

2010 Nevada Science Assessment Matrix Grades 3-5

Science Test Matrix for Grade 5 CRT

	Physical Science – C1	Life Science –C2	Earth/Space Science – C3	Nature of Science – C4	Total
DOK 1	6	5	5	3	19 - 41%
DOK 2	6	7	7	5	25 – 54%
DOK 3**	1	1	0	0	2 – 5%
Total	13	13	12	8	46 items (50 points)
	28%	28%	26%	18%	

** DOK 3 items are Constructed Response items each worth 3 points.

Expanded Matrix

C1- Physical Science (13 items)

- Matter: items for this standard will focus on the states of matter, how changes in energy inputs can lead to matter changing states, how observable properties of materials can be used to classify them in groups; concepts of conservation of mass, and the particulate nature of materials.
- Forces and Motion: items for this standard focus on how motion of objects change when unbalanced forces are applied. Items will also emphasize how magnetic, gravitational, and electric forces can cause changes in the motion of objects.
- Energy: items for this standard focus on the simple properties of light, the wave characteristics of sound, and organization of simple electric circuits. Items will also examine student knowledge of how heat moves from one object to another.

C 2 – Life Science (13 items)

- Heredity: items for this standard focus on basic aspects of the topic: the inheritance of some physical and behavioral characters, while other characteristics are learned. There will also be items examining student knowledge of variation within populations and the role of reproduction in continuation of species.
- Structure of Life: items for this standard focus on the life cycles of plants and animals, and the structures that enable them to grow, reproduce, and survive.
- Organisms and Their Environments: items for this standard focus on the interaction of organisms with the other living and non-living parts of their environments. Specific emphasis is given to the organization of food webs, the role of adaptations in allowing organisms to survive in specific habitats, and the ways that living organisms can change their physical environments.
- Diversity of Life: items for this standard focus on: classification systems; the role of fossils as evidence of past life; and the importance of variability within populations for the survival of species.

C 3 – Earth/Space Science (12 items)

- Atmospheric Processes and the Water Cycle: items for this standard focus on the processes of the water cycle, including the role of the Sun as the main source of energy, and the role of water in phenomena related to weather.
- Solar System and Universe: items for this standard focus on the Sun, planets, and moons of the solar system, including student knowledge of the cyclical patterns of observable objects in the system including stars and constellations.
- Earth's Composition and Structure: items for this standard measure student understanding of the role of water, wind, and ice in changing features of the Earth's surface. Items also focus on the slow and fast processes shaping land forms, and the formation of rocks and soils.

C 4 – Nature of Science (8 items)

- Scientific Inquiry: items for this standard focus on students' ability to plan and conduct simple investigations, using accepted practices, including collection and analysis of data, and communication of results. Items also focus on the role and use of models in communicating information.
- Science, Technology, and Society: items for this standard focus on the role of peoples from diverse cultures in the development of scientific knowledge throughout history, and the impact of changing technology on society.

Depth of Knowledge

DOK Level 1: Recall

Items at the DOK 1 Level require the **recall** of information, such as a fact, definition, term, or a simple procedure, as well as performing a **simple** science process or procedure. Level 1 only requires students to demonstrate a rote response, use a well-known formula, follow a set procedure (like a recipe), or perform a clearly defined series of steps. DOK 1 items may also require that students employ a simple procedure or formula to **reproduce** a previously learned result. It is not left to the student to come up with an original method or solution. A “simple” procedure is well-defined and typically involves only **one-step**. Verbs such as “identify,” “recall,” “recognize,” “use,” “calculate,” and “measure” generally represent cognitive work at the recall and reproduction level. Simple word problems that can be directly translated into and solved by a formula are considered Level 1. Verbs such as “describe” and “explain” could be classified at different DOK levels, depending on the complexity of what is to be described and explained.

A student answering a Level 1 item either knows the answer or does not: that is, the answer does not need to be “figured out” or “solved.” In other words, if the knowledge necessary to answer an item automatically provides the answer to the item, then the item is at Level 1. If the knowledge necessary to answer the item does not automatically provide the answer, the item is at least at Level 2.

DOK Level 2: Use of Concepts and skills

Items at the DOK 2 level require the engagement of some mental processing beyond recalling or reproducing a response. The content knowledge or process involved is **more complex** than in level 1. DOK 2 Items require students decide what to do, using methods of reasoning and problem solving skills, and to bring together concepts and skills from various domains. Keywords that generally distinguish a Level 2 item include “classify,” “organize,” “estimate,” “make observations,” “collect and display data,” and “compare data.” These actions imply **more than one step**. For example, to compare data requires first identifying characteristics of the objects or phenomenon and then grouping or ordering the objects. Level 2 activities include making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.

Some action verbs, such as “explain,” “describe,” or “interpret,” could be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, requiring reading information from the graph, is a Level 2. An item that requires interpretation from a complex graph, such as making decisions regarding features of the graph that need to be considered and how information from the graph can be aggregated, is at Level 3.

DOK Level 3: Strategic Thinking and Problem Solving

Items at the DOK 3 level require students to employ a higher level of thinking than the previous two levels. **Strategic Thinking** requires deep knowledge using **reasoning, planning, and using evidence to support results**. The cognitive demands at

Level 3 are **complex** and **abstract**. The complexity does not result only from the fact that there could be multiple answers, a possibility for both Levels 1 and 2, but because the multi-step task requires more demanding reasoning. In most instances, requiring students to explain their thinking is at Level 3; requiring a very simple explanation or a word or two should be at Level 2. An activity that has more than one possible answer and requires students to justify the response they give would most likely be a Level 3. Experimental designs in Level 3 typically involve more than one dependent variable. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems.