2010 Nevada Science Assessment Matrix
Grades 6-8

Science Assessment Matrix Grade 8

	Physical Science C-1	Life Science C-2	Earth/Space Science C-3	Nature of Science C-4	Totals
DOK 1	5	5	5	3	18 - 39%
DOK 2	7	7	6	5	25 - 54%
DOK3**	1	1	1	0	3 - 7%
Totals	13	13	12	8	46 items (52 Points)
	28%	28%	26%	18%	

** DOK 3 items are all Constructed Response Items, each worth 3 points.

Extended Test Matrix:

C 1 – Physical Science (13 items)

- Matter: items for this standard will focus on the particulate nature of matter, including atoms and their components; other items will look at elements and the characteristics used to arrange them in the Periodic Table. Items will also address how elements combine to form molecules, mixtures, and solutions, and the fact that in all these reactions matter is always conserved.
- Force and Motion: items for this standard emphasize the effects of unbalanced forces on the motion of objects; the relationship between electric currents and magnetic forces; and the gravitational force that exists between all objects.
- Energy: items for this standard address: the characteristics of visible light as part of the electromagnetic spectrum; the characteristics of wave and how waves (vibrations) travel at different speeds in different mediums. Items will also focus on how energy is transferred using electrical circuits; including how energy can be transformed from one form to another, but is never destroyed.

C 2 – Life Science (12 items)

- Heredity: items for this standard will focus on heredity as the passage of genetic information from one generation to the next and how changes in the genes of eggs and sperm can cause changes in inherited characteristics in the next generation. Items will address ideas around the artificial selection of characteristics in organisms, and how some characteristics are changed during interaction with the environment.
- Structure of Life: items for this standard will focus on student's knowledge of cells and cell structures, and how cells grow, divide, get and use energy; items will also focus on how in multicellular organisms cells can combine to form tissues, organs, and organ systems to perform specialized functions. Items may also address how cells and organisms are impacted by disease and infection.
- Organisms and Their Environments: items for this standard focus on the functional roles that organisms perform in their ecosystems, how energy is obtained and transferred in living systems; how limitations of resources and energy impact the number and types of organisms that can live in a given habitat; and how changes in non-living components impact living organisms.
- Diversity of Life: items for this standard will focus on how characteristics of organisms, including fossils, can be used to form classification systems; items will also focus on the relationship between heredity and environment in shaping the behaviors of organisms.

C 3 – Earth/Space Science (13 items)

- Atmospheric Processes and the Water Cycle: items for this standard will address the causes for seasons on Earth; the composition of the atmosphere and the role of the atmosphere and the water cycle in shaping weather and climate; some items will also focus specifically on how the weather and climate in Nevada is influenced by the topography of the state.
- Solar System and Universe: items for this standard will focus on the components of the solar system and their characteristics. There will also be items that measure student's understanding of the Earth as part of the Milky Way Galaxy, and how the Earth's movement in the solar system helps explain many phenomena such as days, years, phases of the moon, and eclipses.
- Earth's Composition and Structure: items for this standard will focus on the rock cycle, including how fossils in sedimentary rocks provide evidence of environmental changes. Items will also address how geologic processes including the movement of tectonic plates, and result in changes in the Earth's surface structures. Items will address student' knowledge of renewable and non-renewable resources and also on the structure and development of soils.

C 4 – Nature of Science (8 items)

- Scientific Inquiry: items for this standard will focus on student's ability to identify, evaluate, and use data to answer questions and support positions; items will also focus on the use of scientific models to organizing data and communicating results of experiments.
- Science, Technology, & Society: items for this standard emphasize student's ability to understand the consequences of using technologies to exploit environmental resources. Items will also focus on using tools and technology to answer questions and communicate findings.

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.