

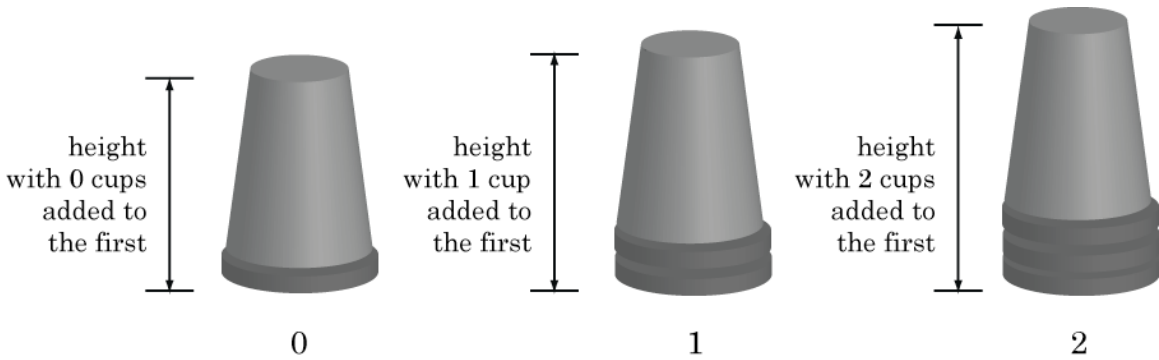
# Cup Packing Activity Sheet

Name: \_\_\_\_\_

You have been hired by a company that makes disposable drinking cups for a popular coffee retailer. The company typically ships cups in boxes of 100 cups. They need to determine a method of packaging the cups that will be as inexpensive as possible, while using resources as efficiently as possible. What is the least expensive box that will hold 100 cups?

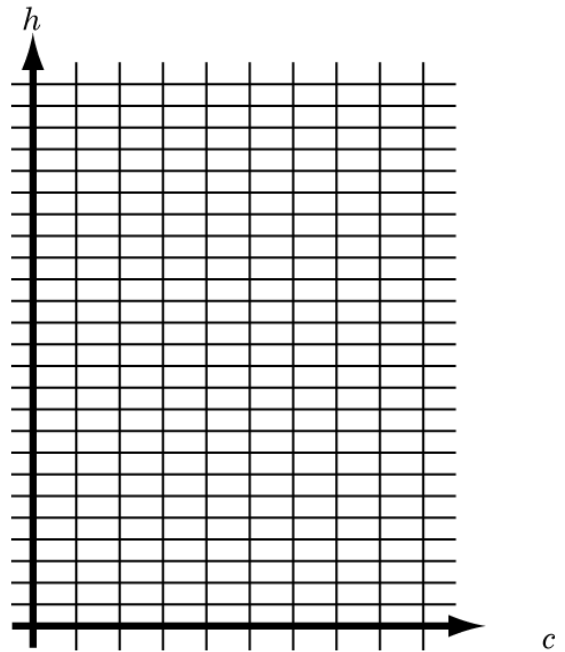
## Investigation Steps

- Stack cups, one at a time. Record the total height of the cup stack for each number of cups added to the first.



- Record your measurement data for the styrofoam cups in the table below. Then make graph of the data set on the coordinate grid below.

Cups added to the first ( $c$ )	Height in centimeters ( $h$ )
0	
1	
2	
3	
4	
5	
$n$	



(3) Predict how tall a stack of 100 cups would be. How tall would a stack of  $n$  cups be? Explain how you determined each (hint: use your graph and/or your table of data).

(4) You have been asked to determine a method of packaging cups that will be as inexpensive as possible, while using resources as efficiently as possible. On this page and the next, sketch/describe several different configurations of 100 cups. When splitting the cups up into several stacks, each stack must contain the same number of cups.

Configuration 1:

Configuration 2:

Configuration 3:

5. Assume that your cups will be shipped in cardboard containers. For each of the configurations that you described/sketched in item (4), determine (a) the amount of cardboard needed to contain the cups, (b) the total cost of the cardboard (assume that cardboard costs \$0.0001 per sq. cm.), and (c) the total volume of the container. Show work below. Place your final calculations in the table on the next page.

Work (Configuration 1):

Work (Configuration 2):

Work (Configuration 3):

### Calculation Results

Cup Configuration	Amount of Cardboard Required (square cm)	Total Cost (Dollars)	Volume of Container (cubic cm)
1			
2			
3			

6. Based on your cost and volume calculations, recommend the inside dimensions of a carton that will be least expensive and use resources as efficiently as possible.