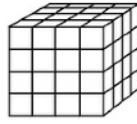


# CUBES, CUBES, CUBES!



## Patterning Group Project (max. three people per group)

1. Pretend that you dip a cube comprised of smaller cubes in paint. If the cube is  $3 \times 3 \times 3$ , how many of the smaller cubes of which it is comprised will be painted? How many will not be painted? What if the cube is  $4 \times 4 \times 4$  or  $5 \times 5 \times 5$  or even  $120 \times 120 \times 120$ ?

Show CLEARLY on a large sheet of paper using diagrams, tables, pictures, words, etc. how you figured out how many smaller cubes comprising a  $120 \times 120 \times 120$  cube would be painted and how many would not be painted.

2. Can you also find out how many cubes will have only one side painted, two sides and three sides? Communicate your findings CLEARLY on the same paper.

## Mathematics Problem Solving and Communication Rubric

	<b>Problem Solving</b> (understands problem/task, plan/strategy, computation/solution)	<b>Communication</b> (explanation, details (e.g. use of graphs, tables, charts, figures, diagrams, numbers, symbols), math language/notation/units)
	<ul style="list-style-type: none"> <li>An understanding of the problem or task is evident; appropriate mathematical concepts and procedures needed for task are evident</li> <li>A strategy is evident; the strategy is developed and leads to a solution;</li> <li>The computations or solutions are correct; components are answered</li> </ul>	<ul style="list-style-type: none"> <li>Strategies, processes or ideas are explained; solution statement is evident</li> <li>Provides details</li> <li>Uses appropriate mathematical language/notation/units</li> </ul>
<b>Proficient (4)</b>	<ul style="list-style-type: none"> <li>A thorough understanding of the entire task is evident; all appropriate mathematical concepts and procedures needed for the task are evident</li> <li>A strategy is clearly evident; the strategy is well developed and leads directly to a solution</li> <li>The solution addresses all components of the task and is correct; computations are correct although a minor error, omission or transposition of number or symbols may occur.</li> </ul>	<ul style="list-style-type: none"> <li>The explanation of strategies, processes or ideas is logical and clear; a solution statement is clearly evident and complete</li> <li>Details (words, pictures, diagrams, etc) are consistently clear and complete</li> <li>Appropriate math language/notation/units are consistently used and are correct</li> </ul>
<b>Competent (3)</b>	<ul style="list-style-type: none"> <li>A general understanding of the entire task is evident; most of the mathematical concepts and procedures necessary for the task are evident</li> <li>A strategy is evident; the strategy is mostly developed and leads to a solution</li> <li>The solution address all components of the task although it may or may not be correct; computations are mostly correct and may or may not lead to a correct solution</li> </ul>	<ul style="list-style-type: none"> <li>The explanation of strategies, processes or ideas is mostly logical and clear; some processes or ideas may have to be inferred; a solution statement is evident but may be separated throughout the task</li> <li>Details (words, pictures, diagrams, etc) are mostly clear and complete</li> <li>Appropriate math language/notation/units are often used and are correct; minor errors in notation/units may be present</li> </ul>
<b>Developing (2)</b>	<ul style="list-style-type: none"> <li>A partial understanding of the entire task or an understanding of part of the task is evident; some mathematical concepts and procedures necessary for the task are evident</li> <li>Strategy is somewhat evident; the strategy is incomplete or leads to an incomplete solution</li> <li>Some parts of the solution are correct; computations have errors; only some of the components have been addressed</li> </ul>	<ul style="list-style-type: none"> <li>The explanation of strategies, processes or ideas is somewhat clear for the components that were addresses; many processes or ideas is somewhat clear for the components that were addressed; many processes or ideas must be inferred; part of a solution statement is evident</li> <li>Details (words, pictures, diagrams, etc.) are somewhat clear; some details are missing</li> <li>Math language/notation/units are sometimes used; some terminology/notation/units may be used inappropriately</li> </ul>
<b>Limited (1)</b>	<ul style="list-style-type: none"> <li>Little or no understanding of the entire task is evident; mathematical concepts are not present or are incorrect</li> <li>Little or no evidence of a strategy; the strategy, if evident does not lead to a solution</li> <li>The solution is not correct; computation are not shown and/or not correct; few, if any, of the components have been addressed</li> </ul>	<ul style="list-style-type: none"> <li>The explanation of the strategies, processes, or ideas is vague or disorganized; a solution statement is not evident</li> <li>Details (words, pictures, diagrams, etc) are vague and mostly lacking</li> <li>Math language/notation/units, if present, are rarely used or not used correctly</li> </ul>