

Eureka Math Parent Guide

A GUIDE TO SUPPORT PARENTS AS THEY WORK WITH THEIR STUDENTS IN MATH.

GRADE 7
MODULE 5

GRADE FOCUS

Seventh grade mathematics is about (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

- Module 1: Ratios and Proportional Relationships
- Module 2: Rational Numbers
- Module 3: Expressions and Equations
- Module 4: Percent and Proportional Relationships
- » **Module 5: Statistics and Probability**
- Module 6: Geometry

LET'S CHECK IT OUT!

MODULE 5 FOCUS

In this 23-lesson module, students begin their study of probability and learn how to interpret, estimate and compute probabilities in simple settings. Additionally, students build on their knowledge of data distributions that they studied in Grade 6, compare data distributions of two or more populations, and are introduced to the idea of drawing informal inferences based on data from random samples.

MORE SPECIFICALLY, CHILDREN WILL LEARN HOW TO:

- Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.
- Draw informal comparative inferences about two populations.
- Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $1/2$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- Approximate the probability of a chance event by collecting data.

- Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

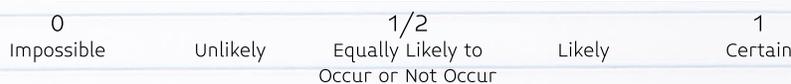
TOPIC OVERVIEW

Topics are the lessons within a module that help children master the skills above. Here are the lessons that will guide your child through Module 5:

- Topic A: Calculating and Interpreting Probabilities
- Topic B: Estimating Probabilities
- Topic C: Random Sampling and Estimating Population Characteristics
- Topic D: Comparing Populations

WORDS TO KNOW

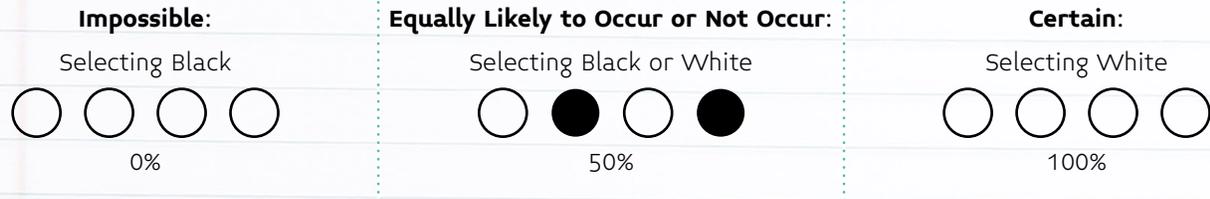
- **Probability:** A number between 0 and 1 that represents the likelihood that an outcome will occur.
- **Probability model:** A probability model for a chance experiment specifies the set of possible outcomes of the experiment—the sample space—and the probability associated with each outcome.
- **Uniform probability model:** A probability model in which all outcomes in the sample space of a chance experiment are equally likely.
- **Compound event:** An event consisting of more than one outcome from the sample space of a chance experiment.
- **Tree diagram:** A diagram consisting of a sequence of nodes and branches. Tree diagrams are sometimes used as a way of representing the outcomes of a chance experiment that consists of a sequence of steps, such as rolling two number cubes, viewed as first rolling one number cube and then rolling the second.
- **Simulation:** The process of generating "artificial" data that are consistent with a given probability model or with sampling from a known population.
- **Long-run relative frequency:** The proportion of the time some outcome occurs in a very long sequence of observations.
- **Random sample:** A sample selected in a way that gives every different possible sample of the same size an equal chance of being selected.
- **Inference:** Using data from a sample to draw conclusions about a population.



SAMPLE PROBLEMS

SAMPLE 1

Probability: How likely is it that an event will happen?



SAMPLE 2

Your teacher gives you a number cube with numbers 1–6 on its faces. You have never seen that particular cube before. You are asked to state a theoretical probability model for rolling it once. A probability model consists of the list of possible outcomes (the sample space) and the theoretical probabilities associated with each of the outcomes. You say that the probability model might assign a probability of $1/6$ to each of the possible outcomes, but because you have never seen this particular cube before, you would like to roll it a few times. (Maybe it's a trick cube.) Suppose your teacher allows you to roll it 500 times and you get the following results:

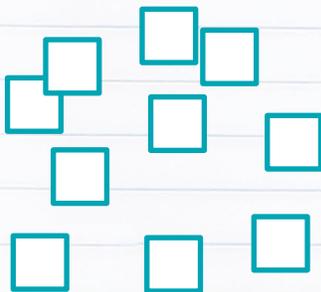
Outcome	1	2	3	4	5	6
Frequency	77	92	75	90	76	90

1. If the "equally likely" model were correct, about how many of each outcome would you expect to see if the cube is rolled 500 times? **Solution:** If the "equally likely" model were correct, you would expect to see each outcome occur about 83 times.
2. Based on the data from the 500 rolls, how often were odd numbers observed? How often were even numbers observed?

Solution: Odd numbers were observed 228 times. Even numbers were observed 272 times.

Since the number cube clearly favors even numbers, the estimated probabilities cause doubt about the conjectured equally likely model.

SAMPLE 3



Chance Experiments

Use the picture on the left to answer the following questions.

1. How would you color the cubes so it is equally likely to choose a blue or yellow cube?

Solution: Color five yellow and five blue.

HOW YOU CAN HELP AT HOME

- Every day, ask your child what they learned in school and ask them to show you an example.
- Ask your child to create an example of something that is certain to happen and another event that is impossible. For example, if there is a bag containing only five red crayons and you reached your hand in to grab a crayon, it is certain you will pull out a red crayon and impossible that you will pull out a blue crayon.
- Discuss the importance of random sampling in probability.