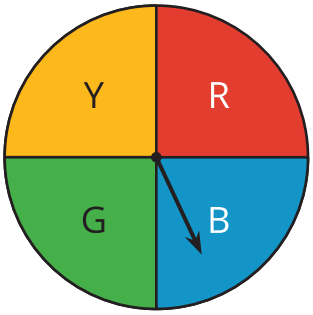
Unit 8, Lesson 9

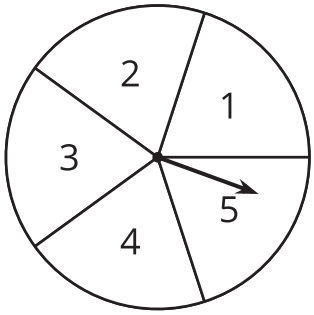
Multi-step Experiments

Let's look at probabilities of experiments that have multiple steps.

9.1 Notice and Wonder: Spinning

What do you notice? What do you wonder?

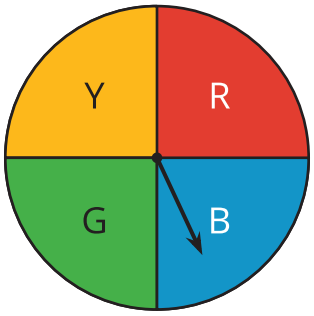


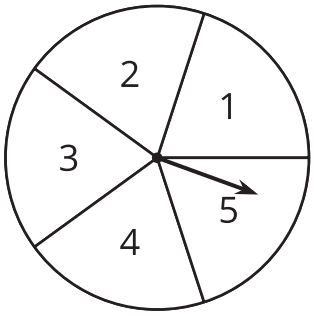


9.2 Spinning a Color and Number

What is the probability of getting:

1. Green (G) and 3?
2. Blue (B) and any odd number?
3. Any region other than red (R) and any number other than 2?





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9.3 Cubes and Coins

1. Your teacher will assign you to use either a list, table, or tree. Be prepared to explain your reasoning.

   A number cube is rolled and a coin is flipped.

   a. What is the probability of getting tails and a 6?

   b. What is the probability of getting heads and an odd number?

   Pause here so your teacher can review your work.

2. You may use any method you wish to answer these questions. Suppose you roll two number cubes. What is the probability of getting:

   a. Both cubes showing the same number?

   b. Exactly one cube showing an even number?

   c. At least one cube showing an even number?

   d. Two values that have a sum of 8?

   e. Two values that have a sum of 13?

3. Jada flips three quarters. What is the probability that all three will land showing the same side?

9.4 Pick a Card

Imagine there are 5 cards. On one side they look the same and on the other side they are colored red, yellow, green, white, and black. You mix up the cards and select one of them without looking. Then, without putting that card back, you mix up the remaining cards and select another one.

1. What are the outcomes in the sample space? How many outcomes are there?

2. What structure did you use to write all of the outcomes (list, table, tree, something else)? Explain why you chose that structure.

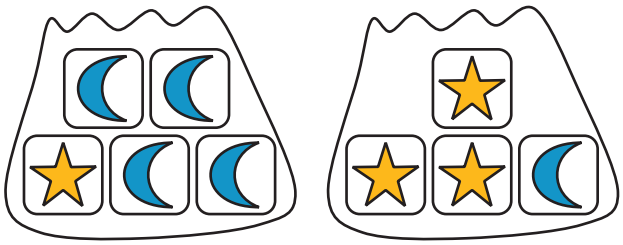
3. What is the probability that:
   a. You get a white card and a red card (in either order)?
   b. You get a black card (either time)?
   c. You do not get a black card (either time)?
   d. You get a blue card?
   e. You get 2 cards of the same color?
   f. You get 2 cards of different colors?

Are you ready for more?

In a game using five cards numbered 1, 2, 3, 4, and 5, you take two cards and add the values together. If the sum is 8, you win. Would you rather pick a card and put it back before picking the second card, or keep the card in your hand while you pick the second card? Explain your reasoning.

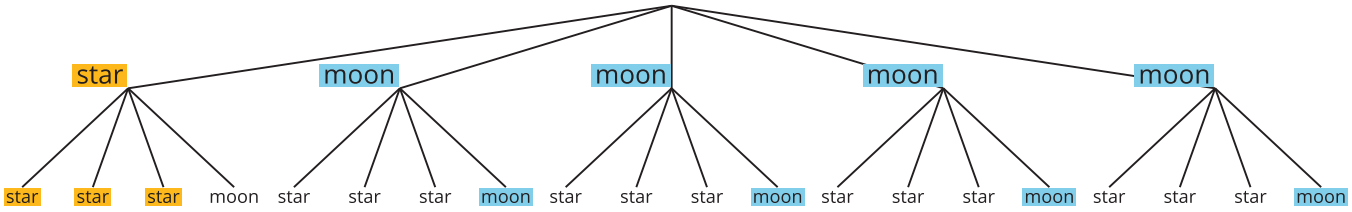
Lesson 9 Summary

Suppose we have two bags. One contains 1 star block and 4 moon blocks. The other contains 3 star blocks and 1 moon block.



If we select 1 block at random from each, what is the probability that we will get 2 star blocks or 2 moon blocks?

To answer this question, we can draw a tree diagram to see all of the possible outcomes.



There are $5 \cdot 4 = 20$ possible outcomes. Of these, 3 of them are both stars, and 4 are both moons. So the probability of getting 2 star blocks or 2 moon blocks is $\frac{7}{20}$.

In general, if all outcomes in an experiment are equally likely, then the probability of an event is the fraction of outcomes in the sample space for which the event occurs.

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