Explaining the Alignment of an Item to a Multidimensional Standard

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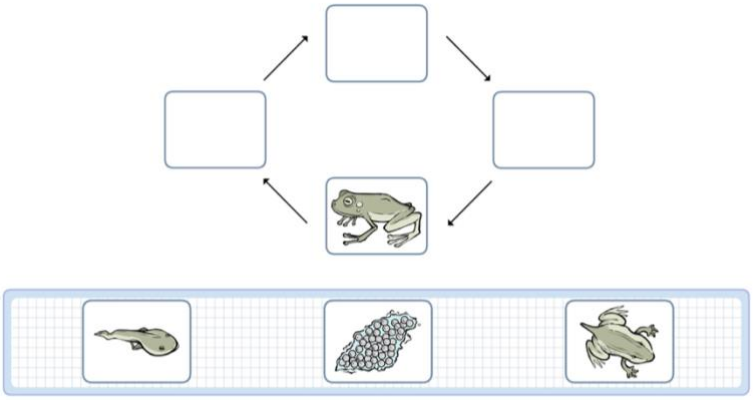
To align items to multidimensional standards such as the Next Generation Science Standards* (NGSS), multiple NWEA Science Content Specialists compare the item and its NWEA Learning Statement to the NGSS **Performance Expectations (PEs)** starting with the **Disciplinary Core Idea (DCI)**. Items are then appropriately tagged with a **Science and Engineering Practice (SEP)** and/or a **Crosscutting Concept (CCC)** using the citations from *A Framework for K-12 Science Education* (2012 NRC) bulleted in the foundation boxes of the standards. Items are then reviewed for a focus on a phenomenon or problem engaging to students. Single items usually target portions of a **PE** since **PEs** are often broad and complex. To measure students' proficiency in a whole **PE**, a well-defined set of items or a performance task is needed. However, the *MAP Science for use with NGSS* is measuring growth, not proficiency. *MAP Science for use with NGSS* items provide evidence of growth toward understanding of their aligned **PEs**.

This sample item focuses on a phenomeon a student observes about frogs in a pond. The item aligns to a 3rd grade **PE** 3-LS1-1 abut the **unique life cycle of organisms**. This item aligns to the underlined portion of the **DCI** cited in the foundation box: **Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.**

A student observes frogs in and near a pond for a year. He discovers a pattern in the way they change during their lives.

Which changes did the student most likely observe during the year?
Move the images to show the order of the changes.



NGSS Performance Expectation	NGSS Foundation Boxes		
Aligned PE: 3-LS1-1 **Develop models to describe** that **organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.** **	**DCI: Growth and Development of Organisms** + • **Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.**	**SEP: Developing and Using Models**** • **Develop models to describe phenomena**	**CCC: Patterns** ** • **Patterns of change can be used to make predictions.**

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** NGSS Lead States. 2013. *Next Generation Science Standards: For States, By States.* Washington, DC: The National Academies Press

+ District of Columbia adopting the Next Generation Science Standards: 2013.

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NGSS Science and Engineering Practice

The **SEP** of this **PE** is **Developing and Using Models** **. In the item, students are given an incomplete model and are asked to complete it. The item is tagged with this **SEP** because students are **completing the development of a model describing this phenomena**. Items may be tagged with a **SEP** different from the **PE**.

NGSS Crosscutting Concept

The **CCC** of this **PE** is **Patterns** **. Sometimes this **CCC** involves significant amounts of data, but notice that for this 3rd grade **PE**, the uderlined citation is about **patterns of change**. Students are expected to use their familiarity with life cycle patterns of common organisms to predict the correct sequence for the given illustrations. Items may be tagged with a **CCC** different from the **PE**.

NWEA multidimenstional Learning Statement and Item RIT

NWEA Learning Statement:
Constructs models to show patterns of physical development in the **life cycles of animals**
Item RIT: 192 **Item DOK**: 2

This NWEA Learning Statement is seen in the Learning Continuum Report in the 191-199 RIT band for the Life Cycle Topic or **PE** 3-LS1-1 in the Life Sciences Instructional Area. Like all NWEA Learning Statements, this statement clearly reflects the dimensions of the item.

Adding to the confidence of this alignment, notice that the RIT of the item is 192. NWEA Research has established that for the 3-5 grade range, the 50th percentile Norms in 2020 were from 188 to 200. So this item's RIT is within that range. An item's RIT does not need to align to the RIT Norm for the grade of a **PE** or the grade range of a test, but RIT is an indicator of the item's appropriateness.

Cognitive complexity

Multdimensional cognitive complexity

NWEA uses Achieve/WestEd's framework to assign complexity for an item's scenario and dimensions. This framework allows us to characterize the sample item as follows:

Scenario complexity	SEP complexity	DCI complexity	CCC complexity
Low	Medium	Medium	Low

DOK

NWEA is a WebbAlign® Depth of Knowledge Partner. This item is rated DOK 2 because students did not develop the whole **model** or explain their completed **model**. DOK ratings can also be based upon the content complexity of how students demonstrate their understanding of a **DCI** and/or **CCC**.

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