# MATHCOUNTS®
Ratios & Simple Probability

Warm-Up!

Try these problems before watching the lesson.

1. What is $\dfrac{9}{30}$ as a common fraction?

2. In a pasture there are 12 white horses and the rest are black. If there are 52 horses in the pasture what fraction are black? Express your answer as a common fraction.

3. Lakeland Middle School's MATHCOUNTS club has 14 girls and 12 boys. What fraction of the members are girls? Express your answer as a common fraction.

4. The graph shows the results when 100 teachers reported the number of years they have been teaching. What percentage of these teachers have been teaching more than 5 years but no more than 15 years?

TEACHING EXPERIENCE

5. There are three times the number of orange fish as blue fish in a tank at the pet store, and there are no other fish. What percentage of the fish are orange?
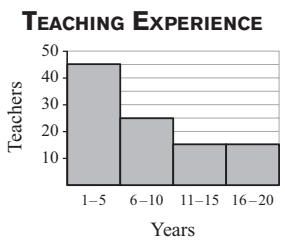
The Problems

Take a look at the following problems and follow along as they are explained in the video.

6. A drawer contains five socks: two green and three blue. What is the probability that a sock pulled out of the drawer at random will be green? Express your answer as a common fraction.

7. Nine cards are numbered 1 through 9. What is the probability of selecting a card with a number greater than four or an even number? Express your answer as a common fraction.

8. What is the probability that a randomly selected positive integer less than or equal to 3000 is a multiple of 5? Express your answer as a common fraction.

Piece It Together

Use the skills you practiced in the warm-up and strategies from the video to solve the following problems.

9.   What is the probability that Kai will select a red or blue marble when he selects one marble from a jar containing three green, two red and five blue marbles? Express your answer as a common fraction.

10.   The table shows the number of students enrolled for each grade at East-West High School. Every 9th- and 10th-grade student at East-West is automatically entered into a drawing to win a new tablet computer. One winning students will be chosen randomly. What is the probability that a 10th-grader at East-West will win the drawing? Express your answer as a common fraction.

Grade	Enrollment
9	192
10	136
11	129
12	93

11.   What is the probability that a positive integer less than or equal to 24 is a multiple of 4? Express your answer as a common fraction.

12.   A jar contains 28 marbles. Half of the marbles are red. Half of the non-red marbles are white and the rest are blue. Todd chose a white marble at random and kept it. What is the probability that when Hosea now draws a marble it will also be white? Express your answer as a common fraction.

Optional Extension

To extend your understanding and have a little fun with math, try the following activities.

Practice simple probability calculations by playing a dice game! Get a six-sided die and a partner. Decide who will be Player 1 and who will be Player 2 for round one (you will switch off after every round). Player 1 starts the round by rolling the six-sided die. Player 2 now has two options: roll or don't roll. If Player 2 chooses not to roll, she gets 0 points and Player 1 gets +1 point. If Player 2 chooses to roll, there are three possible outcomes: she rolls a number lower than Player 1, she rolls the same number as Player 1 or she rolls a number higher than Player 1. If she rolls a number lower, then Player 1 gets +1 point and she gets −1 point. If she rolls a number equal to Player 1, they both get 0 points. If she rolls a number higher, then Player 1 gets 0 points and she gets +1 point. These four outcomes are summarized in the table below.

	No roll	Player 1 > Player 2	Player 1 = Player 2	Player 1 < Player 2
Player 1	+1	+1	0	0
Player 2	0	−1	0	+1

Switch off who is Player 1 each round. Play 10 rounds and keep a running score. The winner is the one with the most points at the end of the rounds. If you are tied, continue playing until someone pulls ahead in points. Make sure you are considering the probability each time you choose to roll or not roll!