Nevada Educator Performance Framework

A Guide for SCIENCE Educators

STANDARD 1	STANDARD 2	STANDARD 3	STANDARD 4	STANDARD 5
New Learning is Connected to Prior Learning and Experience 1	Learning Tasks have High Cognitive Demand for Diverse Learners 2	Students Engage in Meaning-Making through Discourse and Other Strategies 3	Students Engage in Metacognitive Activity to Increase Understanding of and Responsibility for Their Own Learning 4	Assessment is Integrated into Instruction 5

Standard 2: Learning Tasks have High Cognitive Demand for Diverse Learners

Indicator 1 - Tasks purposefully employ **all** students' cognitive abilities and skills

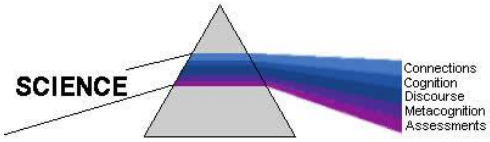
Indicator 2 - Tasks place appropriate demands on each student

Indicator 3 - Tasks progressively develop **all** students' cognitive abilities and skills

Indicator 4 - The teacher operates with a deep belief that **all** children can achieve regardless of race, perceived ability and socio-economic status.

General Examples of Science Classroom Strategies:

- Design and Conduct Inquiry-Based Labs
- Active Modeling
- Link Lessons to the Big Idea
- Support Diverse Learners



Key Ideas from Theory and Research:

- The success of students in developing high-level cognitive abilities and skills is dependent on their engagement in deep and rich tasks that afford such opportunities (Lin, 2005; Stein, Grover, & Henningsen, 1996; Stigler et al., 1999).
- The nature and level of a task will vary among students. This needs to be considered when planning activities that have high cognitive demand for diverse learners as a goal (Moll, 1990).
- Students attain deep knowledge when engaged in tasks that are authentically related to the everyday practices of professionals in a discipline, retaining fundamental, disciplinary practices and beliefs while also being age appropriate (Sawyer, 2006).
- Learning tasks that connect new learning to prior learning in networks structured around key ideas of the subject-matter can support the development of schema (Good & Brophy, 1994).
- Teachers engage students in learning that is within their ZPD, (Zone of Proximal Development, not too hard and not too easy) through tasks and interactions that involve a gradual release of assistance so that the learning ultimately becomes part of the student's independent achievement (Tharp & Gallimore, 1989; Vygotsky, 1986).

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Key Practice Examples for a Science Classroom:

Indicator 1 Example:

Students actively engage, as lead facilitators, in inquiry-based, experimental design laboratory investigation.

Have students revisit the big question for the unit and develop their own scientifically testable research question. Students can brainstorm ideas in their interactive notebooks and use them to define a system for planning and carrying out investigations. After brainstorming different ideas, students will determine how to organize and collect data to generate evidence-based claims.

Example lab ideas:

- Physical Science – What is the relationship between light and how it travels through different media?
- Life Science – What effect does a lack of nutrients have on a plant's growth?
- Earth and Space Science – What is the relationship between a regional streamflow and the rate of erosion on a landscape?
- Engineering – What is the relationship between building design and stability?

Indicator 2 Example:

Students are the "driver of thinking" and are asked to re-think their understanding based upon data and information from investigations.

Students will create representations in their interactive notebooks of the relationships among science concepts before, during and after investigations. Students initially create a model of the science concept being taught. After their investigation, have students revisit the models they created in their interactive notebooks and revise as needed. Ask students to reflect on their interpretation and analysis of the data and how their model demonstrates or does not demonstrate their understanding.

Example Models:

- Sketches
- Pictures
- Graphs

Indicator 3 Example:

Teachers plan thematic units of instruction, which coherently link all topics to the Big Idea.

Teachers purposefully plan lessons that coherently connect to big ideas in science. This can be done by reviewing the big ideas and Grade Band Endpoints described in *A Framework for K-12 Science Education.* Grade Band Endpoints can be used to understand the progression of understanding through grade 12, which described appropriate grade level abilities and skills. All lessons should intentionally target the big idea while scaffolding student understanding. This can be done through modeling and asking students to reflect on learning in their interactive notebooks.

Indicator 4 Example:

Students come from diverse backgrounds and may not have had similar experiences, which help to develop scientific understanding. Keeping this in mind, some students may have never experienced the scientific concept that is being taught. Integrating physical elements, real-life pictures, etc. into instruction to provide context for learning can help students better conceptualize scientific concepts.

Examples:

- Take students on a virtual field trip
- Use real-life pictures with graphic and written representations