

Connecticut Scientific Inquiry Formative Assessment Rubric

INTRODUCTION

The Scientific Inquiry Formative Assessment Rubric has been developed as a resource for assessing student performances in scientific inquiry and providing meaningful feedback to students to promote learning. Elementary and Middle Grades rubrics can be used to assess student work on Connecticut's Curriculum-Embedded Performance Tasks for Grades 3 to 8, or for any performance task that features the essential components of scientific inquiry. The rubric serves two purposes:

1. to clearly describe what distinguishes novice from skillful performances; and
2. to communicate to students their strengths and targets for improvement.

Rather than assigning a point score or a letter grade to student work, this rubric describes *qualities* of novice, intermediate and skillful work for each of four key components of scientific inquiry. By selecting the performance descriptor that most closely describes a student's work for each inquiry component, the rubric can be used by teachers and students to:

- a) develop a profile of a student's inquiry abilities at a given point in time;
- b) identify strengths and areas for improvement;
- c) clearly describe criteria for progressing to the next higher level of competence; and
- d) track student growth each year, and across grades.

The essential components of scientific inquiry are drawn from *Inquiry and the National Science Education Standards* (National Academy of Sciences, 2000):

- Component 1. Making scientific observations and posing testable questions
- Component 2. Designing investigations to answer scientific questions
- Component 3. Displaying and working with data
- Component 4. Communicating evidence-based conclusions

Each component is divided into two elements within the rubric. The elements are based on the Expected Performances for Scientific Inquiry, Literacy and Numeracy in Connecticut's 2004 Core Science Curriculum Framework.

Performance descriptors are provided for Level 5 (Skillful), Level 3 (Intermediate), and Level 1 (Novice). Level 2 and Level 4 do not have predetermined performance descriptions on the rubric. This is to allow flexibility to describe student performances that have some elements of Level 1 and some elements of Level 3 as "Level 2"; or some elements of Level 3 and some elements of Level 5 as "Level 4".

Teachers may customize the rubrics by adding their *own* criteria as elements of the performance descriptors. For example, if students are learning to make hypotheses, calculate the mean, or use commas to set off parenthetical information, these expectations can be added as a third performance element.

The Scientific Inquiry Formative Assessment Rubric allows users to create a dynamic learner profile that changes as students progress. The rubric can be used to pre-assess students' abilities prior to instruction, to monitor their learning after an instructional intervention, and as a summative measure at the end of a learning unit or school year. The profile can be used to plan

targeted and differentiated instructional interventions (e.g., flexible skills groups, mini-lessons, guided practice, etc.) and then to monitor progress by using the formative assessment rubric to analyze post-intervention student work.

Each inquiry component is assessed independently of the others. As a result, a student may be “Skillful” when it comes to making scientific observations (Component I), but at a “Novice” level in designing investigations (Component II). At different times, teachers may choose to assess and provide feedback to students for all four components of inquiry, or for just one component of an inquiry investigation (for example, the observation component). In addition, students can be trained to use the rubric to assess their own work and the work of their peers.