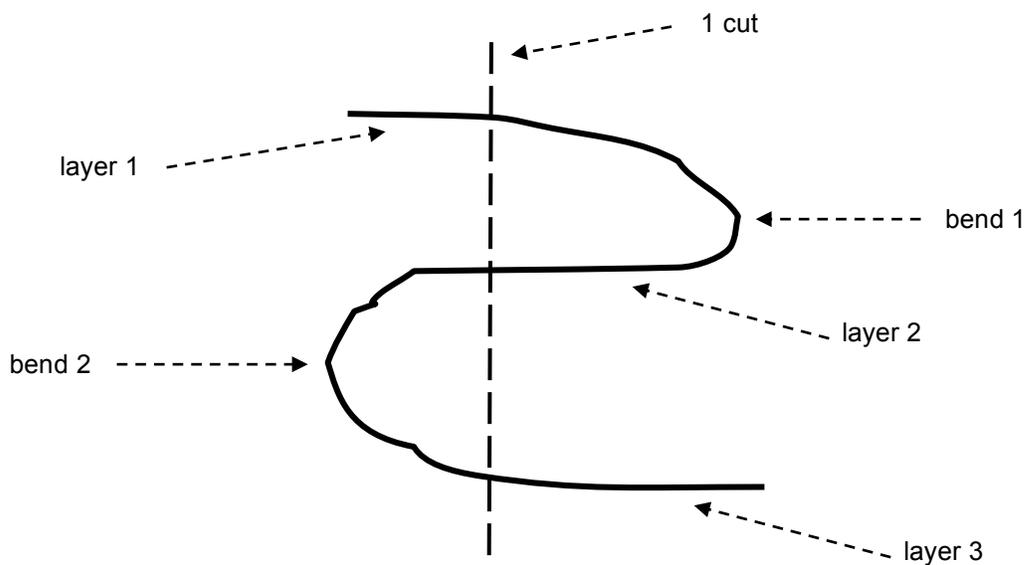


THE ROPE PROBLEM: GETTING STARTED

Many situations can be modeled using mathematics. In this problem, you will use the pictures, numbers, symbols and words to explore patterns that arise from cutting a rope.

- Start with **one** long piece of rope with three “layers” and two “bends.”
- One vertical cut is made through all three layers as shown.

1. After one cut, how many pieces of rope are there? _____



2. Draw a 2nd vertical line that cuts through each layer again.

How many pieces of rope are there now? _____

3. Draw a 3rd vertical line that cuts through each layer again.

How many pieces of rope are there now? _____

CUTTING THE ROPE

Explore cutting the rope for different numbers of layers and cuts.

1. # of layers (q) = 1



# of cuts (c)	# of pieces (p)

Rule for any number of cuts:
 $p =$

2. # of layers (q) = 2



# of cuts (c)	# of pieces (p)

Rule for any number of cuts:
 $p =$

3. # of layers (q) = 3

# of cuts (c)	# of pieces (p)

Rule for any number of cuts:
 $p =$

4. # of layers (q) = 4

# of cuts (c)	# of pieces (p)

Rule for any number of cuts:
 $p =$

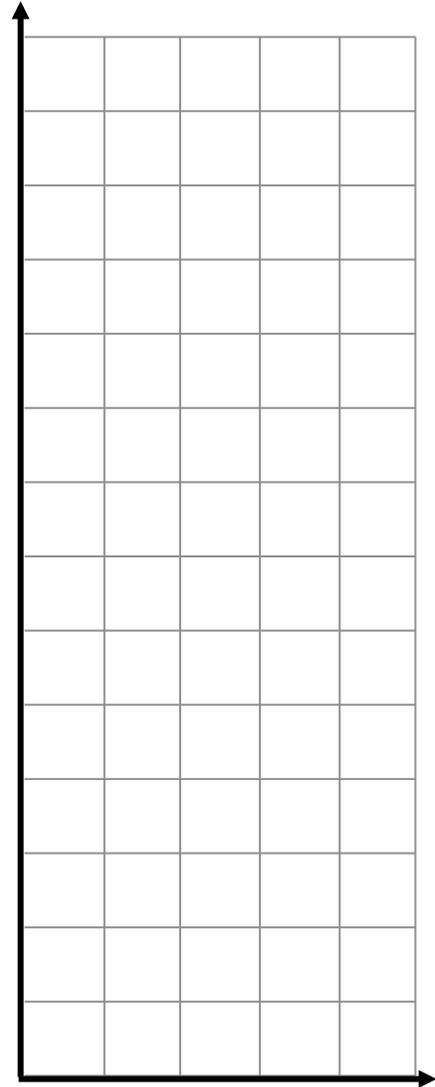
Adapted from *MathLinks*: Grade 8

©Center for Mathematics and Teaching (www.mathandteaching.org)

For more information about core programs, intervention, or PD contact info@mathandteaching.org

CUTTING THE ROPE (Continued)

- For each table, plot the points on the grid.
Graph each set of points with a different color.
Label and scale the axes appropriately.
- What is the same about each graph?
- What is different?
- What does the y -intercept represent for each graph in terms of the cutting rope experiment?
- What does the slope represent for each graph?



- Looking at all four tables, write a rule that can be used to find the total number of pieces (p) for any number of layers (q) and any number of cuts (c):

$$p = \underline{\hspace{2cm}}$$

Adapted from *MathLinks*: Grade 8

©Center for Mathematics and Teaching (www.mathandteaching.org)

For more information about core programs, intervention, or PD contact info@mathandteaching.org