

# Section Overview

## Probability

Lesson 11-5

**Why?** Probability is used to make plans and predictions. If a weather forecast gives a 30% chance of rain, then there is a 30% probability of rain, based on the study of meteorology and mathematical modeling.

Vocabulary	Definition	Example
Experiment	An activity in which results are observed	Spin a fair spinner that has 5 equal areas.
Outcome	A result of one trial of an experiment	4
Sample space	The set of all possible outcomes of an experiment	1, 2, 3, 4, 5
Event	Any set of one or more outcomes	Spinning a number greater than 2 1, 2, <b>3, 4, 5</b>
Probability	A number from 0 (0%) to 1 (100%) that tells how likely an event is to happen	$P(\text{spinning a number greater than 2}) = \frac{3}{5} = 60\%$

The sum of the probabilities of all possible outcomes in an experiment is 1.

## Experimental Probability

Lesson 11-6

**Why?** Insurance companies use experimental probability to compare the probabilities that drivers in various categories will be involved in accidents.

**Experimental probability:**  

$$\frac{\text{number of times event occurs}}{\text{total number of trials}}$$

### Example

If you roll a number cube 100 times and you roll a 3 on 18 of those trials, then the experimental probability of rolling a 3, based on this experiment is as follows: probability  $\frac{18}{100} = \frac{9}{50} = 0.18 = 18\%$ .

## Theoretical Probability

Lesson 11-7

**Why?** You use **theoretical probability** to find the chance of something occurring, without directly measuring its occurrence.

**Theoretical Probability**  

$$\text{probability} = \frac{\text{number of outcomes in event}}{\text{number of possible outcomes}}$$



**Sample Space**  
 The sample space of outcomes for the spinner is 1, 2, 3, 4, and 5.

What is the probability of spinning an odd number on the spinner?

$$P(\text{odd}) = \frac{\text{possible odd numbers } \{1, 3, 5\}}{\text{possible outcomes } \{1, 2, 3, 4, 5\}} = \frac{3}{5}$$

