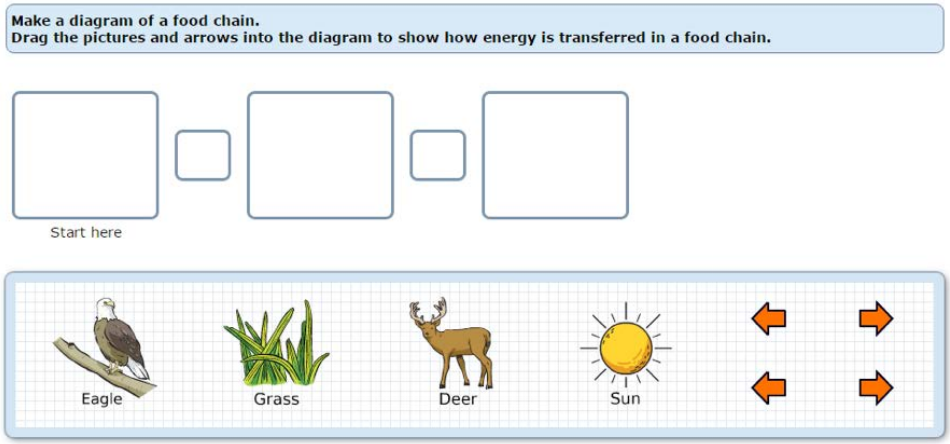
Narrative: The item provides evidence of students' growth in understanding the relationship between the functioning of internal and external structures of plants and animals and the functioning and survival of the organism as a whole. Students demonstrate their understanding by making a claim about how the internal structures of a plant system interact to provide the leaves with water. Students then support their claim with evidence. This item aligns to the three dimensions of this 4th grade PE. This is a difficult item for students as reflected by the high RIT. However, it is rated only a DOK 2 because students are performing a series of DOK 2 steps and not providing reasoning.

+ Washington State 2013 K–12 Science Learning Standards adopting the Next Generation Science Standards (2013).

Instructional Area: Life Sciences

Sub-area: Ecosystems: Interactions, Energy, and Dynamics

	DCI+	SEP**	CCC**
Aligns to PE MS-LS2-3: Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.** *Note: This is an example of a middle school PE included in the grades 3–5 test blueprint to provide an extension of grades 3–5 core ideas and a means of assessing the growth of high-achieving students.*	Cycle of Matter and Energy Transfer in Ecosystems	Developing and Using Models	Energy and Matter
Content is a progression from PE 5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.**	Cycle of Matter and Energy Transfer in Ecosystems	Developing and Using Models	Systems and System Models
NWEA Learning Statement: Develops models of food chains and food webs **Item RIT:** 200 **Item DOK:** 2	Cycle of Matter and Energy Transfer in Ecosystems	Developing and Using Models	Systems and System Models



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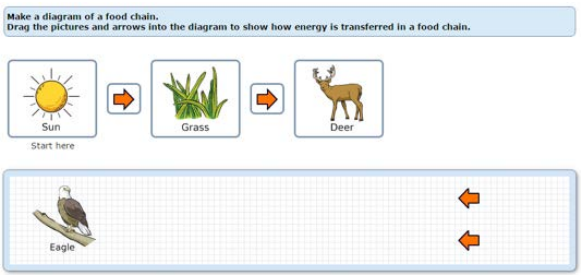

Narrative: This item provides evidence of students' ability to develop a model of a food chain showing the relationships among the living and nonliving parts of an ecosystem. The item aligns to the middle school PE because the 5th grade PE is about matter and this food chain includes the sun for energy, not matter. The item is rated DOK 2 because students are completing a given model instead of developing their own model.

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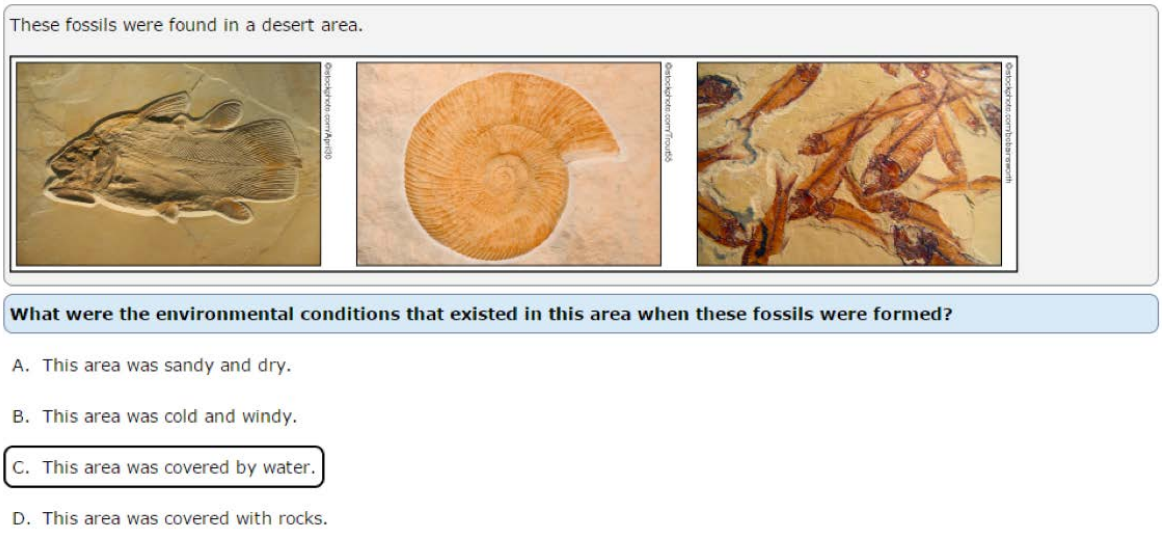
Instructional Area: Life Sciences

Subarea: Heredity and Biological Evolution

	DCI+	SEP**	CCC**
ALIGNS PE 4-LS1-1: Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.**	Evidence of Common Ancestry and Diversity	Analyzing and Interpreting Data	Scale, Proportion, and Quantity
NWEA Learning Statement: Analyzes and interprets fossil evidence to infer ancient environmental conditions **Item RIT:** 200 **Item DOK:** 2	Evidence of Common Ancestry and Diversity	Analyzing and Interpreting Data	Scale, Proportion, and Quantity

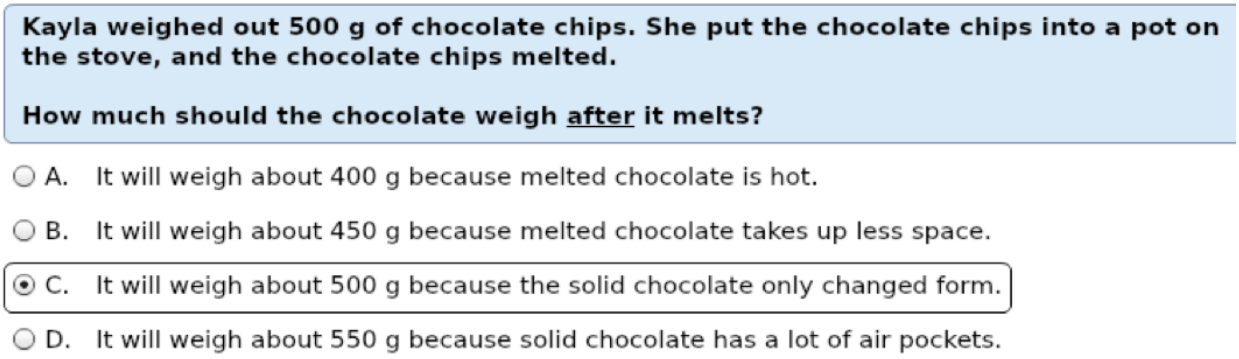


Narrative: This item provides evidence of students' ability to interpret pictorial data from long ago. Students then need to apply their knowledge that fossils provide evidence of animals and plants that lived in different environmental conditions. This three-dimensional item aligns well with this 3rd grade NGSS PE and all its dimensions. The item is rated a DOK 2 because students need to analyze the pictorial data and select an interpretation rather than write their own.

Instructional Area: Physical Sciences

Subarea: Matter and Its Interactions

	DCI+	SEP**	CCC**
Aligned PE 5-PS1-2: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.**	Structure and Properties of Matter	Constructing Explanations and Designing Solutions	Scale, Proportion, and Quantity
NWEA Learning Statement: Applies conservation of matter to determine mass/weight after changes of state **Item RIT:** 201 **Item DOK:** 2	Structure and Properties of Matter	Constructing Explanations and Designing Solutions	Energy and Matter



Narrative: This item provides evidence of students' growth in understanding the conservation of matter/weight in a quantitative and qualitative manner appropriate for 5th graders (201 RIT). By selecting 500 g with an explanation of why the weight of the melted chocolate will remain the same, students avoid misconceptions about heat/energy affecting weight and about solids containing air pockets. This 3-dimensional item aligns to a different CCC than in the 5th grade PE but provides a good growth measure. Notice that constructing explanations is often a DOK 3 level of complexity. This item is rated a DOK 2 because students do not construct the explanation themselves.

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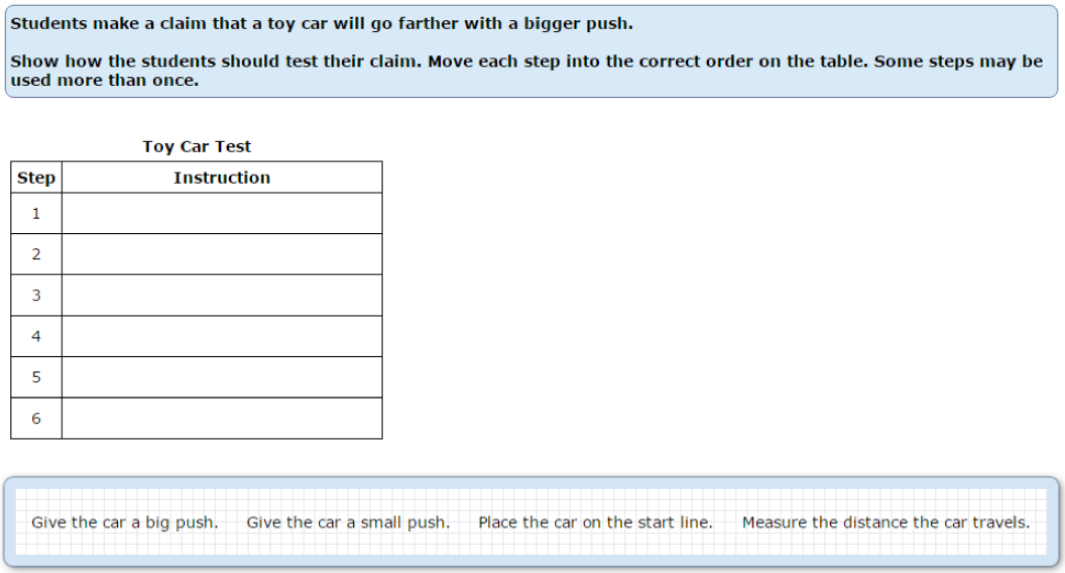
Instructional Area: Physical Sciences

Subarea: Motion and Stability: Forces and Interactions

	DCI+	SEP**	CCC**
Aligns to PE K-PS2-1: Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.**	Forces and Motion, Types of Interactions	Planning and Carrying Out Investigations	Cause and Effect
NWEA Learning Statement: Plans investigations about the cause-effect relationship between forces and motions of objects **Item RIT:** 205 **Item DOK:** 2	Forces and Motion	Planning and Carrying Out Investigations	Cause and Effect



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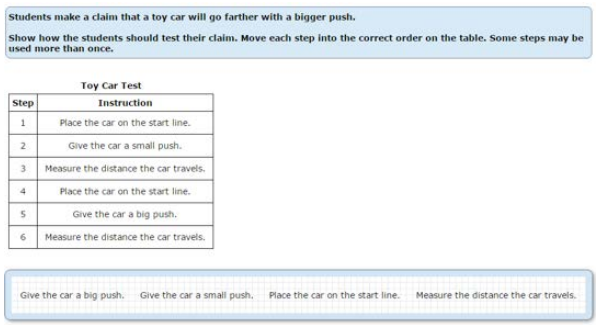

Narrative: This item provides evidence of students' growth in the ability to **plan investigations about force and motion**, a concept which progresses in complexity from kindergarten through high school. This item illustrates how kindergarten PE items are presented to students in grades 3–5. Notice the RIT of this item indicates the appropriateness for students in grades 3–5 according to the 2020 Norms. The item is rated a DOK 2 because students are **using given investigation steps to plan the investigation**, not constructing their own steps.

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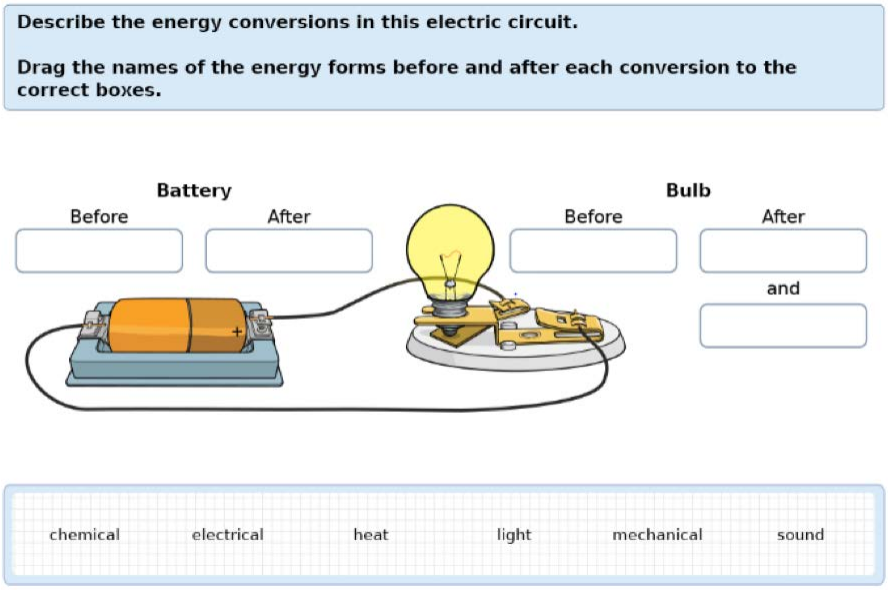
Instructional Area: Physical Sciences

Subarea: Energy and Waves

	DCI+	SEP**	CCC**
Aligned PE 4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. **	Definitions of Energy, Conservation of Energy and Energy Transfer	Planning and Carrying Out Investigations	Energy and Matter
NWEA Learning Statement: Describes energy conversions in devices, using a model **Item RIT:** 202 **Item DOK:** 2	Definitions of Energy, Conservation of Energy and Energy Transfer	Developing and Using Models	Energy and Matter



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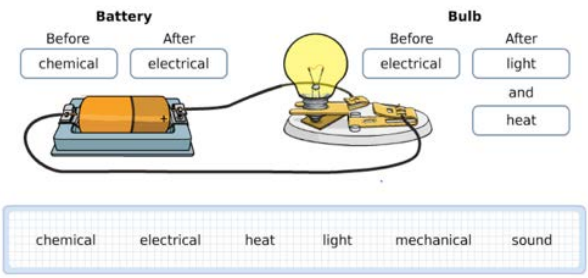
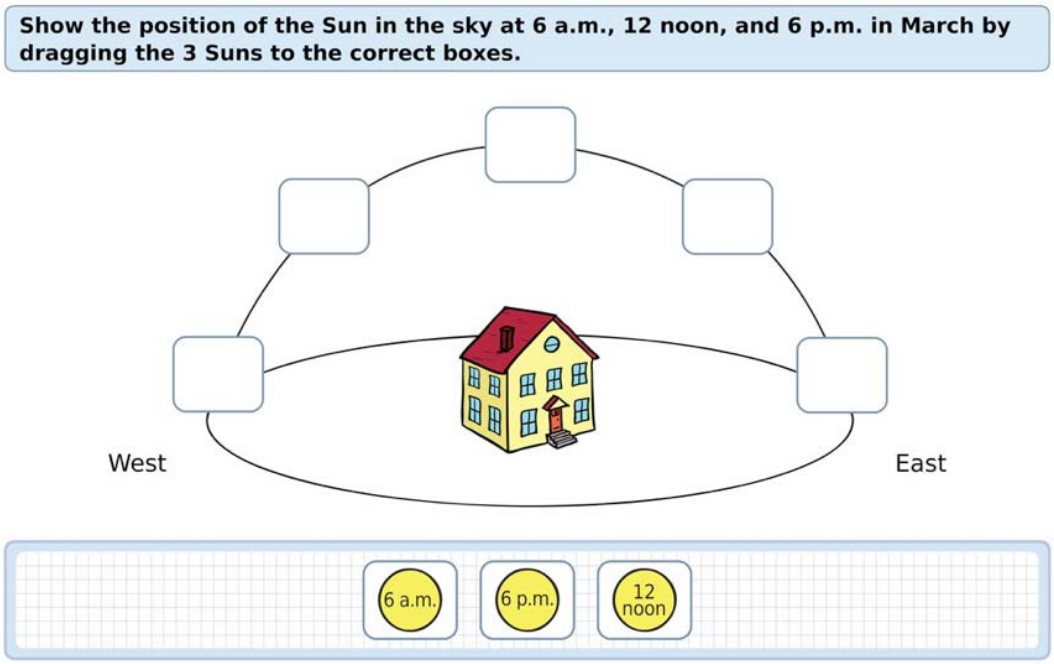


Narrative: This item provides evidence of students' growth in understanding of energy conversions in a battery and a bulb by naming before-after energy forms in this model. We can also infer an understanding that electrical energy is transferred from the battery to the bulb. This three-dimensional item aligns to both DCIs of this 4th grade PE but to a different SEP. Notice that the 202 RIT indicates high-achieving 4th graders would likely answer correctly.

Instructional Area: Earth and Space Sciences

Subarea: Earth's Place in the Universe

	DCI+	SEP**	CCC**
Aligned PE 5-ESS1-2: Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.**	Earth and the Solar System	Analyzing and Interpreting Data	Patterns
NWEA Learning Statement: Constructs models to show daily patterns of how the sun appears to move across the sky **Item RIT:** 198 **Item DOK:** 2	Earth and the Solar System	Developing and Using Models	Patterns



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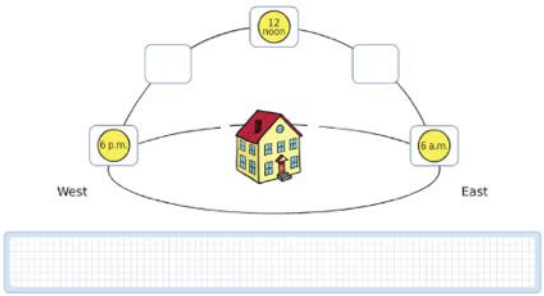

Narrative: This item provides evidence of students' growth in the ability to develop a visual model showing how the sun changes positions in the sky, following the same general pattern from day to day. This three-dimensional item aligns to the CCC of this 5th grade PE and a different SEP. The item's core idea is from *A Framework for K–12 Science Education* (2012 NRC) but is not in the PE. The NWEA Learning Statement reflects this item's alignment to the modeling SEP and to a core idea in *A Framework:* the changing positions of the sun in the sky. The item's RIT places it in the middle of the 3–5 grade band.

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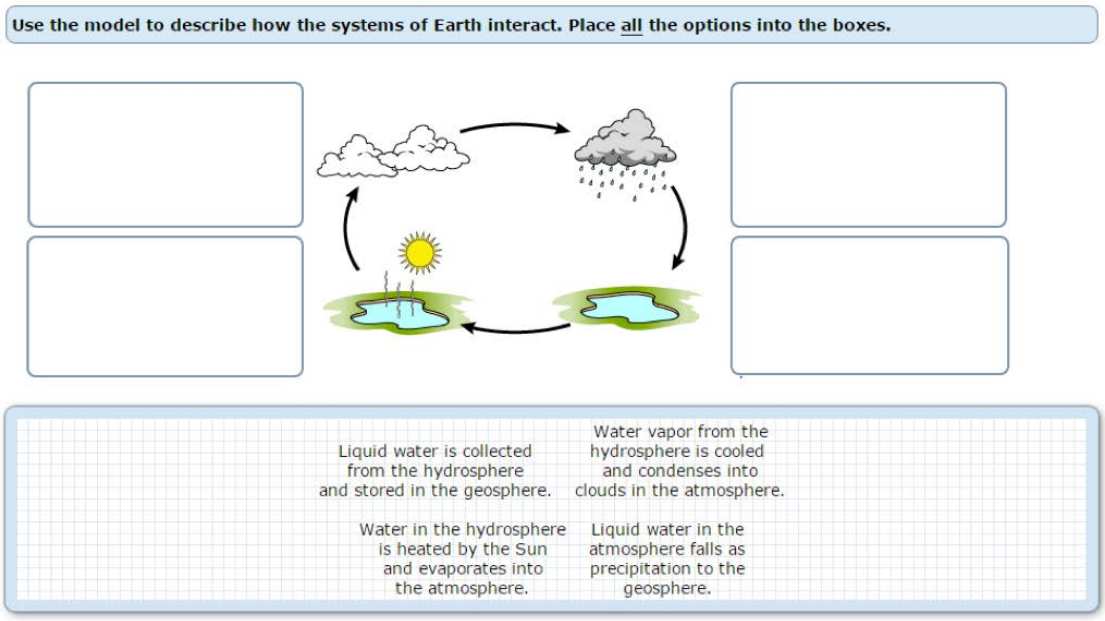
Instructional Area: Earth and Space Sciences

Subarea: Earth's Systems

	DCI+	SEP**	CCC**
Aligns to PE 5-ESS2-1: Develop a model using an example to describe the ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.**	Earth and the Solar System	Developing and Using Models	Systems and System Models
NWEA Learning Statement: Describes how water moves through Earth systems using models **Item RIT:** 207 **Item DOK:** 2	Earth and the Solar System	Developing and Using Models	Systems and System Models



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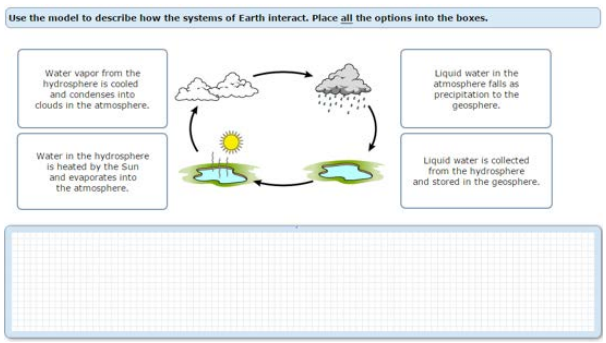

Narrative: This item provides evidence of students' growth in their ability to model interactions among the hydrosphere, geosphere, and atmosphere, in the context of the water cycle. Notice how this item aligns to this 5th grade PE and its three dimensions. This item is rated a DOK 2 since students are completing a given model. The item's RIT indicates the item is challenging for 5th graders.

Instructional Area: Earth and Space Sciences

Subarea: Earth and Human Activity

	DCI+	SEP**	CCC**
Aligns PE MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.**	Human Impacts on Earth Systems	Constructing Explanations and Designing Solutions	Cause and Effect
Content is a progression from this PE 5-ESS3-1: Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.**	Human Impacts on Earth Systems	Obtaining, Evaluating, and Communicating Information	Systems and System Models
NWEA Learning Statement: Applies scientific ideas to design solutions to problems involving human impacts on ecosystems **Item RIT:** 206 **Item DOK:** 2	Human Impacts on Earth Systems	Constructing Explanations and Designing Solutions	Cause and Effect

Students want to develop a plan for their school yard that will help the ecosystem.

Which plan will help the ecosystem?

A. Remove earthworms and ants from the yard.

B. Plant native plants to reduce water runoff.

C. Use more fertilizer in the school garden to grow more food.

D. Leave food out for animals such as raccoons, deer, and coyotes.

Narrative: This item provides evidence of students' growth in ability to develop plans that would minimize human-related disruptions and protect a schoolyard environment. The item aligns to the DCI, SEP, and CCC of a middle school PE and there is a strong progression from this 5th grade PE. The two PEs share the DCI of Human Impacts on Earth Systems. The SEP progresses from 5th grade, where students are asked to research and report on ways to protect ecosystems, to middle school, where students are asked to design a solution to protect ecosystems. This item allows higher-achieving 3–5 students to apply their understanding of core ideas to cause-effect relationships in systems and to compare solutions to a problem. The item is rated a DOK 2 because students are predicting the best outcome based on their knowledge of human-environmental relationships. This item would appear under an Engineering Design topic, as well as the topic of Human Impacts in the Learning Continuum report.

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