

ABILITIES NECESSARY TO DO SCIENTIFIC INQUIRY:

STUDENT SCORING RUBRIC

Purpose

This document provides a framework to guide teacher evaluations of a student's ability to do scientific inquiry.

Overview

This rubric provides criteria to judge student performance in five different abilities to do scientific inquiry. The abilities include:

- A. Asking Questions
- B. Conducting Investigations
- C. Using Tools
- D. Developing Reasonable Explanations
- E. Sharing Findings

This rubric is aligned with the NSES "abilities necessary to do scientific inquiry." At the primary and intermediate level, there is a direct match to the five fundamental abilities that underlie the NSES Inquiry Standard. The eight NSES abilities at the middle level have been collapsed into the five areas. The NSES "mathematics" and "critical and logical thinking" abilities have been incorporated within "C, D, and E" of the student rubric. The NSES Content Standard: 5-8, Inquiry Standard, "recognize and analyze alternative explanations..." has been placed at the senior high level. Finally, at the senior high level, the NSES Content Standard: 9-12 Inquiry Standard, "recognizing alternative explanations" is incorporated in "D" of the student rubric.

Performance Levels

Four performance levels are described for each of the five abilities. These levels represent a continuum describing growth in achieving the standards. The performance levels are:

- 4 Advanced
- 3 Proficient
- 2 Progressing
- 1 Beginning

Formats

Please note that two formats, "Grade-Band View" and "Program View" of the rubric set are provided. Each format contains identical content. The Grade-Band View has all five abilities grouped together for a particular grade-band level. The Program View has each grade level group within inquiry ability. Each format is better suited for a particular purpose. For example, classroom teachers and students would find the Grade-Band View most helpful in evaluating what is expected of students. Educators and community members may find the Program View more useful when making science curriculum decisions.

Use

The student scoring rubric for *Abilities Necessary to Do Scientific Inquiry* can be used to evaluate the products of student inquiry, such as investigations, projects, labs, and portfolios. Teachers may elect to use portions of the rubric, as appropriate, to match needs in both assessment and instruction. **Classroom assessment for learning (formative) can be framed with three general guiding questions – Where are you going? Where are you now? How can you get there? Classroom Assessment and the National Science Education Standards discusses connecting effective classroom assessment to efficient instruction for science as inquiry (National Research Council, pp. 25-30, 2001.)** The rubric criteria should be shared with students ahead of time to help them understand expectations for their learning. Students will be able to use rubrics to guide self-reflections. The rubric criteria can be used to guide the feedback in teacher/student interactions.

Acknowledgement

This document is based on an original rubric written by Sherri Person-Pandil and Joan Anthony, Nebraska Educational Service Unit #3, Omaha, NE, 2002.

Reference Used in Developing this Rubric

CCSSO Science Portfolio Scoring Guide, Council of Chief State School Officers; State Collaborative on Assessment and Student Standards Project, April, 1997

Project 2061, *Benchmarks for Scientific Literacy*, pp 9-13, 281-300, 1993

National Science Education Standards—Chapter 6—Science Content Standards—Science As Inquiry; pp 121-123, 143-148, 173-176, 1996