COGNIA

Formative Assessments

Formative Item Sets Overview

Science

Grades K–1

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Formative Item Sets—Science

Purpose

Cognia formative item sets are designed to help teachers gauge students' understanding of key concepts and skills that are emphasized by the Next Generation Science Standards (NGSS). The item sets support formative assessment practices and provide evidence of student understanding. Educators may administer the items at any time in their lesson plans for a science unit to engage students in the learning and generate data that can be used to inform instruction.

Number of Item Sets per Grade Level			
Grade	K	1	Total
Sets	3	3	6

Item Set Components

Each formative item set for kindergarten and grade 1 includes the following components:

- **Blueprints**—Outline the specifications of each item set and include the following elements for each item:
  - Next Generation Science Standards
  - The domain, topic, and performance expectations
  - Learning targets, to clarify learning expectations for students
  - DOK (depth of knowledge) level for each item
  - Item type
  - Position of the item within the item set
- **Scoring Guides for traditional items**—Materials for the teacher to score student responses. Elements of the scoring guide include:
  - Answer key
  - Distractor rationales that describe the misconception associated with the answer option
  - Scoring rubric
  - Scoring notes

- **Activity Guides for classroom activities**—Materials for the teacher to facilitate the activities with students in the classroom. Elements of the activity guide include:
  - Activity overview that provides background information, a list of needed materials, and estimated time for the activity
  - Activity rubric
  - Activity content that outlines a teacher script and possible student responses for the elements of the activity
  - Printable copies of select student worksheets, graphics, and/or teacher observation checklists

Design Specifications

Each science item set for kindergarten and grade 1 aligns to a topic-based set of NGSS performance expectations. Science item sets are designed to help educators integrate formative assessment into instruction while learning is still occurring.

Each science item set includes activities and/or items across a range of cognitive complexities and encourages students to apply their understanding of key skills and concepts.

Items

Each science item set for kindergarten and grade 1 consists primarily of activities, in consideration of appropriate assessment methods for learners in those grades. Some of the item sets also include one or two multiple choice and/or constructed response items.

Item Details

The following table provides the approximate administration time for each item type.

Item Type	Number of Points	Administration Time (minutes)
Multiple Choice (MC)	1	1–2
Constructed Response (CR)	2	8–10
Activity (A)	2	*

*Time estimates vary based on the content of each activity. The activity overview for each activity specifies the estimated time for that specific activity.

Depth of Knowledge

Each item is coded to a depth of knowledge level, from level 1 through level 4. A description of an example of the expectations at each level is provided below.

DOK	Description
Level 4	Using extended thinking to synthesize information or apply it to real-world applications.
Level 3	Employing strategic thinking through the use of reasoning or decision making.
Level 2	Conceptual knowledge, or the ability to put facts into context.
Level 1	The ability to recall facts.

Science
Item Set Index

The following tables provide domain, topic, number of items and item types, Depth of Knowledge and learning targets for each item set by grade level.

Kindergarten | Formative Item Sets

Name/Item Set	Domain	Topic	Item Position	Item Type	DOK	Learning Target
Forces and Interactions Kindergarten	Physical Science	Forces and Interactions: Pushes and Pulls	1	A	2	I can find out how different strengths of pushes and pulls change how far or fast an object moves.
			2	A	2	I can solve a design challenge using knowledge of how one object can affect another object when it pushes on it.
			3	A	2	I can predict and make objects move using pushes or pulls.
			4	A	3	I can investigate and use pushes and pulls to make an object move in specific directions and at different speeds.
			5	A	3	I can plan and test different designs to make an object move a specific length with a push.
Interdependent Rel Ecosystems Kindergarten	Life Science	Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment	1	A	2	I can see and tell about patterns of what plants and animals, including people, need to live.
			2	A	2	I can see and tell about patterns of what plants and animals need to live.
			3	A	3	I can use information to hold up my idea about how animals can change where they live to meet their needs.
			4	A	2	I can use a model to show how the needs of different plants and animals are met in the places they live.
			5	A	3	I can use a model to show how the needs of animals are met in the places they live.
			6	MC	2	I can share ideas about ways to stop people from hurting the water supply in the area where they live.
			7	A	2	I can share ideas about ways to stop people from hurting the land, water, air, and other living things in the area where they live.
			8	A	2	I can share ideas about ways to stop people from hurting the land, water, air, and other living things in the area where they live.
Weather and Climate Kindergarten	Earth and Space Science	Weather and Climate	1	A	2	I can see what happens to the temperature of objects when sunlight shines on them compared to when it does not.
			2	A	3	I can describe and make a model of something that will stop too much sunlight from warming an area using tools and other things given to me.
			3	A	2	I can use and share things I see about weather in my area to tell about patterns over time.
			4	A	2	I can use and share things I see about weather to tell about patterns over time.
			5	A	2	I can ask and answer questions about dangerous weather to help people in my area know what to do when that type of weather happens.

Grade 1 | Formative Item Sets

Name/Item Set	Domain	Topic	Item Position	Item Type	DOK	Learning Target
Waves G1	Physical Science	Waves: Light and Sound	1	A	3	I can show and explain that sound waves make objects vibrate.
			2	A	2	I can show and explain how making an object vibrate causes sound.
			3	CR	2	I can explain a way to be able to see objects if it is dark.
			4	A	2	I can explain why I can or cannot see an object inside a box based on whether there is a light source.
			5	A	2	I can plan and do an investigation to show what happens when objects made of different materials are placed in the path of a beam of light.
			6	A	3	I can use tools to build something that uses light or sound to answer the problem of sending and getting information over long distances.
Structure Function Info Processing G1	Life Science	Structure, Function, and Information Processing	1	A	3	I can use things given to me to make something that is like an outside body part of an animal but helps protect people's bodies.
			2	A	3	I can use things given to me to tell about or make something that is like an outside body part of a plant and/or animal but helps people to live, grow, and meet their needs.
			3	CR	2	I can use pictures to see patterns in how parents and their young behave that help the young to live.
			4	A	2	I can use information to see and tell about patterns in how parents and their young behave that help the young to live.
			5	CR	2	I can see and tell about things that hold up the idea that young animals are like, but not exactly like, their parents.
Space Systems G1	Earth and Space Science	Space Systems: Patterns and Cycles	1	A	2	I can gather information about the Sun's location at different times of day to tell about patterns that predict its path.
			2	A	2	I can make and use a model to describe patterns and predict the movement of the Earth and Moon.
			3	A	2	I can describe and predict patterns of objects seen in the daytime and nighttime skies.
			4	A	2	I can observe the amount of daylight during each season to learn how it changes during the year.