Module 4: Analyzing Populations and Probabilities

TOPIC 1: INTRODUCTION TO PROBABILITY

In this topic, students use familiar objects, such as number cubes and spinners, to learn the terminology of probability, including outcome, experiment, sample space, event, simple event, probability, complementary events, and equally likely. Students calculate probabilities rolling number cubes, using spinners, and drawing marbles from a bag. For real-world situations or probabilistic situations that require a large number of trials, students use simulation techniques, including random number tables, to simulate the results of experiments.

Where have we been?

This topic is students' formal introduction to probability, but they have encountered probabilistic situations throughout their lives and in previous school years. The topic opens with asking students to interpret the meaning of a meteorologist's forecast. They use their intuition of the meaning of "chance of rain" and rewrite the percent as a fraction.

Where are we going?

In later lessons, students will use probability and ideas about randomness to explore sampling and drawing inferences about data, which is the start of the formal study of statistical inference. The basic ideas developed in this topic will be used in the next topic on compound probability.

Using a Number Line to Interpret Probabilities

The probability of an event is a value from 0 to 1, with 0 meaning that the event is impossible, and 1 meaning that the event is certain.
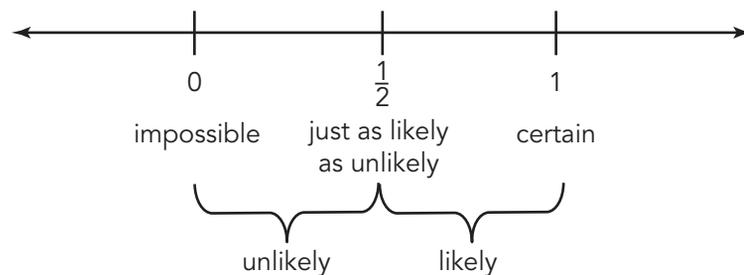
Myth: Cramming for an exam is just as good as spaced practice for long-term retention.
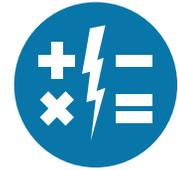
Everyone has been there. You have a big test tomorrow, but you've been so busy that you haven't had time to study. So you had to learn it all in one night. You may have gotten a decent grade on the test. However, did you to remember the material a week, month, or year later?

The honest answer is, "probably not." That's because long-term memory is designed to retain useful information. How does your brain know if a memory is "useful" or not? One way is the frequency in which you encounter a piece of information. If you only see something once (like during cramming), then your brain doesn't deem those memories as important. However, if you sporadically come across the same information over time, then it's probably important. To optimize retention, encourage your student to periodically study the same information over expanding intervals of time.

#mathmythbusted

Talking Points

You can further support your student's learning by resisting the urge, as long as possible, to get to the answer in a problem that your student is working on. Probability is a tricky concept. Students will need time and space to struggle with all the implications of thinking about events in terms of their probabilities. Practice asking good questions when your student is stuck.

Questions to Ask

- Let's think about this. What are all the things you know?
- What do you need to find out?
- How can you model this problem?

Key Terms

sample space
A list of all possible outcomes of an experiment is called a sample space. A sample space is typically enclosed in brackets, { }, with commas between the outcomes.

event
An event is one or a group of possible outcomes for a given situation.

complementary event
Given an event A, a complementary event to A is the event *not A*, which contains all of the outcomes not in event A.

experimental probability
Experimental probability is the ratio of the number of times an event occurs to the total number of trials performed.