

Use of Rubrics

Traditional assessments, including short answer, multiple choice and essay questions have been the go-to assessments used for science teachers for many years. In the past, the focus of science teaching and learning was more about getting students to remember science content and science facts. Traditional science assessments were adequate methods for determining how much science knowledge students had acquired by participating in the lessons and completing the activities and homework assigned by the teacher. The advent of the Next Generation Science Standards brings with it an emphasis on 3 dimensional learning: Disciplinary Core Ideas, Crosscutting Concepts and Science and Engineering Practices. Only one dimension, the Disciplinary Core Ideas, reflects the type of content and science facts that made up the majority of past science standards. The other 2 dimensions involve making and understanding connections to other science areas (Crosscutting Concepts), and being able to do science by engaging in the types of activities that scientists and engineers do every day. To put it more simply, the Next Generation Science Standards is less about knowing and remembering facts about science and more about being able to put ideas together, solve problems, conduct research and experimentation and effectively share what has been learned.

The Next Generation Science Standards require a shift not only in how science is taught, but how we assess students. No longer can an assessment just measure what students know, it must also measure what a student can do as well as the ability of a student to make connections. In more simple terms, science has become more of a performance-based subject. In order to determine if students can effectively perform science, we need assessments that can measure this type of performance. To fully understand how ineffective a traditional science test is to the student in an NGSS classroom, consider this analogy: An orchestra student would never be given just a paper and pencil test to measure how well he or she knows a piece of music, there would also be some sort of test of how well the student can play the piece of music. In that same way, we need methods for measuring how well students can do science; the old way of measuring just what students know does not effectively measure the other two dimensions of NGSS.

Rubrics are an effective solution to this problem. When grading students products, models, projects, writing, and performances, using a criteria to judge if essential elements have been included or not gives meaning to the points that are assigned. For the teacher, rubrics clarify the expectation for how the product or performance should look. Rubrics also provide a means to score students' work accurately and consistently from student to student. Scoring with a rubric provides students and parents with descriptive feedback that shows clearly what was accomplished and what was missed by the student. When analyzed, the data from a class set of rubrics can act as a formative assessment tool and give teachers valuable information about

what students know and what they can do as a result of the instructional process and whether or not goals have been met before moving on to the next topic.

If rubrics are shared with students in advance of the due date for an activity, project or performance, there are added benefits. Students will know in greater detail what is expected; less misunderstanding of what a student needs to do or needs to include to earn the grade desired. This is helpful to parents as well, especially when the project or activity is completed at home and the parent may have a role in advising or assisting their child; no more confusion wondering what the teachers was looking for. Students can also use a rubric to self-evaluate their work or evaluate the work of peers; this is consistently emphasized in NGSS as part of the Science and Engineering Practices.

Rubrics can be time consuming to create, but having them prior to beginning the instruction of a unit or the introduction of an activity is essential to keeping both the student and teacher focused on the learning and performance goals. The inclusion of these rubrics is an added benefit to choosing to use Savvas' *Elevate Science*.