

Name _____
Date _____

Ms. Karahoca
Grade 6

Estimation Versus Calculation: How Do You Win These Things?!

☺ *Winning free stuff makes everybody smile* ☺

Predicament: Have you ever entered a contest to guess the exact number of candies in a jar? Did you guess a random number or use some kind of logic? Did you win?

A contest like this deals with the *volume* of two objects or how much 3-dimensional space they take up. The first object is the container or jar and the second object is the candy or other contents inside the first object. So doesn't it make sense to use math to calculate the volumes for the number of pieces?

Complete this worksheet individually or in a group to discover your preferred approach to finding the contents of the cylinder, sphere, rectangular box, and square box. Answer each question in the space provided and submit your completed packet for a class participation grade. A completed and submitted worksheet qualifies your final guess to win the prize.

Step 1. Make A Prediction



- A. Which method do you think will work better—estimation or calculation? Why do you think this?

Step 2. Using Calculations—Candy Corn Container

- A. Take the blue ruler from the left-hand side of the board.
B. Complete the measurements chart by measuring the corresponding sides of the Candy Corn Container. Be sure to use centimeters!!

	Candy Corn Container
Length (cm)	
Width (cm)	
Height (cm)	

- C. Find the volume formula card (located in the Volume Formulas envelope) that matches the shape of the container.
D. Copy down the volume formula:

Name _____
Date _____

Ms. Karahoca
Grade 6

- E. Calculate the volume of the candy corn box using the information you gathered in part B.

$$V =$$

ANS _____ (units)

Step 3: Using Calculations—Candy Corn

- A. Consider the shape of the candy corn. Find the Volume Formula card that most closely matches the shape of the candy corn.

Copy down the volume formula:

- B. Using the above formula, and the Contents Measurement chart on the board, find the volume of the candy corn.

$$V =$$

ANS _____ (units)

- C. To find the number of candy corn in the container, take the volume of the container found in Step 2-E and divide it by the volume of each candy corn found in Step 3-B.

$$\text{_____} = \text{_____} \text{ pieces}$$

(In other words, divide the amount of space inside the box by the amount of space a piece of candy corn takes up. The answer is the number of candy corn in the box.)

Name _____
Date _____

Ms. Karahoca
Grade 6

D. Check your answer by lifting the Candy Corn flap. Is your answer correct? Is your answer close?

E. What do you think accounts for your answer above?

Step 4: Using Calculations—Gum Container

A. Using the ruler, measure (in centimeters) the diameter and height of the Gum Container. Fill in the chart with your answers. Use the diameter to calculate the radius of the Gum Container.

	Gum Container
Diameter (cm)	
Height (cm)	
Radius (cm)	

B. Find the volume formula card that matches the shape of the container.

C. Copy down the volume formula:

$$V =$$

D. Calculate the volume of the Gum Container by substituting your measured values in the formula you just copied.

$$V =$$

ANS _____ (units)

Step 5—Using Calculations—Bubble Gum

A. Using the chart on the board, and the same cylinder volume formula calculate the volume of one piece of gum.

$$V =$$

Name _____
Date _____

Ms. Karahoca
Grade 6

ANS _____ (units)

- G. To find the number of pieces, take the volume of the container found in Step 4-D and divide it by the volume of each gum found in Step 5-A.
- H. Check your answer by lifting the Gum flap. Is your answer correct? Is your answer close?
- I. How does this answer's accuracy compare to the accuracy you calculated with the Candy Corn?
- J. Using the information you just found out, reformulate or keep your hypothesis here:

Step 6: Using Estimation

The second method is using estimation. In this method you use only basic counting.

The Method: Count the number of objects covering the top (or bottom) of the container and multiply it by the number of objects along the edge of the container that is perpendicular to the surface you counted.

Let's try the Gum Container again.

- A. Count the number of Gum pieces on the top of the cylinder. Count each visible part as an additional one—even if the whole piece can't be seen.

ANS _____ pieces

- B. Now, pretend there's an imaginary line down the middle of the cylinder. Count all the pieces that touch or cross that line.

ANS _____ pieces

Name _____
Date _____

Ms. Karahoca
Grade 6

- C. Multiply these two answers together to estimate the number of pieces in the container.

ANS _____ pieces

- D. Check your answer by lifting the Gum flap on the board. How does your answer compare?

Step 7: Estimation—Gummy Bear Ball

- A. Repeat the same process with the Gummy Bear Ball, you may gently rotate the ball to count the number of bears on the bottom.

ANS _____ bears

- B. Now, looking at the side view of the Gummy Bear Ball. Pretend there is an imaginary line going vertically up the middle. Count the number of Gummy Bears (full and partial) that touch or cross that line.

ANS _____ bears

- C. Multiply parts A and B to estimate the number of bears.

(You just calculated the “area” of the bottom and multiplied it by the “height” to predict the number of bears.)

ANS _____ bears

- D. Check your answer under the Gummy Bear flap.

Is your answer close?

Step 8: Evaluation

Which method worked better for you—estimation or calculation?

What could be the possible reasons that one worked better than the other?

Step 9: Your turn!

Use the method that best worked to formulate a guess for the Marshmallow Container. When you have finished, submit your guess to me by filling out a slip with your guess and initials. Be sure to write your name on this packet and hand it in for participation!