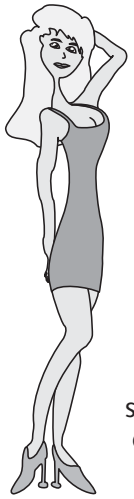


How Big is Barbie?

If Barbie™ was the size of an average woman and Batman™ an average man, what would they look like?

First, find two dolls or action figures (one male, one female) and measure various attributes of their bodies (see charts below). Second, calculate an appropriate scale factor to enlarge a certain dimension to a certain size. For example, in the chart below, the height of the average male is listed as 72 inches. After you measure your male doll, multiply the figure's measurements by some factor in order to enlarge it to 72 inches. Then use that scale factor to determine the other enlarged measurements. You will perform this process several times for each figure. The numbers provided are the hypothetical average measurements for females and males.

DATA CHARTS

MALE	Doll	Height	Head	Chest	Waist	Inseam	Foot
Ratio							
Height		72"					
Head			23"				
Chest				40"			
Waist					32"		
Inseam						32"	
Foot							11"

FEMALE	Doll	Height	Head	Chest	Waist	Inseam	Foot
Ratio							
Height		65"					
Head			21"				
Chest				36"			
Waist					24"		
Inseam						30"	
Foot							9"

Remember: Each column represents a different possible enlargement of the doll. Look for their distinct characteristics. What makes one different from another?

ASSIGNMENT

Once you have the chart completed, answer the following questions about your data:

1. What are your initial impressions as you look at your results?
2. What would the figures look like if they were real people? Describe each possibility in detail.
3. How do the female's measurements in the height column compare to those in the foot column?
4. Why do you think the figures are designed with such measurements? Do these designs have social impact?

Extra Credit

Option #1: Take measurements of yourself and scale them backwards (reduce them) to determine the dimensions of a doll or action figure modeled after you. Write a paragraph describing what you would look like as a doll. You may also draw a picture to illustrate.

Option #2: Using the given measurements in one of the charts as the "average" male or female, scale the measurements backwards (reduce them) to determine the dimensions of a 12-inch doll or action figure with proportional measurements. Then compare the doll with your original doll's measurements and write a paragraph explaining the similarities and differences.

STUDENT HANDOUT

COUNTING FISH

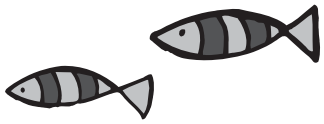
FIRST SAMPLING

1. Total brown beans scooped from the baggy and replaced with white beans: 1) _____
2. Total number of beans (brown and white) re-scooped: 2) _____
3. Number of white beans only in the re-scooped sample: 3) _____
4. Proportion to be used: Solve:

_____ = _____

a) Number of total brown beans estimated in the original baggy: 4a) _____

b) Margin of error:



4b) _____ %

THE TRUE COUNT

5. Total number of brown beans COUNTED to be in the baggy: 5) _____

SECOND SAMPLING

1. Total brown beans scooped from the baggy and replaced with white beans: 1) _____
2. Total number of beans (brown and white) re-scooped: 2) _____
3. Number of white beans only in the re-scooped sample: 3) _____
4. Proportion to be used: Solve:

_____ = _____

a) Number of total brown beans estimated in the original baggy: 4a) _____

b) Margin of error:

4b) _____ %

Which sampling gave you a more accurate estimate and why?

_____

_____

_____

m&m™ Count & Crunch

1. Estimate the quantity of each color and the total number of candies in your bag. Also guess the percentage of the total that each color comprises. Record your results in the left chart below.

2. Open your bag and count the actual number of each color and calculate the percentage.

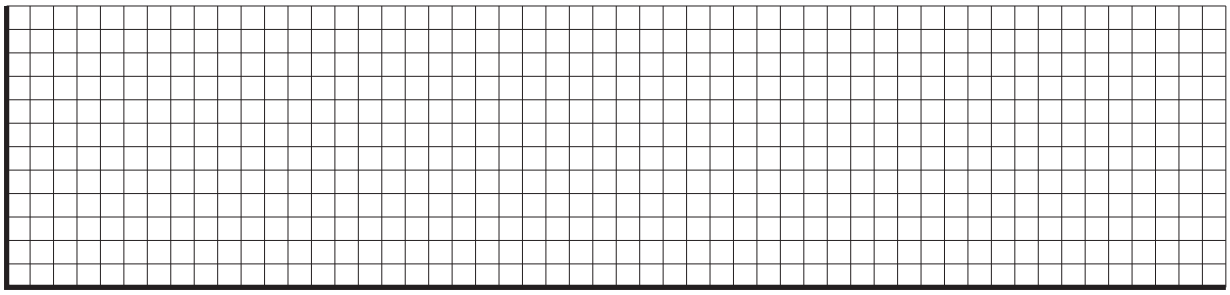
ESTIMATIONS

Color	Number	%
Red		
Brown		
Yellow		
Green		
Orange		
Blue		
TOTALS		

ACTUAL DATA

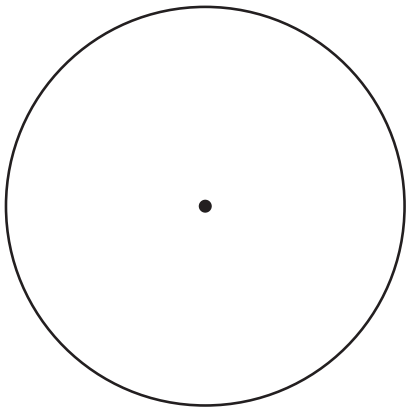
Color	Number	%
Red		
Brown		
Yellow		
Green		
Orange		
Blue		
TOTALS		

3. Make a bar graph showing your estimations and the actual count of each color.

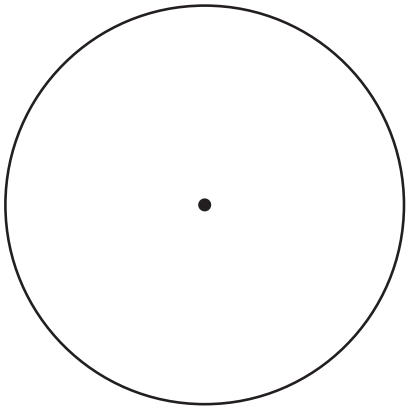


4. Make two pie charts, each representing the percentage of each color in the bag. The first pie chart will represent your estimations, the second is to represent the actual counts. Each sector of the pie chart should be proportional to the percentage it represents. For instance, if you are graphing 13% for yellow, then your yellow sector should measure 13% of 360 degrees.

ESTIMATIONS



ACTUAL DATA



m&m™ Count & Crunch

5. Characteristics of one m&m candy (show all calculations)
   a. Weight:

   b. Diameter:

6. Unit Conversion & Area
   a. How many m&m's fit in an inch?
      ... in a foot?
      ... in a mile?

   b. How many fit in a square inch?
      ... in a square foot?
      ... in a square mile?

   c. How many would cover a football field?
      (The dimensions of a football field, not including the end zones, are 100 yards by 55 yards.)

   d. How many bags of m&m's would it take to cover the field in one color?
      Group's assigned color:

7. Statistical Study
   a. Record the m&m data from all the groups in the class:

Group	Red	Brown	Yellow	Green	Orange	Blue
#1						
#2						
#3						
#4						
#5						
#6						
#7						
#8						
#9						
TOTALS						

   b. Calculate the mean, median, mode and range for each color.

	Red	Brown	Yellow	Green	Orange	Blue
Mean						
Median						
Mode						
Range						

m&m™ Count & Crunch

8. Proportions: Small Bag vs. Large Bag
   a. Using the figures from your group's small bag, estimate the quantity of each color and the total number of m&m's in the one-pound bag.

   b. Using the figures from the class statistics, estimate the quantity of each color and the total number of m&m's in the one-pound bag. Be sure to designate which statistics your group chose to use.

   c. As a class, open the one-pound bag and count the actual quantity of each color and the total.

	a) Est. from Group's Bag		b) Est. from Class's Stats		Actual Bag
Color	**Small Bag**	**Large Bag**	**Class Stats**	**Large Bag**	**Large Bag**
Red					
Brown					
Yellow					
Green					
Orange					
Blues					
TOTALS					

   d. Which provided a more accurate prediction, the data from the individual bag or the class statistics?

9. Probability
   a. Compute the probability of each of the following occurrences, if the first candy is replaced.

   b. Compute the probability of each of the following occurrences, if the first candy is not replaced.

First Draw	Second Draw	a) Probability w/ Replacement	a) Probability w/o Replacement
Blue	**Red**		
Red	**Yellow**		
Brown	**Brown**		
Blue	**Orange**		
Yellow	**Red**		
Green	**Green**		

   c. Do your odds improve or diminish by not replacing the candy?

   d. Conduct an experiment to test one of the above. On another sheet of paper, describe your experiment and record the data, analyze and display the results.