

What Can Spinners Tell Us?

Go to this site: http://enlvm.usu.edu/ma/nav/toc.jsp?sid=__shared&cid=emready@probability1&bb=course

- I. Choose "The Long Run" and then "1600 spins" from the activity pull down menu.
- You will see a spinner with 4 equal sectors. What is the theoretical probability of landing on a certain color, if the spinner provided is spun once? Enter the theoretical probabilities in column 2 of the table below.
 - How many spins out of 50 would you expect to land on each color? Enter these numbers in column 3.
 - Click **Record Results** and enter 50 for the number of spins. Click **Spin** and record the number of hits out of 50 for each color in column 4.
 - Click **Clear** and run this experiment twice more, with the number of spins indicated in columns 5 and 7. Record your results in columns 6 and 8.

<i>Color</i>	<i>Theoretical probability</i>	<i>Expected spins out of 50 spins</i>	<i>1st run</i>	<i>Expected spins out of 200 spins</i>	<i>2nd run</i>	<i>Expected spins out of 800 spins</i>	<i>3^d run</i>
Purple							
Yellow							
Green							
Red							

1. Discuss your results. How close to the expected spins were your experimental results?
2. How do the results, both theoretical and expected, for 50 spins and 200 spins compare? How about 50 spins and 800 spins? 200 spins and 800 spins?



II. Now click **Change Spinner** and create a new spinner by adding at least 1 more color; also change the distribution of your spinner by changing some of the numbers of sectors.

- Fill in columns 1 and 2 in the table below with the color and number of sectors for each color.
- Fill in column 3 with the theoretical probability for each color in your spinner.
- Fill in column 4 with expected hits out of 800.
- Run the 800-spin experiment 3 times (clicking **Clear** between runs) and record of the number of hits out of 800 by color in columns 5, 6, and 7.

<i>Color</i>	<i># of sectors</i>	<i>Theoretical probability</i>	<i>Expected spins out of 800</i>	<i>1st run</i>	<i>2nd run</i>	<i>3rd run</i>

1. How close were your experimental results to the expected results?
2. Suppose you doubled the number of spins. What would you expect for the number of hits on purple? Why? Try it. What do you notice?
3. Suppose you doubled the number of sectors for purple. Would you expect the number of hits on **purple** to double? Explain. Try it. What do you notice?



III. Now click *Back* or *Go Back* twice to the NLVM menu, and choose "Experimenting to find probabilities". You will see an "unequal spinner" of 5 colors with different-sized sectors.

- Guess the probabilities of the whole spinner for each color and enter these guesses in the second column of the chart below (no fair going to "Change spinner" yet).
- Carry out the experiment as many times as you need to try to estimate the theoretical probabilities for each color. Three columns are provided for experimental results, but run more experiments if you wish.
- Use the results of your runs to estimate the probability for each color. Enter these values in the sixth column.
- Now check the actual spinner by going to *Change Spinner* to calculate the theoretical probability for each color; enter these values into the last column.

<i>Color</i>	<i>Guessed probability</i>	<i>1st run</i>	<i>2nd run</i>	<i>3rd run</i>	<i>Estimated probability</i>	<i>Theoretical probability</i>
Purple						
Yellow						
Green						
Red						
Orange						

Describe how you calculated your estimated probabilities. Discuss your observations.

