Matching Starbursts

Note: In bag is 4 red and 2 yellow

The game is simple. Reach your hand into the bag and choose a Starburst. Replace the Starburst into the bag, mix up the bag, then reach in for another. If the color matches the first one, you win! What is the probability of winning this game?

1. Your group should play the game 10 times total.

   a. Number of wins for the group = 6

   b. Based on the results from your group, what is the probability of winning this game? $\frac{6}{10} = 0.60$

2. Let's see what happened in the other groups. Record your number of wins at the front of the room.

   a. Number of wins for the class = 59

   b. Based on the results from your whole class, what is the probability of winning this game? $\frac{59}{110} = 0.54$

   Experimental probability

3. How could we improve this estimate of the probability of winning?

   Play the game more! → Simulation

STOP

4. To determine the true probability of winning, we can list out all possible pairs of choices that we could get. Complete the table.

Sample Space

1st candy \ 2nd candy	R	R	R	R	Y	Y
R	RR	RR	RR	RR	RY	RY
R	RR	RR	RR	RR	RY	RY
R	RR	RR	RR	RR	RY	RY
R	RR	RR	RR	RR	RY	RY
Y	YR	YR	YR	YR	YY	YY
Y	YR	YR	YR	YR	YY	YY

5. Complete the following:

   a. Circle the outcomes with both red. What is the probability of winning with two red?

   $\frac{16}{36} = 0.444$ P(1st red AND 2nd red) $= \frac{4}{6} \times \frac{4}{6} = \frac{16}{36}$

   b. Circle the outcome with both yellow. What is the probability of winning with two yellow?

   $\frac{4}{36} = 0.111$ P(1st yellow AND 2nd yellow) $= \frac{2}{6} \times \frac{2}{6} = \frac{4}{36}$

   c. Overall, what is the probability of winning?

   $\frac{16}{36} + \frac{4}{36} = \frac{20}{36} = 0.555$ → P(win red OR win yellow)