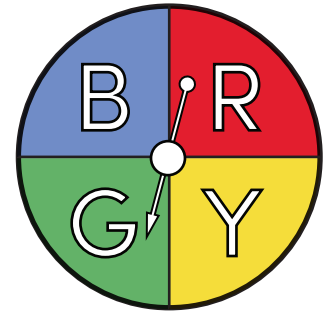


Probability Models

A **probability model** can help you represent a chance event and all of its possible outcomes.

To create a probability model, first identify all possible outcomes. This is called the **sample space**. The sample space for this spinner includes green, blue, red, and yellow. So, there are 4 possible outcomes.



Then, find the **probability** of each outcome. The four regions of the spinner are the same size, so each color has an equal chance.

Probability Model	
<p>What is the sample space?</p> <p>$S = \{\text{green, blue, red, yellow}\}$</p>	<p>What is the probability of each outcome in the sample space?</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> $P(\text{green}) = \frac{1}{4}$ </div> <div style="text-align: center;"> $P(\text{red}) = \frac{1}{4}$ </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> $P(\text{blue}) = \frac{1}{4}$ </div> <div style="text-align: center;"> $P(\text{yellow}) = \frac{1}{4}$ </div> </div>

You can use probability models to make **predictions**. If you spin the spinner 100 times, how many times would you expect it to land on yellow?

$$\frac{x}{100} = \frac{1}{4}$$

Since $P(\text{yellow}) = \frac{1}{4}$, you would expect $\frac{1}{4}$ of the spins to land on yellow. Set up a proportion showing that the ratio of yellow spins to total spins equals $\frac{1}{4}$.

$$\frac{x}{100} \cdot 100 = \frac{1}{4} \cdot 100 \quad \text{Multiply both sides by 100.}$$

$$x = 25$$

Simplify. So, you can predict that the spinner will land on yellow about **25** times out of 100 spins.

Try it! Create a probability model for the event. Then use your model to make a prediction.

1. Alondra is choosing a card from this three-card set.

<p>What is the sample space?</p> <p style="color: red; font-size: 1.2em; text-align: center;">$\{2, 4, 8\}$</p>	<p>What is the probability of each outcome in the sample space?</p> <p style="color: red; font-size: 1.2em; text-align: center;">$P(2) = \frac{1}{3} \quad P(4) = \frac{1}{3} \quad P(8) = \frac{1}{3}$</p>
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If Alondra chooses a card and replaces it 36 times, what is the best prediction for the number of times she will draw a 2?

12 times

Probability Models

Keep going! Create a probability model for each event. Then use your models to make predictions.

2. Harvey is flipping a coin.

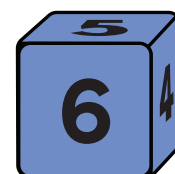
What is the sample space? {heads, tails}	What is the probability of each outcome in the sample space? $P(\text{heads}) = \frac{1}{2}$ $P(\text{tails}) = \frac{1}{2}$
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If Harvey flips the coin 36 times, what is the best prediction for the number of times the coin will land on tails? 18 times

3. Lina is rolling a six-sided die.

What is the sample space? {1, 2, 3, 4, 5, 6}	What is the probability of each outcome in the sample space? $P(1) = \frac{1}{6}$ $P(2) = \frac{1}{6}$ $P(3) = \frac{1}{6}$ $P(4) = \frac{1}{6}$ $P(5) = \frac{1}{6}$ $P(6) = \frac{1}{6}$
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If Lina rolls 24 times, what is the best prediction for the number of times she will roll a 5? 4 times

4. In this lucky winner spinner, the player wins a giant stuffed animal if the spinner lands on black.

What is the sample space? {black, white}	What is the probability of each outcome in the sample space? $P(\text{black}) = \frac{1}{7}$ $P(\text{white}) = \frac{6}{7}$
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If 35 players each spin once, what is the best prediction for the number of players who do **not** win a stuffed animal? 30 players

You got it! Make predictions. Use your understanding of probability models to help!

5. If you roll a twelve-sided die 24 times, what is the best prediction for the number of times you will roll an 8? 2



6. You select a tile from the bag without looking and then put it back. If you repeat this process 48 times, what is the best prediction for the number of times you will select a tile that is **not** H? 30

