



Middle School Science

At least one of the following artifacts must be discussed during the evaluation: peer feedback, student feedback, lesson plans, student work or parent feedback.

QUALITY STANDARD 1

Teachers demonstrate mastery of and pedagogical expertise in the content they teach.

The elementary teacher is an expert in literacy and mathematics and is knowledgeable in all other content areas he or she teaches. The secondary teacher has knowledge of literacy and mathematics and is an expert in his or her content endorsement area.

ELEMENT A: Teachers provide instruction that is aligned with the Colorado Academic Standards, their District's organized plan of instruction; and the individual needs of their students.

Examples of artifacts that may be used as evidence to support practice:

- Warm-ups
- Entry & Exit tickets
- Teacher is having the students write CERs (Scientific Explanation= Claim, Evidence, and Reasoning)
- Learning Targets based on CAS, NGSS & CCSD curriculum framework are posted
- Teacher verbalizes explicit connections between the learning target and the lesson.
- Activities are differentiated according to student needs (grouping, text complexity, procedural or lab complexity, levels of tests or questions, individual interactions)
- Participation in PLTs, department meetings, any available vertical or horizontal articulation between schools

ELEMENT B: Teachers demonstrate knowledge of student literacy development in reading, writing, speaking and listening.

Examples of artifacts that may be used as evidence to support practice:

- Uses differentiated text
- Use of common core literacy standards for literacy in science
- word walls
- teach use of index, glossary, & table of contents in texts
- intentional grouping strategies
- Science notebooking
- CERs (Claim, Evidence & Reasoning: Scientific Reasoning)
- Clear representation of thinking through Thinking Maps
- Teaching nonfiction reading strategies
- Analyzing the validity of print & electronic resources
- Allows for student choice when selecting complex text
- Variety of lesson and/or assessment formats (gallery walk, oral presentation, visuals,

- video production, raps or songs, drawings)
- Using Socratic Seminar or debate or “4-corners”
- Use of current events as tie-ins to curriculum

ELEMENT C: Teachers demonstrate knowledge of mathematics and understand how to promote student development in numbers and operations, algebra, geometry and measurement and data analysis and probability.

Examples of artifacts that may be used as evidence to support practice:

- Use of math language in instruction and direct math instruction when applicable:
 - scale, distance, vectors, x & y-axis, mean, median, range, average, probability, percentages, slope
- Graphing
- Solving mathematical problems
- Use of models
- Measuring
- Making reasonable predictions based on data
- Interpreting & drawing conclusions from a variety of data (CERs, etc)
- Conversions (grade level appropriate)
- Scientific notation
- Use of metric system

ELEMENT D: Teachers demonstrate knowledge of the content, central concepts, tools of inquiry, appropriate evidence-based instructional practices and specialized character of the disciplines being taught.

Examples of artifacts that may be used as evidence to support practice:

- Scientific & Engineering Practices
- STEM
- National Board Certification or degree in content area
- Continuing Education credits (specific to science content & practices)
- PBL (project or problem based learning)
- CERs (Scientific Explanation: Claim, Evidence & Reasoning writing)
- Uses current, up-to-date materials
- Uses available technology (information, applications & programs: PhET, NASA, NOAA, NREL, Khan Academy, probeware)
- Providing opportunities for students to actively seek answers to open-ended questions (labs, inquiry, research, comparison of multiple documents or the research results of multiple scientists)
- Intentional use of the inquiry continuum (teacher-guided to student guided) dependant on student needs and the specific task
- Content is scaffolded to levels appropriate for different students

ELEMENT E: Teachers develop lessons that reflect the interconnectedness of content areas/disciplines.

Examples of artifacts that may be used as evidence to support practice:

- Using word origin, roots to show connections between vocabulary in other disciplines
- Use of common cross-curricular language (claim, evidence, math terms, thinking maps, annotating text, extrapolate, hypothesize, etc.)
- Uses CER
- Uses literacy strand of district CER base rubric
- STEM lesson planning
- Co-planning with other disciplines
- Nonfiction reading strategies
- Mini lessons help students relate science to other content areas
- Intentionally points out cross-cutting concepts in science (energy, patterns, structure & function, cause & effect, systems & system models, stability & change, scale, proportion & quantities)
- Co-plan with team members and teach interrelated lessons (ie. reading a book that relates to the science content)

ELEMENT F: Teachers make instruction and content relevant to students and take actions to connect students' background and contextual knowledge with new information being taught.

Examples of artifacts that may be used as evidence to support practice:

- Develops relationships with students specifically to understand their interests
- uses data from student interest inventories
- POGIL (Process Oriented Guided Inquiry Learning) group roles
- flexible grouping
- provides opportunities for student choice in process, product, assessments, etc.
- warm-ups to activate prior knowledge
- Makes explicit connections to prior content and to students' daily lives
- Lunch groups, book clubs, after-school learning time, tutorials,

QUALITY STANDARD II

Teachers establish a safe, inclusive and respectful learning environment for a diverse population of students.

ELEMENT A: Teachers foster a predictable learning environment in the classroom in each student has a positive, nurturing relationship with caring adults and peers.

Examples of artifacts that may be used as evidence to support practice:

- clearly communicated structured routines
- Teachers clearly communicate expectations (seated when bell rings, start warm-ups, raise hand to speak, on-task, positive peer relationships)
- Learning targets are displayed
- Teacher has positive interactions with students
- Teachers successfully defuse situations that could lead to a power struggle
- Teacher seeks and encourages multiple viewpoints

- Teacher elicits responses from all students equally
- Teacher is sensitive to variation in moods or fluctuating needs of individual students
- Display student work
- Teacher understands adolescent development

ELEMENT B: Teachers demonstrate a commitment to and respect for diversity, while working toward common goals as a community and as a country.

Examples of artifacts that may be used as evidence to support practice:

- Uses the 6 conditions and 4 agreements in classroom
- Teaches students how to navigate the compass when they disagree
- Teacher seeks and encourages multiple viewpoints
- Includes contributions of minority and women scientists
- Attend, and are pleasant and professional, at all teacher conferences
- Respond to parent e-mails and phone calls in a timely fashion
- Positive phone calls and referrals are sent home
- Participates in PBIS (Positive Behavior Interventions Supports) activities.

ELEMENT C: Teachers engage students as individuals with unique interests and strengths.

Examples of artifacts that may be used as evidence to support practice:

- STEM
- Technology
- Interest surveys
- Random order calling tool (Calling cards, popsicle sticks, random student generator, Powerschool)
- Uses all levels of questions with all students
- AVID strategies (WICOR, SLANT, Cornell note process, etc)
- PBIS
- Positive reinforcement for participation
- Uses academic games for engagement
- Attends extracurricular activities (sports, plays, concerts etc.)
- Uses technology as appropriate

ELEMENT D: Teachers adapt their teaching for the benefit of all students, including those with special needs across a range of ability levels.

Examples of artifacts that may be used as evidence to support practice:

- Uses student's 504, IEP, RTI, and ALP to inform instruction
- Scaffolding
- Included all students in laboratory investigations as possible
- Provides peer tutors
- Teacher provides notes
- Learning contracts for advanced learner
- Intentional planning with Paras, ELA, SPED, GT teachers
- Modified assessments, lessons and assignments

- Lab leaders (Junior fellows) - students to help lead labs
- Maintain and use Schoology site

ELEMENT E: Teachers provide proactive, clear and constructive feedback to families about students' progress and work collaboratively with the families and significant adults in the lives of their students.

Examples of artifacts that may be used as evidence to support practice:

- Communicates expectations with parents
- Keeps Schoology updated
- Specifically invites parents to be guest speakers, to assist with labs, etc.
- Responds in a timely fashion to parent emails and phone calls
- Discipline problems are handled in a professional and respectful manner
- Communicates positive student academic performance and behavior as well as concerns
- Works collaboratively with significant adults to address specific student concerns

ELEMENT F: Teachers create a learning environment characterized by acceptable student behavior, efficient use of time and appropriate intervention strategies.

Examples of artifacts that may be used as evidence to support practice:

- Warm-ups
- Entry & Exit ticket
- Teacher verbalizes behavior expectations
- consistent consequences
- Activities are appropriately rigorous according to student needs (grouping, text complexity, procedural or lab complexity, levels of tests or questions, individual interactions)
- Includes specific, intentional, and on-going instruction with regard to science safety procedures and expectations.
- Lessons are designed to go bell to bell without fillers or busy work

QUALITY STANDARD III:

Teachers plan and deliver effective instruction and create an environment that facilitates learning for their students.

ELEMENT A: Teachers demonstrate knowledge of current developmental science, the ways in which learning takes place and the appropriate levels of intellectual, social and emotional development of their students.

Examples of artifacts that may be used as evidence to support practice:

- Teacher differentiates content, process & product as appropriate for middle school students
- Attends professional development around current brain research, student learning

progression, etc.

- Active participation in PLT specifically to work with other teachers to improve the quality of lessons and assessments
- Uses pre-tests, formative assessments, CERs, clickers, discussion boards, exit & entry tickets to inform instruction
- Designs lessons to include collaborative work and movement during transitions
- Integrates WICOR in lesson plans
- Collaborate with Special Education and other specialists as needed

ELEMENT B: Teachers plan and consistently deliver instruction that draws on results of student assessments, is aligned to academic standards and advances students' levels of content knowledge and skills.

Examples of artifacts that may be used as evidence to support practice:

- Uses pre-tests, formative assessments, CERs, clickers, discussion boards, exit & entry tickets to inform instruction
- Uses UBD format plan units & lessons
- Displays daily learning targets
- Use learning target tracking sheets with students
- Encourage academic risk-taking, questioning, learning from mistakes, design & re-design process (STEM process)

ELEMENT C: Teachers demonstrate a rich knowledge of current research on effective instructional practices to meet the developmental and academic needs of their students.

Examples of artifacts that may be used as evidence to support practice:

- Teacher differentiates content, process & product as appropriate for middle school students with varying abilities
- Attends professional development around current brain research, student learning progression, etc.
- Active participation in PLT specifically to work with other teachers to improve the quality of lessons
- Uses pre-tests, formative assessments, CERs, clickers, discussion boards, exit & entry tickets to inform instruction
- Designs lessons to include collaborative work and movement during transitions
- Integrates WICOR in lesson plans

ELEMENT D: Teachers thoughtfully integrate and utilize appropriate available technology in their instruction to maximize student learning.

Examples of artifacts that may be used as evidence to support practice:

- Smartboards
- Probe
- Blended classrooms
- Chromebooks
- PhET

- Laboratory activities
- Bozeman science
- Doc Physics
- Webquests
- Khan Academy
- TED
- Integrates student's personal devices into the classroom (iPhones/Smartphones)
- Calculators
- Clickers
- Use Schoology to make resources available to students
- Teacher is available to help students at lunch before or after school with technology
- Consistent expectations for using technology responsibly

ELEMENT E: Teachers establish and communicate high expectations for all students and plan instruction that helps students develop critical thinking and problem solving skills.

Examples of artifacts that may be used as evidence to support practice:

- Uses high levels of questions for all students
- Teacher works with students to track their progress toward mastery learning targets
- Uses formative assessment to determine level of rigor when planning lessons
- Plans lesson using DOK, Costa's or Bloom's levels to plan questions and learning targets
- Laboratory activities
- Uses catch and release strategies to assess student understanding and modify rigor of lesson
- Uses POGIL roles to define expectations of student performance and to structure group work
- Uses CER, STEM or PBL to incorporate critical thinking and problem solving
- Differentiates content, process, & product to levels that challenge each student

ELEMENT F: Teachers provide students with opportunities to work in teams and develop leadership qualities.

Examples of artifacts that may be used as evidence to support practice:

- POGIL
- Cooperative teams
- Laboratory activities
- Students Leaders/Peer leaders
- Student choice/Teacher choice based on heterogeneous or homogenous groups in classroom based on students' needs for lesson
- Differentiate content, process, and product based on student need
- Long-term and short term work groups

ELEMENT G: Teachers communicate effectively, making learning objectives clear and providing appropriate models of language.

Examples of artifacts that may be used as evidence to support practice:

- Learning Targets visually displayed
- Uses doc camera or whiteboard to model writing
- Teacher models and specifically teaches listening skills
- Teach students to ask appropriate questions
- Provides opportunities for students to communicate about science in writing, orally, and visually.
- Exemplars are posted or shown for writing assignment
- Uses POGIL roles to help students effectively communicate
- Encourages student participation on class discussion boards
- Use Round Robin format to facilitate Arguing from Evidence experiences

ELEMENT H: Teachers use appropriate methods to assess what each student has learned, including formal and informal assessments, and use results to plan future instruction.

Examples of artifacts that may be used as evidence to support practice:

- Summative assessment aligned with CAS standards for each curriculum unit co-created with grade level teachers
- Project (PBL)
- Science Notebooking
- Thinking Maps
- Exit Tickets
- Paige Keeley's Formative assessments
- District CER's (using formal rubric)
- Using rubrics in general
- Lab practical
- Student conferencing
- Blogs/Online discussions
- Uses schoology to turn-in and provide rubric feedback