

CHARACTERISTICS OF A HIGH-QUALITY PROBLEM OR TASK

For Workshops 2, 4, 6 and 8

During each In Practice workshop, Learner Teachers create problem stems, problems or projects. Viewers should keep the following guidelines in mind when creating their own tasks:

- A sound strategy for developing good tasks is to start with the math goals and skills, develop your specific scoring guidelines for a “4” project, and then create the activities. Start with the end in mind and then go backward from there.
- Creating quality tasks and lessons is challenging. Start with tested sources such as NCTM addenda books or NSF project materials and then modify. Once written, pilot your tasks and lessons with colleagues and students and revise them, based on the responses.
- You do not have to start from scratch when creating good lessons and tasks. The Missing Link Web site connects you to numerous excellent sites, such as the Math Forum. Go to www.learner.org/channel/workshops/missinglink. Select Links & Resources.

The following list suggests some important qualities to look for when developing or evaluating a task:

Essential (not tangential)

- aligned with NCTM standards
- represents “big” mathematical ideas
- students construct, refine and use significant math models

Authentic (not contrived)

- directly involves meaningful, real-life uses of mathematics
- not artificially constrained in terms of the solution

Equitable (not biased)

- gives diverse students opportunities to use their talents and display growth
- students apply their own experiences and understandings to solve the problem

Rich (not simplistic)

- contains numerous possibilities, including the potential for extensions and connections
- encourages students to understand the concepts underneath the mathematical formulas

Feasible (not impractical)

- safe and developmentally appropriate, can be done

Clear (not confusing)

- states expectations clearly

Scorable (not vague)

- has scoring guide that is easily applied

Active (not passive)

- student is worker and decisionmaker
- student interacts with others
- student uses mathematical models to understand concepts

Accessible (not just for some students)

- students with widely differing levels of mathematical ability can work actively and productively on the activity

Source: Connecticut Common Core of Learning, Mathematics Assessment Project. Sponsored by a grant from the National Science Foundation.

DRAFTING A PROBLEM OR TASK

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Use the discussion below and the template on page 165 to create your own problems or tasks. You can find examples of tasks that the Learner Teachers created in the In Practice workshop sections of this guide.

Core Concepts

- What are the big mathematical ideas or concepts that students must know?

Mathematical Skills

- What are the skills that students must be able to do to demonstrate proficiency?

Essential Questions

- What are the essential questions that tie the core concepts to the needed skills? The work students show in the problem will answer the essential questions.

Examples:

- Core Concept — Scale factor is a key to solving proportional situations.
- Skill — Determine the scale factor in proportional situations.
- Essential Question — How can you use scale factor to find a missing measure in a proportional situation?

Problem Statement or Prompt

- Tells students in a sentence or paragraph that tells students what the problem is and what they need to do
- Provides a clear invitation to students to demonstrate, as fully and powerfully as possible, what they know and can do mathematically
- Involves essential mathematics
- Exhibits characteristics of a high-quality performance task (see page 163).

Task Criteria

- What do you hope to see?
- What is your picture of an exemplary solution?
- What work is necessary to demonstrate complete mastery and understanding?
- Is the task to be done individually? Partners? Small group? Whole class?
- How will the task solution be displayed or written up?

Time Frame for Completion

Scoring Guide

- What work would rate a “4” score for being exemplary?

TEMPLATE FOR CREATING A PROBLEM OR TASK

For Workshops 2, 4, 6 and 8

Topic: _____ **Lesson:** _____

Grade Level: _____

Core Concepts: _____

Mathematical Skills: _____

PROBLEM STATEMENT OR PROMPT

Is it clearly stated so students understand the problem or task?

TASK CRITERIA OR PROBLEM GUIDELINES

Have you identified the components of the problem?

What do you want students to show, explain or produce?

TIME FRAME FOR TASK COMPLETION

Have you built in adequate time for solving and discussing the problem?

SCORING GUIDE

How will you know that students have successfully completed the task?

What will an exemplary solution or product look like?