Characteristics of Open-Ended Questions

Open-ended questions require students to communicate their thinking, thereby providing teachers with valuable information that can inform their instruction. An open-ended item should:

1. Involve 'Big Ideas'.
   In Mathematics, the problematic aspect of the open question should be the mathematics' concept or skill targeted by the question. Problems should be clearly stated.
   In Language, rich questions involve the students in looking critically at text.

2. Elicit a range of responses.
   An open question may have a variety of solutions and/or a variety of pathways to the solution. Rich questions have a variety of entry points, so students of various levels of understanding can access the problem.

3. Require communication.
   Open questions will require students to explain their thinking and provide reasons for their conclusions. Students should complete responses to the question that:
   - ✓ show a complete solution process;
   - ✓ identify important aspects of the problem;
   - ✓ describe an appropriate conclusion to the problem with supporting evidence.

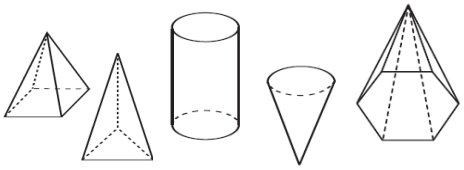
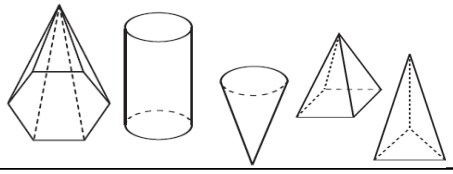
Creating an Open Question

1. Identify the concept or skill you wish to focus on.

2. Locate a lesson or problem that addresses the concept/skill.

3. Revise the problem until the following criteria are met:
   - Does the task focus on conceptual understanding rather than just on mathematical procedures?
   - Is math the central focus of the task?
   - Does the task require justifications?
   - Is there more than one path to a solution?

Creating Open Math Problems

Closed Question	Process Expectations	Open Question
What are the next three numbers in the following sequence? 1, 4, 7, 10, 13, _____, _____, _____ …	**Reasoning and Proving**	Consider the following sequence: 1, 4, 7, 10, 13, ... Is 35 a member of this sequence? Explain your reasoning.
Find the area of your desktop using tiles.	**Selecting Tools and Strategies** **Representing**	How is the teacher's desk different in size from your desk? Show how you know.
Circle all the pyramids: 	**Reasoning and Proving**	Sort these figures. Explain your sorting rule. 
There are 30 maple trees in the forest. A farmer taps half of them for sap. What is the total number of trees that have been tapped for sap?	**Reflecting**	Ryan is given the problem: "There are 30 maple trees on a farm. Half of the trees have been tapped for sap. How many trees were tapped for sap?" Ryan gets the answer 18. Is he correct? Explain your thinking.
Record a repeating pattern. What is your pattern rule?	**Connecting**	Create a pattern with pattern blocks. Represent the pattern you create in a different way. Explain how the patterns are the same.

Problem Solving and Communicating