DC Science

The District of Columbia Assessment of the Next Generation Science Standards

PERFORMANCE LEVEL DESCRIPTORS

DC Science Assessment

Grade 5

Grade 5 Level 2: Approaching Expectations

A fifth-grade student performing at Level 2 demonstrates a basic understanding and draws connections between and among science dimensions when applying grades 3-5 Disciplinary Core Ideas, using elementary Science and Engineering Practices, and using elementary Crosscutting Concepts to make sense of phenomena or address solutions in the natural or designed world. A complete list of Science and Engineering Practices and Crosscutting Concepts is provided in Table 1.

A student performing at Level 2 can do things like:

Physical Science

- identify that models can be used to represent the motion of a wave and that this motion follows a pattern that can be described in terms of amplitude and wavelength (4-PS4-1)
- make an observation or measurement in relation to a phenomenon that involves the transfer of energy from place to place through moving objects, sound, light, and/or electric currents (4-PS3-2)
- explain that digitized signals can be transmitted over long distances, and compare and test the signal patterns generated from multiple potential solutions to the design problem (4-PS4-3)
- identify simple design problems that result from changes in people's wants and needs over time (3-5-ETS1-1)
- propose and compare multiple solutions to a design problem; propose improvements to existing solutions in order to increase their benefits, decrease known risks, and/or meet societal demands; and communicate with peers concerning proposed improvements in relation to a design solution (3-5-ETS1-2)

Life Science

- identify the role of plants as a foundational part of any ecosystem as represented in a model and explain that this is due to the role plants play in cycling of matter (5-LS2-1)
- use a small, simple data set to construct an argument that plants need water and air to grow and that they take in water from soil through their roots (5-LS1-1)
- construct an argument based on a small, simple data set or model that animals and plants use their parts, which compose systems, to survive and grow (4-LS1-1)

Earth and Science

- identify that models can represent the major systems that compose Earth and that these systems play a role in influencing a phenomenon (5-ESS2-1)
- estimate measurements needed, in correct units, to describe the distribution of Earth's fresh water in relation to an explanation of a phenomenon (5-ESS2-2)
- read and comprehend grade-appropriate complex texts and/or other reliable media in order to summarize and obtain scientific and technical ideas related to the effect of human activities on individual Earth systems and on Earth as a whole, and describe how the ideas are supported by evidence (5-ESS3-1)

Grade 5 Level 3: Meets Expectations

A fifth-grade student performing at Level 3 demonstrates a substantial understanding and relevant reasoning when applying grades 3-5 Disciplinary Core Ideas, using elementary Science and Engineering Practices, and using elementary Crosscutting Concepts to make sense of phenomena or address solutions in the natural or designed world. A complete list of Science and Engineering Practices and Crosscutting Concepts is provided in Table 1.

In addition to the scientific knowledge and practices demonstrated at Level 2, a student performing at Level 3 can do things like:

Physical Science

- develop or use models of waves to describe and/or predict phenomena, and compare the waves based on the properties of amplitude and wavelength depicted in these models (4-PS4-1)
- decide which data need to be collected as evidence to explain a phenomenon and/or which methods should be used to collect the data, as the flow of energy from place to place is traced through moving objects, through collisions between objects, or through sound, light, heat, and/or electric currents; explain the changes in energy and motion that occur when objects collide and when energy is converted between forms such as electricity, light, sound, heat, and motion (4-PS3-2)
- use evidence to support a design solution for which the student describes how digitized signals can be used to code and decode information, sorts and classifies designed products based on signal patterns, and then choose the best solution to the design problem based on defined criteria and constraints (4-PS4-3)
- identify the criteria for success of the solution to a design problem and the constraints on materials, time, or cost and/or ask questions about what would happen if a variable in the design is changed (3-5-ETS1-1)
- design an investigation needed in order to test how well a solution performs, and then use the evidence collected to support, choose, or describe improvements to the solution in order to increase its benefits, decrease known risks, or meet societal demands (3-5-ETS1-2)

Life Science

- develop or use a model to describe how air, water, and decomposed materials in soil are changed by plants into matter; make a food web involving plants, animals, and, optionally, decomposers; and/or use a food web to describe relationships in an ecosystem (5-LS2-1)
- interpret two or more pieces of evidence, data, and/or models to construct an argument that plants acquire material for growth chiefly from air and water, that plants process matter using sunlight, and that plants absorb gases in air through their leaves (5-LS1-1)

- interpret two or more pieces of evidence, data, and/or models to construct a scientifically sound argument that the internal and external parts of an animal or plant interact as a system to serve various functions in survival, growth, behavior, and reproduction (4-LS1-1)

Earth and Space Science

- develop or use a model to explain a phenomenon that is based on interactions between Earth's major systems (5-ESS2-1)
- graph quantities of varying units and use the distribution of Earth's fresh water to explain a phenomenon (5-ESS2-2)
- obtain and combine information from complex texts and/or other reliable media, including tables, diagrams, and/or charts, to explain scientific and technical ideas related to the effect of human activities on individual Earth systems and on Earth as a whole, and describe how the ideas are supported by evidence (5-ESS3-1)

Grade 5 Level 4: Exceeds Expectations

A fifth-grade student performing at Level 4 demonstrates thorough understanding and sophisticated reasoning when applying grades 3-5 Disciplinary Core Ideas, using elementary Science and Engineering Practices, and using elementary Crosscutting Concepts to make sense of phenomena or address solutions in the natural or designed world. A complete list of Science and Engineering Practices and Crosscutting Concepts is provided in Table 1.

In addition to the scientific knowledge and practices demonstrated at Level 3, a student performing at Level 4 can do things like:

Physical Science

- evaluate and/or revise models of waves, sort or group waves based on similarities or differences in their patterns and the effects the various waves will have on the motion of an object, and use this information to make predictions (4-PS4-1)
- design an investigation that includes planning fair tests with controlled variables, variables to be changed and measured, and the number of trials considered; the investigation must be one that can be used to provide evidence that supports or refutes an explanation of what changes in energy and motion occur and how energy flows or is transferred when objects collide and when energy is converted between forms such as electricity, light, sound, and motion; the student can also make predictions about what would happen in the investigation if a variable changed. (4-PS3-2)
- apply scientific ideas to generate a solution to a design problem based on defined criteria and constraints, and interpret digitized signals in the context of evaluating the designed product based on signal patterns (4-PS4-3)
- propose solutions to a design problem based on evidence, evaluate the solutions in relationship to the criteria for success and constraints on materials, time, or cost, and predict what would happen if a variable in the design is changed (3-5-ETS1-1)
- plan and conduct the research needed prior to beginning to design a solution, use the research results to generate a solution to a design problem, and/or evaluate the solution or its improvements in terms of increasing benefits, decreasing known risks, or meeting societal demands (3-5-ETS1-2)

Life Science

- use evidence to evaluate and/or revise a food web or make predictions based on a change to an ecosystem (examples include a newly introduced organism or the disappearance of an organism) (5-LS2-1)
- interpret two or more pieces of data to construct or refine an argument that plants cycle water, taking it in through their roots and giving it off through their leaves, and that plants use carbon dioxide in the air and water to produce the sugar they need for growth (5-LS1-1)

- choose the evidence, data, or models needed in relationship to an argument, and then construct an argument (based on the appropriate evidence, data, or model), and/or refine arguments (based on an evaluation of the evidence presented) that differences in structures across species can positively or negatively affect animal or plant survival, growth, and reproduction and/or affect animal behavior and that these effects can be predicted based on system interactions (4-LS1-1)

Earth and Space Science

- use evidence that shows the relationships among variables in order to evaluate or revise a model to improve its representation of the interactions between Earth's major systems (5-ESS2-1)
- interpret graphs and quantities using standard units to reveal patterns that suggest relationships and predicts the effects of changes in the distribution of Earth's fresh water in relation to an explanation of a phenomenon (5-ESS2-2)
- compare and/or combine information from complex texts with that in written texts or graphical displays (including tables, diagrams, and/or charts) to predict the ways in which the activities of humans and individuals affect one or more of Earth's systems, and Earth as a whole, and/or describe changes to human activities that will give a desired effect on one or more of Earth's systems (5-ESS3-1)

Table 1. NGSS Science and Engineering Practices and Crosscutting Concepts

Science and Engineering Practices	**Crosscutting Concepts**
Analyzing and Interpreting Data	Cause and Effect
Asking Questions and Defining Problems	Energy and Matter
Constructing Explanations and Designing Solutions	Patterns
Developing and Using Models	Scale, Proportion, and Quantity
Engaging in Argument from Evidence	Stability and Change
Planning and Carrying Out Investigations	Structure and Function
Obtaining, Evaluating, and Communicating Information	Systems and System Models
Using Mathematics and Computational Thinking	