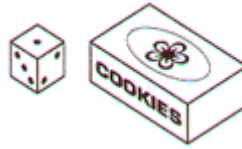


Exploring Cubes

NAME _____

Use the pictures to help you answer the questions.

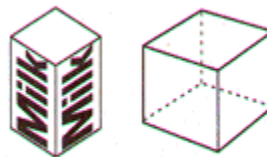
1. Where have you seen objects like these before? _____



What do you call them? _____

What are some objects like these that you have seen in your home, school, and community?

Here are a rectangular prism and a square prism:



Are these cubes? _____ Why or why not? _____

2. Create your own skeletal models of a cube using toothpicks and mini marshmallows. Compare the model with others in your group.



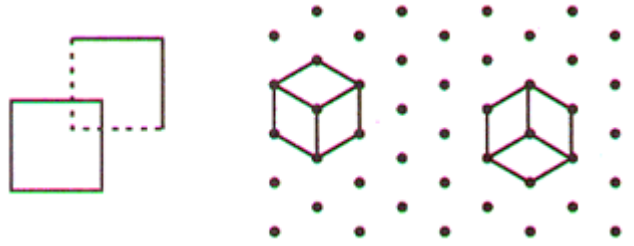
How many toothpicks did you use? _____ How many marshmallows? _____

Are there any parallel lines? Perpendicular lines? Skew lines? Explain.

Are there any parallel planes? Perpendicular planes? Explain.

Discuss and record the different properties that each member of the group observes.

3. One way to sketch a cube is to draw two squares as shown below, and then connect the corresponding vertices of the squares. (An alternative approach is to sketch cubes by using isometric dot paper, as shown.)



Make a sketch of a cube in the space below, and label the vertices with different capital letters.

Using your diagram...

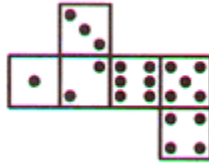
- Name a pair of parallel lines _____
- Name a pair of perpendicular lines _____
- Name a pair of skew lines _____
- Name a square _____
- Determine how many squares are needed to form a cube _____
- Name a right angle _____
- Name a face diagonal _____
- Name a diagonal of the cube _____

Is it possible to name a rectangle in your diagram that is not a square? Explain.

4. Here are some pictures of number cubes.

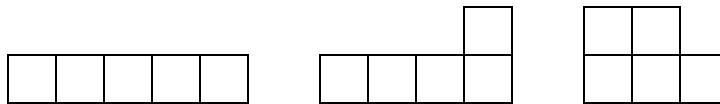


Which of the pictures above could be a view of a number cube that was made by folding the pattern shown below? Circle them.



This flattened-out pattern of a cube is called a *net*.
How many squares are needed to form the net of a cube? _____

5. A flat pattern (or net) made of five squares, where each square shares an edge with another square, is called a *pentomino*. Here are some examples of pentominoes:

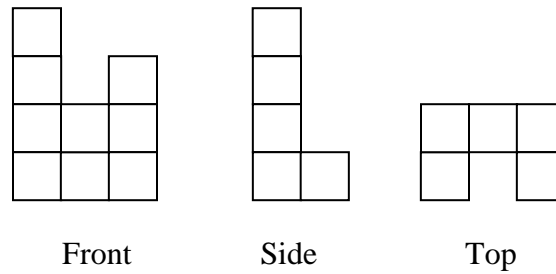


Below, sketch some pentominoes. Then, with the members of your group, discuss the results.

How many different pentominoes are there? _____

How many of these pentominoes can be folded to form an open box? _____

6. Models of buildings are frequently created using cubes, and then the front, side, and top views of the model are drawn, as shown below.



Using cubes, can you construct a figure that has these top, front, and side views? Sketch your result below.

Sometimes the floor plan of a building is recorded by showing the number of cubes needed in each part. For example:

4	2	3
1	0	1

Explain why this floor plan does or does not match your building? _____

Challenge

How many cubes were needed to build the design in this figure? Explain several different ways of solving this problem.

