SM2

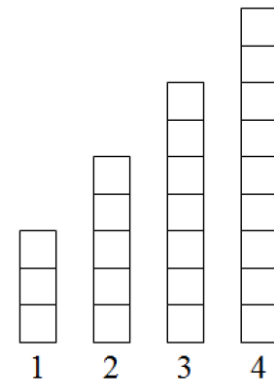## Staircase Towers

Below is a staircase tower that is made by starting with 3 cubes and adding two cubes to get each successive tower.

How many cubes will be in the 10th tower?

How many cubes will be in the nth tower?

any # tower

How do you know?

1   2   3   4

*Make a poster of your groups answers and thinking. Link the diagram to your rule or formula to determine the number of cubes in the nth tower. Be ready to explain your group's thinking to the class!

x t y c

tower #	# of Cubes
0	1
1	3
2	5
3	7
4	9
⋮	⋮
10	21
n	$2n+1$

1st difference

> 2
> 2
> 2
> 2

$$slope = \frac{change\ in\ y}{change\ in\ x}$$

$$slope\ (m) = \frac{2}{1}$$

* 1st difference is constant, so the pattern is LINEAR

$$f(x) = mx + b$$

$$\boxed{f(x) = 2x + 1}$$

$$f(n) = 2n + 1$$

$$C(t) = 2t + 1$$

Aug 20-12:15 PM

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There are three essential building blocks of geometry—the point, the line, and the plane. These three terms are called undefined terms; we can only describe and create mathematical models to represent them.

A **point** is described simply as a location. A point in geometry has no size or shape, but it is often represented using a dot. In a diagram, a point can be labeled using a capital letter.

A **line** is described as a straight, continuous arrangement of an infinite number of points. A line has an infinite length, but no width. Arrowheads are used to indicate that a line extends infinitely in opposite directions. In a diagram, a line can be labeled with a lowercase letter positioned next to the arrowhead. *or 2 capital letters*

(CD or AC)

A mathematical model of several points and lines is shown.

1. Does the name "line *C*" describe a unique line? Explain why or why not.

No "line C" could be talking about line m or s

1. Does the name "line *C*" describe a unique line? Explain why or why not.

2. Does the name "line *CD*" describe a unique line? Explain why or why not.

   Yes, because it has 2 capital letters, we know which one line it's talking about.

3. Does the name "line *m*" describe a unique line? Explain why or why not.

   Yes, . . .

   > Lines have names just like people. Many people may have the same first name. Many lines may pass through the same point.
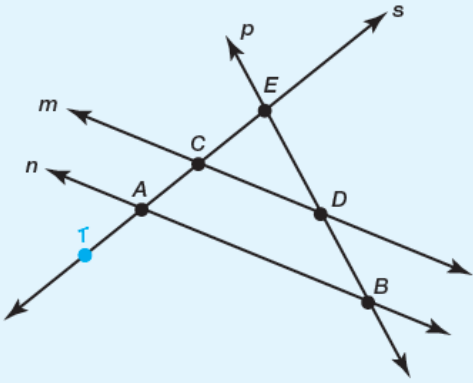
4. How many points are needed to name a specific line?

   Two   ⟷

5. What is another name for line *AB*?

   n   *BA*

   > Line *AB* can be written using symbols as $\overleftrightarrow{AB}$ and is read as "line *AB*."

Aug 26-10:29 AM

6. Analyze each model and explanation.

Brad
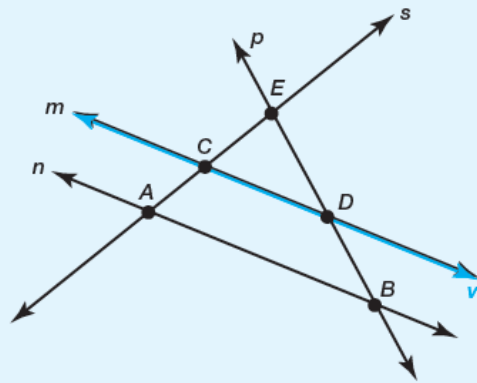
E

p   s

m

n   C

A

D

T

B

I drew point T on line s. Since only one line goes through T, point T describes just one line.

T could be any line

-need 2 points to name a line

Kara

E

p   s

m

n   C

A

D

B   v

I drew line v through points C and D. So, line CD describes two lines.

Line CD only describes one line

Describe the inaccuracy in each students' reasoning.

7. How many lines can be drawn through a single point?

Infinite # of lines

Collinear points are points that are located on the same line.

8. Use the diagram shown prior to Question 1.

   a. Name three points that are collinear.

   A, C, E

   E, D, B

   b. Name three points that are not collinear.

   A, E, D　　　　*E, D, A*

   A, E, B　　　　*E, D, C*

A **plane** is described as a flat surface. A plane has an infinite length and width, but no depth, and extends infinitely in all directions. One real-world model of a plane is the surface of a still body of water. Three non-collinear points describe a unique plane, but planes are usually named using one italic letter located near a corner of the plane as drawn.

Three planes can intersect in a variety of ways or may not intersect at all.

| Figure 1 | Figure 2 | Figure 3 | Figure 4 | Figure 5 |
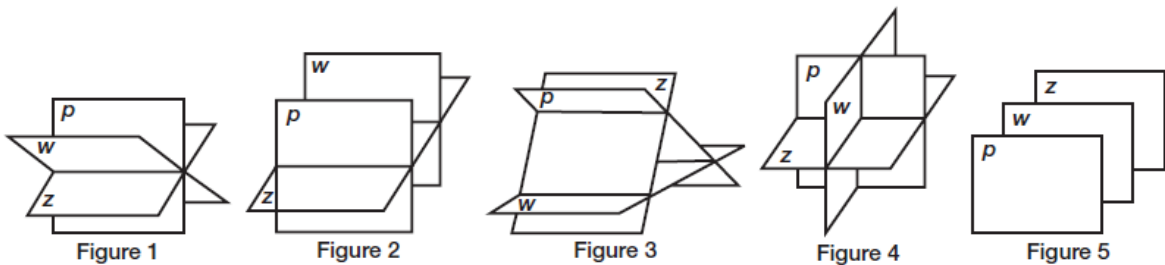
NOT IN STUDENT BOOK

1. Identify each of the following in the figure shown.

   a. Name all points.

   W, X, Y, Z

   b. Name all lines.

   $\overleftrightarrow{WX}$ $\overleftrightarrow{XZ}$ $\overleftrightarrow{YZ}$

   c. Name all planes.

   P or WXZ or XYZ

   HW: finish pgs. 6-7