Creating opportunities for students to show what they know: the role of scaffolding in assessment tasks  
(Kang, H., Thompson, J., & Windschitl, M., 2014, Science Education, 98(4), 674-704)

Scaffolding by Providing a Rubric. (p.13)

Rubrics provided information about the essential attributes of a high-quality evidence-based explanation. A “simple rubric” (Level 1) provided prompts, such as “Once you have written your explanation, pick two pieces of evidence and write how they support your explanation.” Sometimes, a Level 1 rubric provided a more elaborated list for getting full credit, as shown in the skater girl’s assessment (see Figure 3):

- 1 point: Describe the forces acting on the skater girl in #1.
- 1 point: Use at least three words from the Word Bank/Word Wall.
- 1 point: Explain why this is better than another choice she has.

A simple rubric is similar to checklist except that a rubric shows associated credit points. In contrast, a “comprehensive rubric” (Level 2) took the form of a table with multiple rows and columns, elaborating expected levels of performance in detail. The performance expectation was developed by the teacher and, thus, did not always match with our criteria for evaluating the quality of an explanation.

Providing a Rubric: Priming Disciplinary Ways of Thinking and Talking (p. 25):

Rubrics are frequently used to engage students in monitoring their current level of thinking and determining next steps toward learning goals (Shepard, 2005; Walqui, 2006). In this study, rubric scaffolds alone were significantly associated with the quality of student explanations. Many rubrics explicitly encouraged epistemic features of disciplinary thinking and talking. Even prompts at a Level 1 revealed the tacit structure of evidence-based explanations to students. For example, in the skater girl assessment, each prompt guided students to describe what happened (i.e., a skater girl who is about to hit the wall), use scientific concepts as part of the explanation (i.e., force, friction, momentum) and then to describe the reasoning behind a claim (i.e., explain why this is better than another choice she has). Shepard (2000) reminds us that the importance of

ABSTRACT: This study examines the ways in which teachers provide students with written scaffolds in assessment tasks and the impact of these on students’ abilities to demonstrate a core disciplinary proficiency—constructing evidence-based explanations. Data include 76 assessment tasks designed by 33 science teachers and 707 samples of student work. We found five types of scaffolding embedded in assessments that allowed students to make their reasoning explicit: (a) using contextualized phenomena, (b) rubrics, (c) checklists, (d) sentence frames, and (e) encouraging students to draw explanatory models in combination with written explanation. Analyses showed that all five forms of scaffolding were significantly associated with the quality of student explanation even when controlling for teacher variance and student background. Providing contextualized phenomena had the greatest impact on the quality of student explanations, both by itself and in combination with other scaffolding. The results indicate that strategic combinations of scaffolds can prompt students across all achievement levels to more readily use what they know to produce evidence-based explanations, but that the scaffolding must be of high quality.

transparency is to make the assessment an activity for learning. A rubric that makes the expectations for achievement transparent seemed to support students in successfully constructing evidence-based explanations.

Figure 3. Force and motion assessment: What should the skater girl do to minimize her injuries?