

# MathFLIX CHALLENGE

## Proportions: Sampling


A **sample** is the people, objects or events chosen from a given population to represent the entire group. **Capture-recapture** is a method using random samples to estimate the size of a large group or population. Follow these capture-recapture steps so you can estimate the total number of beans in this project with actually counting each one.

*Step #1:* Pour a bag of dry beans into a can.

*Step #2:* Take out 20 beans and mark each one.

*Step #3:* Put the marked beans back in the can and mix them thoroughly.

*Step #4:* Take out a handful of beans (sample) and record the following information for each sample.

	# of marked.	# of beans in handful	$\frac{20}{1} \times \frac{\text{\# of beans in handful}}{\text{\# of marked.}} = \text{Total}$
Sample 1			
Sample 2			
Sample 3			
Sample 4			

*Step #5:* Finally to improve your estimates, find their average.

$$\frac{\text{Total 1} + \text{Total 2} + \text{Total 3} + \text{Total 4}}{4} = \text{Best Estimate}$$

*Read the following paragraph and the accompanying clues. Write your observations about the sample size related to the story.*

Mr. Bean owns a very successful candy factory but had reason to believe that \$10,000 worth of jelly beans were being stolen from the factory each year. Mr. Bean hired private detectives, put recording devices on all the machines, and had the supervisors questioned but discovered nothing. Finally, Mr. Bean hired a specialist who discovered the following facts.

1. The ingredients used for the candy vary from one worker to another.
2. The annual output of the company is estimated from a test run by one of the machine operators.
3. This operator is the company's best worker.