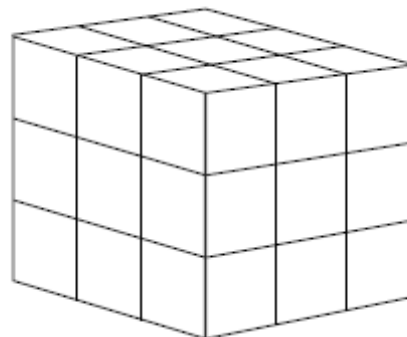


## Preparing for Open-Ended Questions

### Exploring Patterns

**Directions:** Mary bought a 3-inch by 3-inch by 3-inch, solid, unpainted cube and painted it green. She then cut the cube into one-inch cubes. How many of these one-inch cubes had the following:

- 0 sides painted?
- 1 side painted?
- 2 sides painted?
- 3 sides painted?
- 4 sides painted?
- 5 sides painted?
- 6 sides painted?



Build a 3x3x3 cube and color code the type of cubes by using appropriate colors for each type. (i.e., black for 0 sides painted, blue for 1 side painted, yellow for 2 sides painted and brown for 3 sides painted).

Now find how many sides of each cube would be painted if the same process was used to make one-inch cubes from a 4-inch, unpainted, solid cube that was painted yellow. Build this cube using the same coloring system used in the previous step.

Make a chart to know how many of each type of cube you have in each painted cube.

## Decisions

Mary bought a 3-inch by 3-inch by 3-inch, solid, unpainted cube and a 4-inch by 4-inch by 4-inch, solid, unpainted cube. She painted the 3 x 3 x 3-inch cube green and the 4 x 4 x 4-inch cube yellow. She then cut each of the cubes into 1-inch by 1-inch by 1-inch cubes. She then placed each of the 1-inch cubes from the 3-inch cube into brown paper bag A and each of the 1-inch cubes from the 4-inch container into another brown paper bag B.



Container A  
27 Cubes  
from a  
3x3x3-inch  
cube



Container B  
64 Cubes  
from a  
4x4x4-inch  
cube

She decided to randomly select a cube from each container. Find the following probabilities:

1. From which container would she have a better chance to choose a cube that has exactly zero painted sides?
2. From which container would she have a better chance to choose a cube that has exactly one painted side?
3. From which container would she have a better chance to choose a cube that has exactly two painted sides?
4. From which container would she have a better chance to choose a cube that has exactly three painted sides?
5. Which selection is most likely to occur? Which selection is least likely to occur?
6. Which selections are equally likely to occur?
7. If Mary continued to make larger cubes, paint them and cut them into cubes, which selection would continue to decrease in probability? Explain your reasoning.