Module 4: Analyzing Populations and Probabilities

TOPIC 2: COMPOUND PROBABILITY

In this topic, students build on their understanding of the probability concepts from the previous topic. They use arrays and lists to organize the possible outcomes of an experiment that includes two simple events. Students list outcomes that are contained in an event, distinguishing between "and" and "or" situations. Students then design and conduct simulations for compound probability problems. They are provided opportunities to reinforce their new knowledge of compound probabilities.

Where have we been?

In previous lessons, students explored simple events. At the start of this topic, students use two simple events—tossing two coins—and create an array of outcomes. Throughout this topic, probability concepts that students learned in the prior topic (e.g., experimental versus theoretical probability, predictions, and simulation) are reinforced and deepened.

Where are we going?

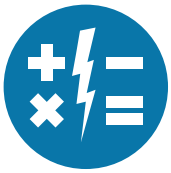
This topic is the culmination of students' learning about probability until they reach high school. In high school, students will engage with probability from a more formal and formula-driven perspective. This topic provides students with the opportunity to build intuition about compound events before formalizing language around independent and dependent events and learning formulas and rules for mutually exclusive events and conditional probability.

Using an Array to Organize Outcomes

This array shows all the possible sums of rolls when rolling two number cubes. There are 6 × 6, or 36, possible outcomes.

	Number Cube 1	1	2	3	4	5	6
Number Cube 2	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9
	4	5	6	7	8	9	10
	5	6	7	8	9	10	11
	6	7	8	9	10	11	12

Myth: "I'm not smart."



The word "smart" is tricky because it means different things to different people. For example, would you say a baby is "smart"? On the one hand, a baby is helpless and doesn't know anything. But on the other hand, a baby is exceptionally smart because they are constantly learning new things every day.

This example is meant to demonstrate that "smart" can have two meanings. It can mean "the knowledge that you have," or it can mean "the capacity to learn from experience." When someone says they are "not smart," are they saying they do not have lots of knowledge, or are they saying they lack the capacity to learn? If it's the first definition, then none of us are smart until we acquire that information. If it's the second definition, then we know that is completely untrue, because everyone has the capacity to grow as a result of new experiences.

So, if your student doesn't think that they are smart, encourage them to be patient. They have the capacity to learn new facts and skills. It might not be easy, and it will take some time and effort. But the brain is automatically wired to learn. Smart should not refer only to how much knowledge you currently have.

#mathmythbusted

Talking Points

You can further support your student's learning by asking questions about the work they do in class or at home. Your student is learning about probability, compound probability, and drawing inferences from random samples.

Questions to Ask

- How does this problem look like something you did in class?
- Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
- Does your answer make sense? How do you know?

Key Terms

tree diagram

A tree diagram is a tree-shaped diagram that illustrates the possible outcomes of a given situation.

compound event

A compound event combines two or more events, using the word *and* or the word *or*.