Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_

# WS 12-1

# Probability and Odds

Activity 1: A crisis for European Sports Fans?

**Background:** The *New Scientist* (January 4, 2002) reported on a controversy surrounding the Euro coins that have been introduced as a common currency across Europe. Each country mints its own coins, but these coins are accepted in any of the countries that have adopted the Euro as their currency.

A group in Poland claims that Belgium-minted Euro does not have an equal chance of landing heads or tails. This claim was based on 250 tosses of the Belgium-minted Euro, of which 140 (56%) came up heads. Should this be cause for alarm or European sports fans, who know that “important” decisions are made by the flip of a coin?

1. For this first step, flip a coin 250 times, keeping a tally of the number of heads and tails observed (this wont take as long as you think).

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2. For your sequence of 250 tosses, calculate the proportion of heads observed.

3. Form a data set that consists of the values for proportion of heads observed in 250 tosses of a fair coin for the entire class. Summarize this data set by constructing a graphical display.

4. Working with a partner, write a paragraph explaining why European sports fans should or should not be worried by the results of the Polish experiment.

Activity 2: M&M Color Distribution

When you open a bag of M&M’s what is the chance that you will have mostly reds? Browns? Blues? We will explore the probability of the color distribution in this activity.

1. You and a partner get a bag of M&M’s from Miss Mendel, open the bag and count how many total M&M’s are in your bag. **DO NOT EAT YOUR M&M’s YET!!!**

2. Separate the M&M’s by color and count how many of each color you have, record the information in the table below:

|  |  |  |
| --- | --- | --- |
| **Color** | **Amount** | **Probability** |
| Brown |  |  |
| Green |  |  |
| Orange |  |  |
| Red |  |  |
| Blue |  |  |
| Yellow |  |  |
| TOTAL |  |  |

Which color has the largest quantity?

Which color has the smallest quantity?

Is this what you expected to find? Why or why not?

3. Calculate the probability of picking a certain color of M&M for each category. Convert you fractions into decimals and then percentages then record them in your table.

4. What color is most likely? Which one is least likely? Are there any that are equally likely?

5. Make a prediction: How many of each color would be likely found in a bag of 50? 100? 250? 500? 1000?

6. Combine all the data from the class for color distribution in the table below:

|  |  |  |
| --- | --- | --- |
| **Color** | **Amount** | **Probability** |
| Brown |  |  |
| Green |  |  |
| Orange |  |  |
| Red |  |  |
| Blue |  |  |
| Yellow |  |  |
| TOTAL |  |  |

Calculate the new probability based on the class’ data.

Which color is most likely? Which one is least likely? Are there any that are equally likely?

How close were your predictions?

Is the class data different from your individual data?

Why?

7. According to Mars, Inc., the manufacturers of M&M’s plain chocolate candies, the distribution of colors in a 13.3 ounce bag should be: 24% blue; 20% orange; 16% green, 14% yellow; 13% red; and 13% brown. Do our percentages match the data given by Mars? Should this be a concern for the company?