SAMPLE ITEMS

MAP GROWTH™ 6–8 Science for use with Next Generation Science Standards* (2013)

Test Purpose

The *MAP® Growth™ 6–8 Science for use with Next Generation Science Standards* (NGSS) is a growth measure as students build understanding of the multidimensional NGSS Performance Expectations (PEs). The tests do not provide a summative or diagnostic measure of a student's proficiency in the NGSS Performance Expectations or their dimensions. Instead the results can be used as a growth measure of overall student understanding of the NGSS with an overall score, as well as scores in the disciplinary instructional areas of the test. Taking this interim, adaptive test 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

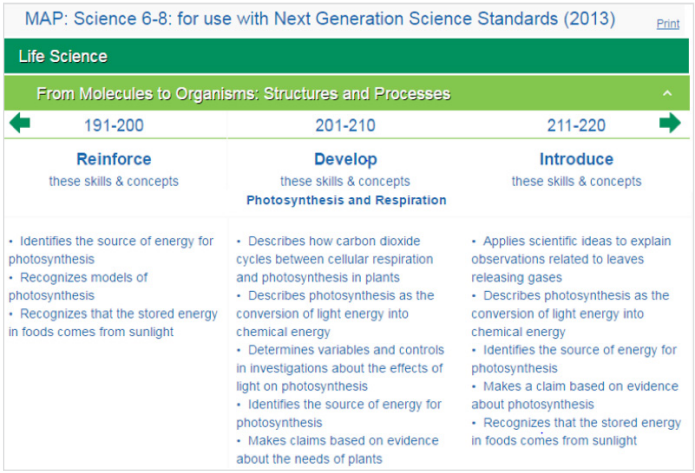
The 2016-17 tests include multidimensional items that align to the NGSS dimensions: **Disciplinary Core Ideas (DCIs)**, **Science and Engineering Practices (SEPs)**, and **Crosscutting Concepts (CCCs)**. Some items assess all dimensions of appropriate PEs for a middle school interim test, and others assess different combinations of the dimensions. All provide measures of growth toward students' understanding of the **DCIs**, **SEPs**, and **CCCs** of NGSS. Over time, more and more of the item pool will include items aligned to all three dimensions of the NGSS PEs. The information about sample items in this document are color-coded for these dimensions.

All existing items were rated for their alignment to the **DCIs**, **SEPs**, and **CCCs** as cited from *A Framework for K-12 Science Education* (2012 NRC). This process included writing multidimensional Learning Statements before hand-aligning items to the NGSS PEs.

The NWEA Learning Statements are used in the 2016-17 Learning Continuum reports. These statements give teachers information about how students are performing in the dimensions of the NGSS. The sample items include the Learning Statements that teachers will see in the reports. For example, this is a part of the Life Sciences Instructional Area, From Molecules to Organisms Sub-area, Photosynthesis and Respiration Topic in typical middle school RIT bands:

Test Blueprint

The blueprint for the *MAP Growth 6-8 Science for use with NGSS* has three Instructional Areas: Life Sciences, Physical Sciences, and Earth and Space Sciences—all with embedded Engineering Design. How Engineering Design is embedded is demonstated by the sample item for Sub-area 2c which is aligned to both MS-PS4-2 and MS-ETS1-4. The results of this item would be reported in the Physical Sciences Instructional Area. The sub-areas are derived from the **DCIs**. In this sample set, Heredity and Biological Evolution are combined into one sub-area, as are Energy and Waves. In the years to come, these combinations may change as more items calibrate, as more item types are employed, and as partners request different structures.



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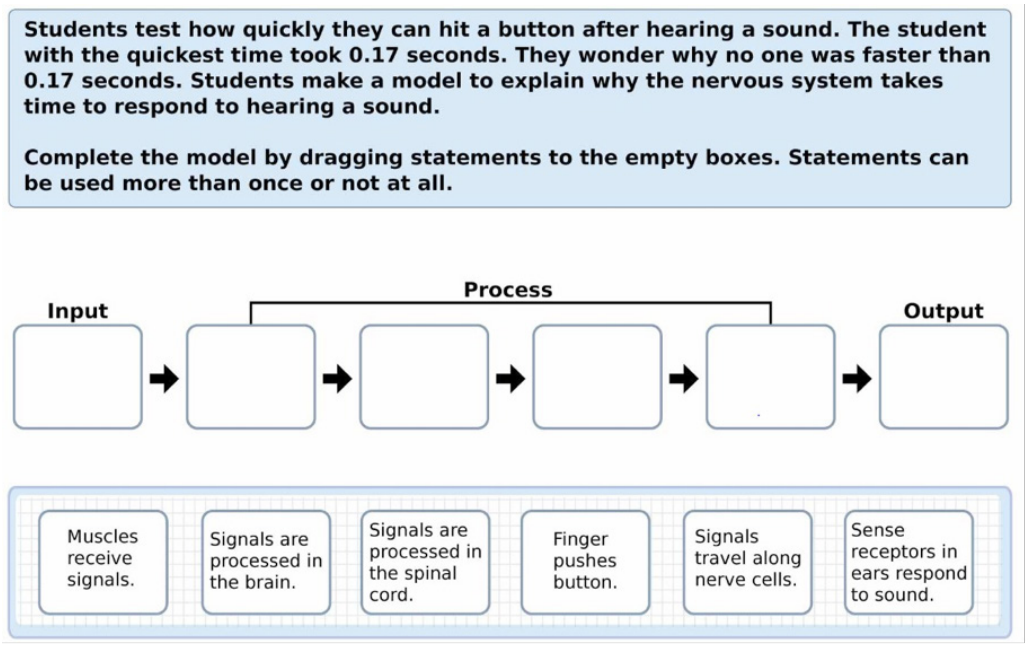
Instructional Area 1: Life Sciences

Sub-area 1a: From Molecules to Organisms–Structures and Processes

	DCI+	SEP**	CCC**
Aligned PE MS-LS1-8: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.**	Information Processing	Obtaining, Evaluating, and Communicating Information	Cause and Effect
NWEA Learning Statement: Describes how information from sound is received, processed and acted upon by humans, using a model **Item RIT:** 210 **Item DOK:** 2	Information Processing	Developing and Using Models	Cause and Effect



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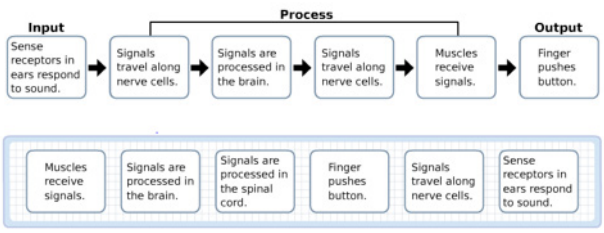

Narrative: The item provides evidence of students' growth in understanding of how information from sound is received, processed and acted upon. Students use a model to explain why there is a delay when responding to a stimuli by tracing the path signals take from sensory receptors to the brain to the resulting behaviors. This item assesses the DCI and CCC of the PE but uses a different SEP. NWEA is a WebbAlign® Depth of Knowledge Partner. This item is rated DOK 2 because students used a given model instead of constructing their own model.

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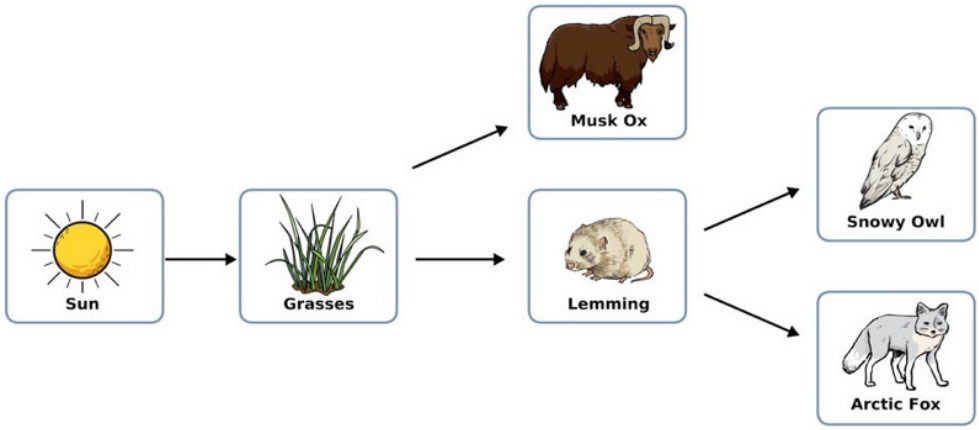
Instructional Area 1: Life Sciences

Sub-area 1b: Ecosystems: Interactions, Energy, and Dynamics

	DCI+	SEP**	CCC**
Aligned 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.**	Cycles of Matter and Energy Transfer in Ecosystems	Developing and Using Models	Energy and Matter
NWEA Learning Statement: Determines producers, consumers and decomposers in models **Item RIT:** 210 **Item DOK:** 2	Cycles of Matter and Energy Transfer in Ecosystems	Developing and Using Models	

The diagram shows a food web for a tundra ecosystem.

Click on all the consumers in the ecosystem.



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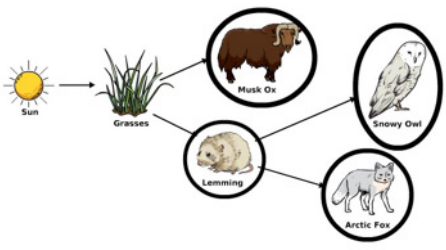

Narrative: This item provides evidence of students' ability to interpret a food web model showing the relationships among the living and nonliving parts of an ecosystem. The item has only 2 dimensions with core ideas from *A Framework for K-12 Science Education* (2012 NRC) but not in the PE. This is an example of an item written prior to NGSS. Over time, items written for use with the NGSS will fill the item pools for the *MAP Growth 6-8 Science for use with NGSS* assessments. This item is rated DOK 2 because students are demonstrating their understanding of the roles of organisms in ecosystems and how to interpret a model.

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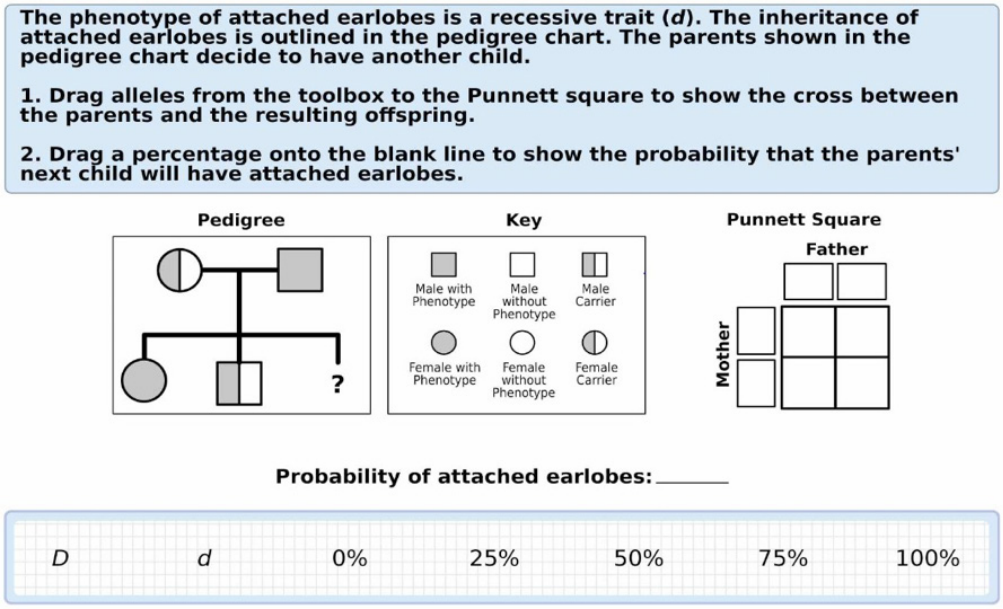
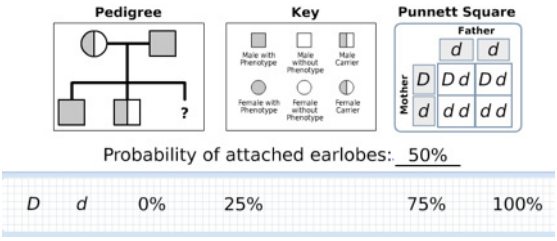
Instructional Area 1: Life Sciences

Sub-area 1c: Heredity: Inheritance and Variations; Biological Evolution: Unity and Diversity

	DCI+	SEP**	CCC**
Aligned PE MS-LS3-2: Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.**	Inheritance of Traits, Variation of Traits	Developing and Using Models	Cause and Effect
NWEA Learning Statement: Determines the probability of offspring inheriting a trait, using Punnett squares **Item RIT:** 216 **Item DOK:** 2	Inheritance of Traits, Variation of Traits	Developing and Using Models	Cause and Effect



One Correct Response



Narrative: The item demonstrates students' understanding of the relationship between gene transmission and the genetic variation seen in offspring, including the appearance of recessive traits. Students show this by determining the genotypes of the parents and predicting the likelihood of particular traits appearing in their offspring using models. This item is rated DOK 2 because students are performing a series of steps at the DOK 2 level. This item aligns to the three dimensions of this middle school PE.

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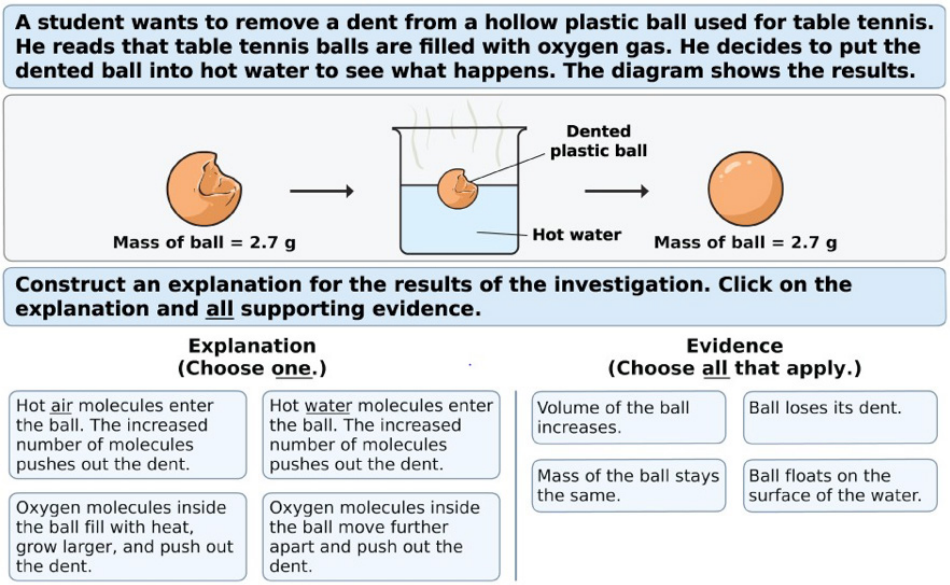
Instructional Area 2: Physical Sciences

Sub-area 2a: Matter and its Interactions

	DCI+	SEP**	CCC**
Aligned PE MS-PS1-4: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.**	Structure and Properties of Matter, Definitions of Energy	Developing and Using Models	Cause and Effect
NWEA Learning Statement: Explains with evidence how heat affects objects at both macroscopic and microscopic levels **Item RIT:** 215 **Item DOK:** 2	Structure and Properties of Matter	Constructing Explanations and Designing Solutions	Cause and Effect



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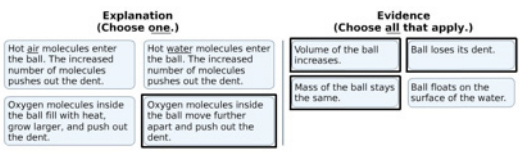

Narrative: This three-dimensional item provides evidence that student can **construct an explanation with evidence of what causes the removal of the dent in the ball**. Notice that this PE has 2 **DCIs** but only 1 is aligned because there is no direct mention of **energy** in the item. Also the **SEP** of the PE is **modeling** whereas this item is about **explaining**, but the item still gathers good growth data for this PE. Notice that **constructing explanations** is often a DOK 3 level of complexity. This item is rated DOK 2 because students did not **construct the explanation** themselves.

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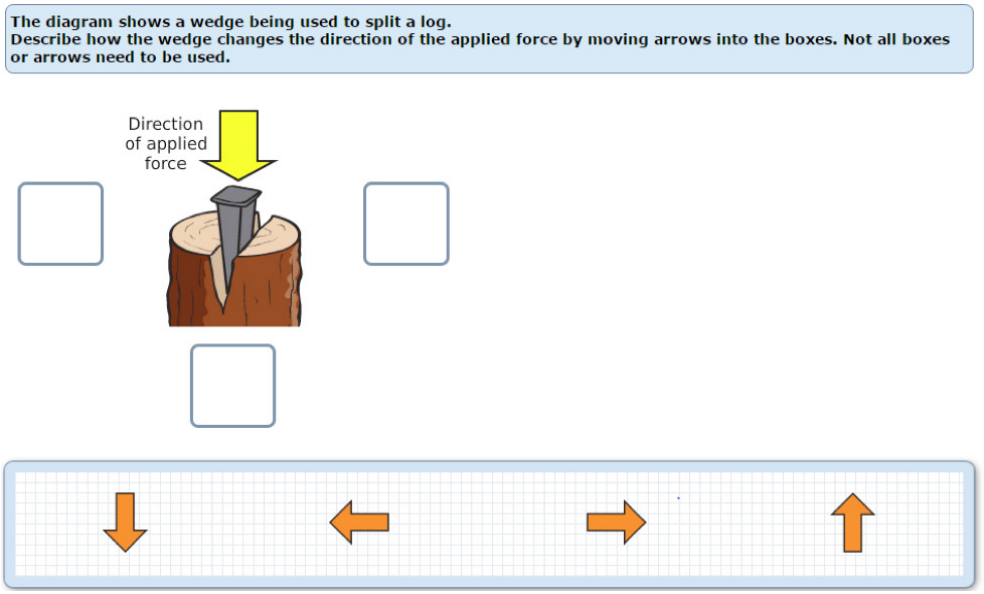
Instructional Area 2: Physical Sciences

Sub-area 2b: Motion and Stability: Forces and Interactions

	DCI+	SEP**	CCC**
Aligned PE MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.**	Forces and Motion	Planning and Carrying Out Investigations	Stability and Change
NWEA Learning Statement: Describes how **simple machines** change applied forces, using a model **Item RIT:** 200 **Item DOK:** 2	Forces and Motion	Developing and Using Models	Stability and Change



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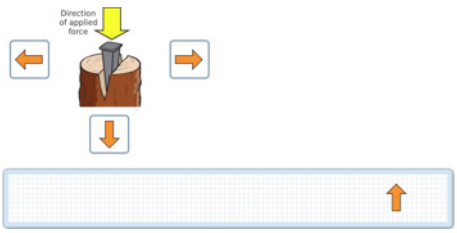
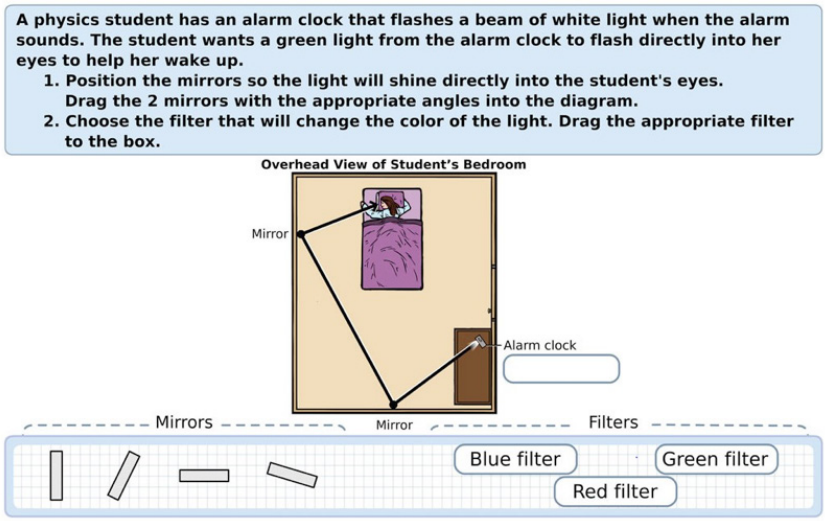


Narrative: This item provides evidence of students' growth in understanding that change happens due to how forces act on objects. This three-dimensional item demonstrates students' ability to use arrows to model how resulting forces change from the direction of an applied force. In this item students use a model to describe the phenomena which may have been part of an investigation, but that was not apparent in the item. So the item is aligned to a different SEP than the PE. The item is rated DOK 2 because students are using a given model, not constructing one.

Instructional Area 2: Physical Sciences

Sub-area 2c: Energy; Waves and Their Applications in Technologies for Information Transfer

	DCI+	SEP**	CCC**
Aligned PEs MS-PS4-2: Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.** **MS-ETS1-4** Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.**	Electromagnetic Radiation, Developing Possible Solutions, Optimizing the Design Solution	Planning and Carrying Out Investigations	Stability and Change
NWEA Learning Statement: Develops design solutions involving the reflection, transmission, or absorption of light, using models **Item RIT:** 213 **Item DOK:** 2	Electromagnetic Radiation, Developing Possible Solutions	Developing and Using Models	Stability and Change



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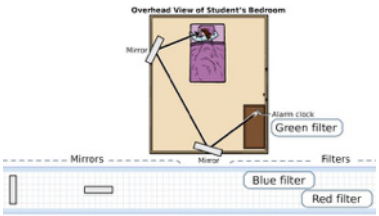

Narrative: This item provides evidence of students' growth in their understanding of developing a solution to a problem involving light and the functions of mirrors and filters using a model. Notice that this item aligns to both a Waves PE and an Engineering Design PE. Students develop a solution to this alarm clock problem by selecting a green filter that absorbs all colors but green and positioning mirrors to reflect the green light to the sleeping student's eyes. This Learning Statement would appear in both the light and engineering topics of the Learning Continuum reports demonstrating how all engineering items are embedded in the disciplinary context of the items. Notice that this item is rated DOK 2 because students were not asked to write an explanation of why they chose to position the mirrors and filters the way they did.

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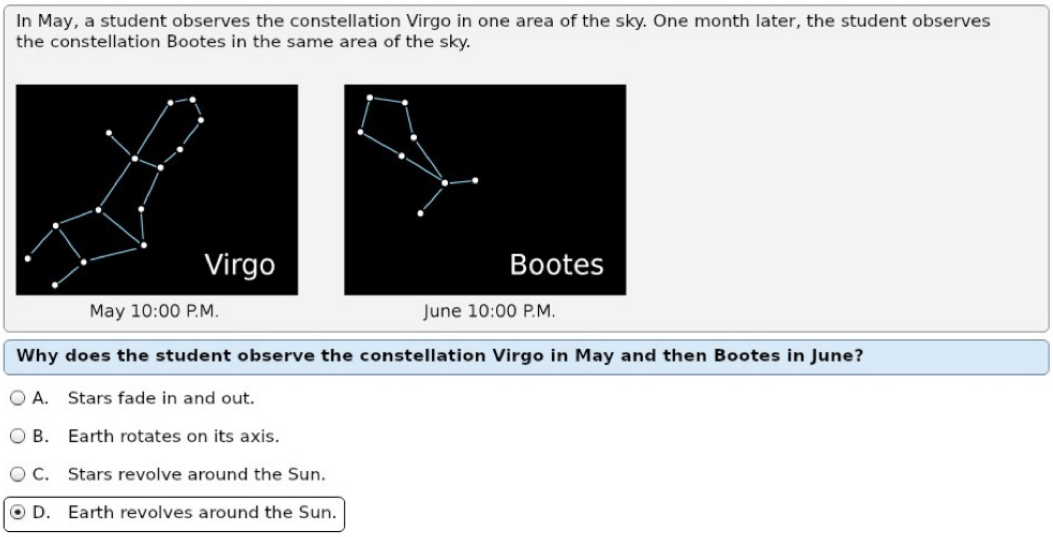
Instructional Area 3: Earth and Space Sciences

Sub-area 3a: Earth's Place in the Universe

	DCI+	SEP**	CCC**
Aligned PE MS-ESS1-1: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.**	The Universe and its Stars, Earth and the Solar System	Developing and Using Models	Patterns
NWEA Learning Statement: Applies scientific ideas to explain the patterns of apparent movement of stars in the sky **Item RIT:** 205 **Item DOK:** 1	The Universe and its Stars,	Constructing Explanations and Designing Solutions	



Narrative: This item provides evidence of students' growth in their understanding of why two different constellations appear in the same area of the sky at different times of the year. This PE has two core ideas, and we've aligned the item to the first one, based on the citation from *A Framework for K-12 Science Education* (2012 NRC). The item aligns to a different SEP because students are applying scientific ideas to explain a phenomenon rather than modeling the Earth-Sun-Moon system. We did not align this item to the CCC of patterns because the two graphics are not enough data to establish a pattern, so students are most likely drawing on content knowledge to explain the observation rather than using a pattern to predict a relationship. The item's RIT places it around the early middle school norm, and the DOK 1 rating is based on students' ability to provide a simple scientific explanation for common observations.

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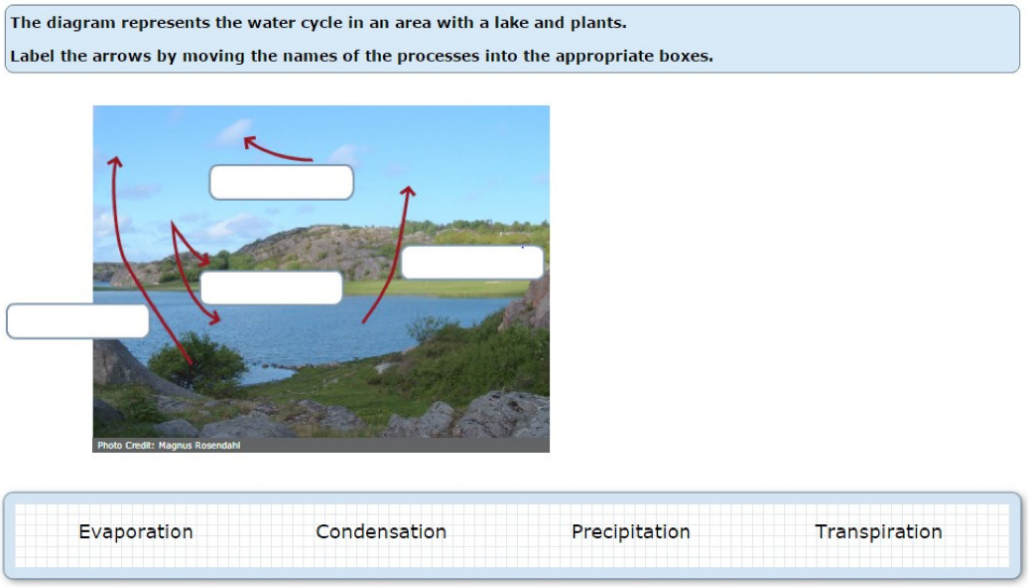
Instructional Area 3: Earth and Space Sciences

Sub-area3b: Earth's Systems

	DCI+	SEP**	CCC**
Aligned PE 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.**	The roles of Water in Earth's Surface Processes	Developing and Using Models	Energy and Matter
NWEA Learning Statement: Represents processes of the water cycle in models **Item RIT:** 213 **Item DOK:** 2	The roles of Water in Earth's Surface Processes	Developing and Using Models	Systems or Systems Models



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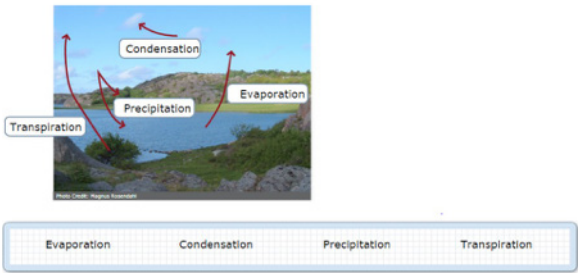

Narrative: This item provides evidence of students' growth in their ability to **model processes** of the **water cycle in multiple Earth systems**. This three-dimensional item aligns to the **DCI** and **SEP** of the PE, and it aligns to a different **CCC: Systems and Systems Models**, since the emphasis of the item is **representing** how the **one Earth system interacts with another**. The 213 RIT indicates this is a difficult item for middle school students. This item is rated DOK 2 because students are specifying relationships among parts of familiar systems.

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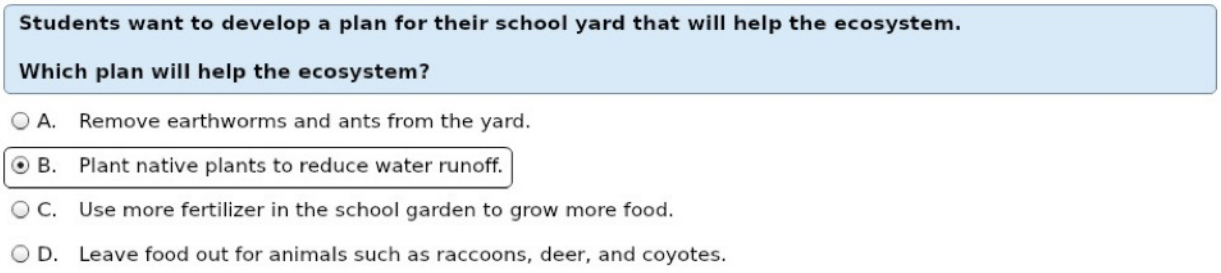
Instructional Area 3: Earth and Space Sciences

Sub-area 3c: Earth and Human Activity

	DCI+	SEP**	CCC**
Aligned 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
NWEA Learning Statement: Applies scientific ideas to design solutions to problems involving human impacts on ecosystems **Item RIT:** 216 **Item DOK:** 2	Human Impacts on Earth Systems	Constructing Explanations and Designing Solutions	Cause and Effect



Narrative: The item provides evidence of students' growth in their ability to develop plans that would minimize human-related disruptions and would protect a schoolyard environment. The item aligns to the DCI, SEP, and CCC of this middle school PE, as students must apply their Earth Systems content knowledge and understanding of cause-effect relationships to compare solutions to a problem. The item is rated DOK 2 because students are predicting the best outcome based on their knowledge of human-environmental interactions. Since students are asked to compare solutions, 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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