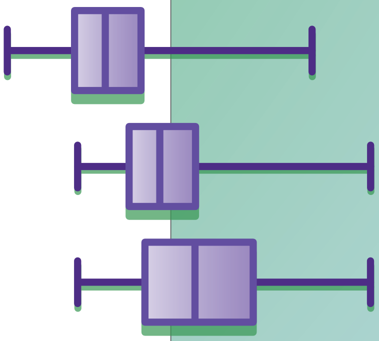
Unit 8

Probability and Sampling

Have you ever wondered what the chances of something happening are? Is the game you are playing a fair one? Do middle schoolers have more homework per night than high schoolers? These are the types of questions we can answer using statistics and probability, which help us make better predictions and decisions.



Essential Questions

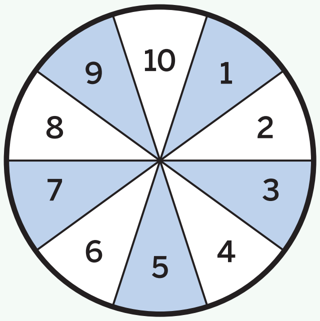
- How can we determine how likely an event is to happen?
- How can we simulate events in the world to make predictions?
- When is a sample representative of a population? How might this affect our analysis?

Summary | Lesson 1

How likely is an **event** to occur? One way to learn more is to look at the outcomes of **experiments**. An **outcome** is any of the possible results that can happen when you perform an experiment at **random**.

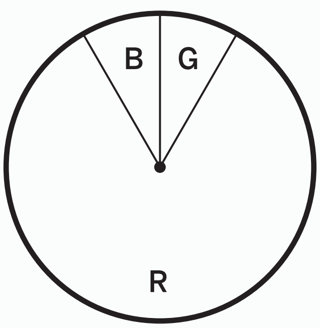
For example, when you spin a spinner with 10 equal sections labeled 1–10, one possible outcome is that the spinner will land on the number 5. You can describe the likelihood of events using these phrases: impossible, unlikely, equally likely as not, likely, or certain.

Event	How likely is it?
Lands on 5	Unlikely
Lands on an even number	Equally likely as not
Lands on a number that is *not* 5	Likely
Lands on a whole number	Certain
Lands on 12	Impossible



Try This

Write the letter that matches the likelihood of getting each letter on one spin.



a. Impossible ________ R

b. Unlikely ________ B

c. Equally likely as not ________ Y

d. Likely ________ R, B, or G

e. Certain ________ G

Summary | Lesson 2

The **probability** of an event is a number that represents how likely the event is to occur. One way to calculate the probability is to look at all of the possible outcomes for an experiment, which is known as the **sample space**.

When all of the outcomes are equally likely, the probability of an event is a ratio.

$$\frac{\textit{number of favorable outcomes}}{\textit{total possible number of outcomes}}$$

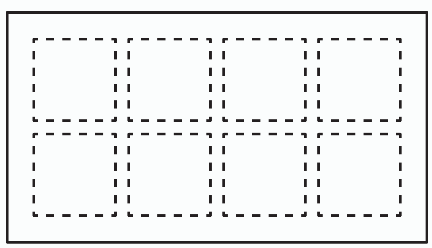
Probabilities are numbers between 0 and 1 written as fractions, decimals, or *percentages*. A probability of 1 means the event will always happen. A probability of 0 means the event will never happen.

Here are some examples of events and their probabilities.

Example	Probability
Picking a green marble out of a bag that contains only red and yellow marbles.	0
Rolling a 1 on a number cube.	$\frac{1}{6}$ (or equivalent)
Flipping a coin and it landing heads up.	50% (or equivalent)
Picking a yellow marble from a bag of 10 marbles, where 8 of the marbles are yellow.	0.8 (or equivalent)
Picking a green marble in a bag that only contains green marbles.	1

Try This

A mystery box contains a secret set of letter tiles.

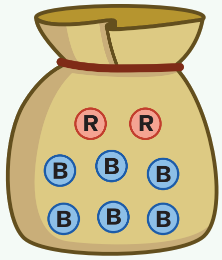


Label the secret letter tiles using these three probability clues:

- The probability of picking a P is $\frac{1}{4}$.
- The probability of picking a B is 0.
- The probability of picking a G is equal to the probability of picking an R.

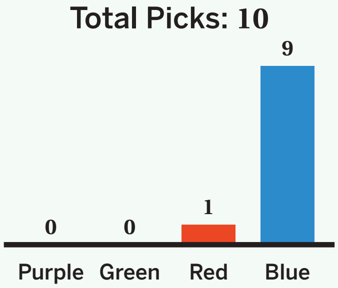
Summary | Lesson 3

In situations where you don't know the sample space, you can use data from experiments and proportional reasoning to predict what the sample space is. Repeating an experiment more times can help make your prediction more accurate.



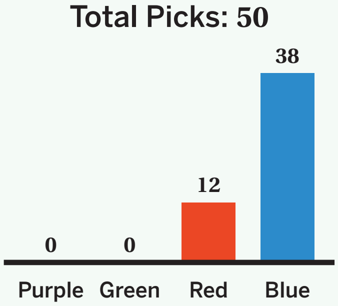
For example, here are the results from picking a marble out of a mystery bag 10 times. The bag has 8 marbles in it.

Only 1 out of the 10 marbles was red, so the *constant of proportionality* is 0.1. Multiplying 0.1 times the number of marbles in the bag (8), may lead someone to predict that there is only $0.1 \cdot 8 = 0.8$ or 1 red marble in the bag.



After 50 picks, the constant of proportionality (0.24) times the number of marbles in the bag is $0.24 \cdot 8 = 1.92$, which is close to 2.

This is a more accurate prediction of the number of red marbles in the bag.



Try This

There are 6 blocks in a bag. The table shows results from 100 picks.

Based on these results, how many of the 6 blocks are likely to be red?

Explain your thinking.

Block Color	Number of Picks
Purple	32
Red	68

Summary | Lesson 4

Graphing the outcomes of a repeated experiment can help you make sense of how likely an event is to occur. The fraction of experiments that result in a certain outcome is called the **relative frequency** of that outcome.

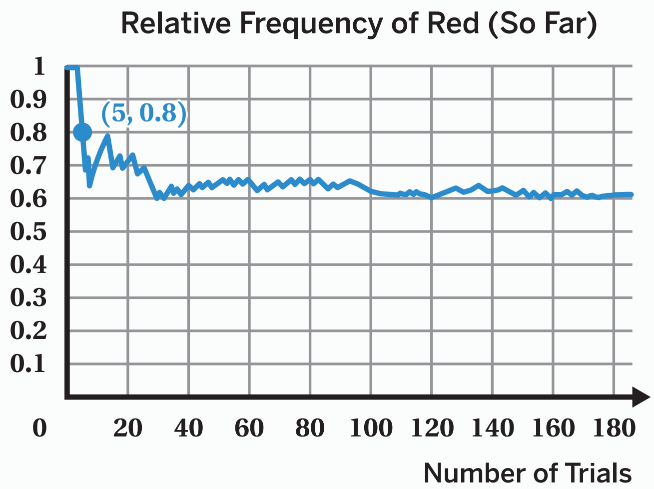
When an experiment is only repeated a few times, the results may surprise you because they may be far from the probability you expected. As the number of experiments increases, the relative frequency of each outcome gets close to its probability.

For example, the probability of a flipped coin landing heads up is $\frac{1}{2}$ or 0.5. This means that if the coin is flipped many times, we expect it to land heads up about half of the time.

If the coin landed tails up three times in a row, this does not mean that the next flip is more likely to be heads up. The chances of landing heads up are the same on each flip regardless of the previous outcomes.

Try This

This graph shows the results of 200 spins of a color spinner.



a There is a point on the graph at $(5, 0.8)$. What does this point represent?

b Based on these results, what is the probability that the spinner lands on red?

Explain your thinking.

Summary | Lesson 5

Repeated experiments can help you decide if an object is fair.

If an experiment is repeated only a few times, the results may not be what you expect, even if the object is fair. The more times you repeat the experiment (i.e., hundreds or thousands of times), the closer the relative frequency should get to the probability. This allows you to make a better decision about whether the object is fair.

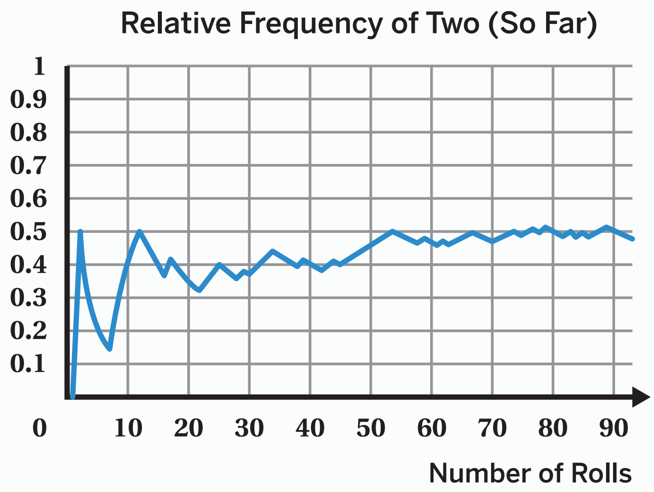
For example, here is a fair coin. The probability of this coin landing heads up is $\frac{1}{2}$.

If you flip the coin only 3 times, it may land heads up all 3 times. You may think the coin is unfair, but continuing to repeat the experiment can change your perspective.

If you flipped the coin $1,000$ times, it would land heads up about half of the time because the sample space of this event is "heads" and "tails."

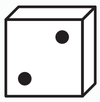
Try This

This graph shows the results of 100 rolls of a number cube.



a Based on these results, what is the probability of rolling a 2 with this number cube?

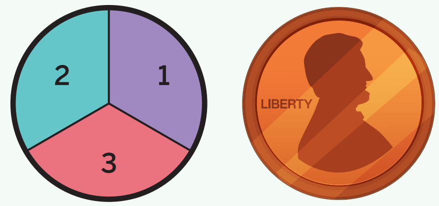
b Describe or draw what the rest of this number cube could look like.



Summary | Lesson 6

There are several different ways to make sense of **compound events**, or events that involve multiple steps.

Here is one example: Let's spin a spinner and flip a fair coin. There are 6 outcomes in the *sample space* of this multistep event, which you can see in a list, a table, and a **tree diagram**.



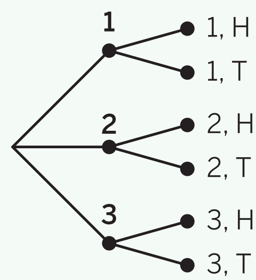
List

1, Heads	1, Tails
2, Heads	2, Tails
3, Heads	3, Tails

Table

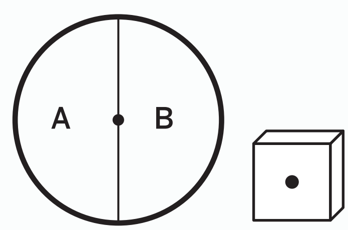
	H	T
1	1, H	1, T
2	2, H	2, T
3	3, H	3, T

Tree Diagram



Try This

Juana is playing her favorite board game, Dice & Doors, which uses a spinner and a standard number cube.



a Make a tree, table, or list to represent the sample space.

b What is the probability of Juana getting an A and an even number?

Summary | Lesson 7

Simulations are experiments that are used to estimate the probability of a real-world event. They are especially useful for estimating the probabilities of compound events, such as determining the probability that it will rain at least once over a three day period. In order to design a good simulation, first determine the probability of the individual events occuring.

For example, you could use a coin, number cube, or spinner to simulate a 50% probability of rain.

Flipping a Coin

Landing heads up

$\left(\frac{1}{2} = 50\%\right)$

Rolling a Number Cube

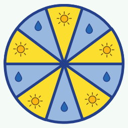
Rolling an even number

$\left(\frac{3}{6} = 50\%\right)$

Using a Spinner

Spinning a raindrop

$\left(\frac{5}{10} = 50\%\right)$



To simulate the probability of rain over three days where each day has a 50% chance of rain, you can use three coins, number cubes, or spinners and repeat the experiment many times.

Try This

Brianna loves monkeys, seals, and elephants, so she designed a simulation with spinners to help her estimate the probability of these 3 animals being awake when she visits the zoo.

This table shows the results of 300 experiments with the spinners.

Estimate the probability that at least 2 of Brianna's favorite animals will be awake when she visits the zoo.

Experiments With . . .	Count	Percentage (%)
No animals awake	12	4
1 animal awake	171	57
2 animals awake	105	35
3 animals awake	12	4

Summary | Lesson 8

You can use simulations to estimate the probability of an event. Simulations are especially useful for estimating the probability of compound events. The more simulations you perform, the closer the probability in the relative frequency of each outcome should be to the probability.

Many professionals such as scientists, computer programmers, financial analysts, and sports analysts create simulations to model the outcomes of complicated real-world events. Using computer software, they are able to perform thousands of simulations to answer questions about everyday situations. Similarly, you can create a simulation using items such as spinners or bags to determine the probability of a real-world question you may want to answer.

Try This

Mayra is a basketball player who makes about 50% of her free throws.

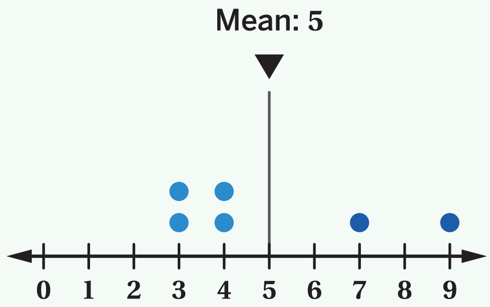
Design a simulation that you could use to answer the question: *What is the probability that Mayra will make exactly* 3 *out of* 5 *free throws in her next basketball game?*

Describe your simulation precisely enough that someone else could perform it.

Summary | Lesson 9

When comparing two sets of data, you can compare their centers, shapes, and spreads. Data sets can have the same center but very different shapes and spreads.

The *mean* is a measure of center. One way to measure the spread of data is to use the distances between each value in the data set and the mean. The average of those distances is called the *mean absolute deviation (MAD)*. In this example, the MAD is 2 units.



Data Point	3	3	4	4	7	9
Distance from Mean	2	2	1	1	2	4

$$\frac{2+2+1+1+2+4}{6} = 2$$

MAD: 2

Try This

Prisha eats cheese and crackers as a snack every day.

Here is some data Prisha collected about the number of crackers in her snack bags.

Number of crackers per bag:
[15, 19, 27, 23, 21]

a Calculate the mean.

b Calculate the MAD.

Summary | Lesson 10

To answer a question about a population, it is sometimes not realistic to collect data from the entire **population**. Instead, you can collect data from a **sample** of the population.

- A *population* is a set of people or things that we want to study.
- A *sample* is part of a population.

The sample you choose should be large enough to be able to draw conclusions about the population.

Here are some examples of populations and samples.

Population	Sample
All of the people who watch basketball	The people at a basketball game
All 7th grade students in your school	The 7th graders in your school who are in a band
All oranges grown in the U.S.	The oranges in your local grocery store

Try This

Alisha wants to survey the other 7th graders at her school to learn how many minutes they spend on their cell phones each day.

a What is the population for Alisha's question?

b What is a sample Alisha could use to help answer this question?

Summary | Lesson 11

Samples are useful when a population is too large to survey or measure. Depending on the strategy you use to sample, your sample might or might not be **representative** of the population. Some samples are not good representations of the population.

A representative sample has a distribution that closely resembles the distribution of the population. Representative samples are useful for making predictions about the whole population.

For example, if you were curious about all middle school students' favorite sport to play, the population would be all middle schoolers. A representative sample of this population might be randomly selecting 5 students from each class or 15 students from each grade to ask. A sample that is *not* representative of this population would be asking students in the tennis club because their responses might lead someone to believe that tennis is the favorite sport among all middle schoolers.

Try This

Match each headline with the sampling method that most likely produced it.

Headline		Sampling Method
a. One Quarter of Working Americans Spend Time Working From Home!	________	Ask all 100 employees at one technology company.
b. Most Americans Spend Time Working From Home!	________	Ask all the employees at 100 random grocery stores.
c. Almost Nobody Works From Home!	________	Call random phone numbers until you ask 100 people.

Summary | Lesson 12

How can we use data from a sample to make claims about a population? One way is to use *proportional* reasoning.

Let's say someone is wondering how many students at their school might vote for a candidate for student council. It would be challenging and time consuming to ask all 500 students at the school, so they collect a sample of 25 students. It is important to gather the sample in a way that makes sure the sample is likely to be representative, like asking one student from each homeroom or asking 25 students at random.

If 10 out of the 25 students in the sample said they would vote for this candidate, there are several strategies for making a prediction about the population.

Strategy A

10 out of 25 is equal to $\frac{10}{25}$ or 40% of the sample.

40% of the population (500 students) would be $0.4 \cdot 500 = 200$ students.

Strategy B

The population is $\frac{500}{25} = 20$ times as large as the sample, so multiply the number of votes by 20 to determine the number of students in the population who would vote for them.

Votes	Total Students
10	25
200	500

Try This

Cameron bought a bag of White Flower Seed Mix and is curious about how many flowers of each type there are. They planted 25 seeds, and these were the results.

a Complete the table with the percentage of each flower type.

Flower Type	Count	Percentage (%)
Daisy	14	
White Zinnia	5	
Aster	6	
Total	25	

b Estimate how many of the 600 seeds in the bag will be asters.

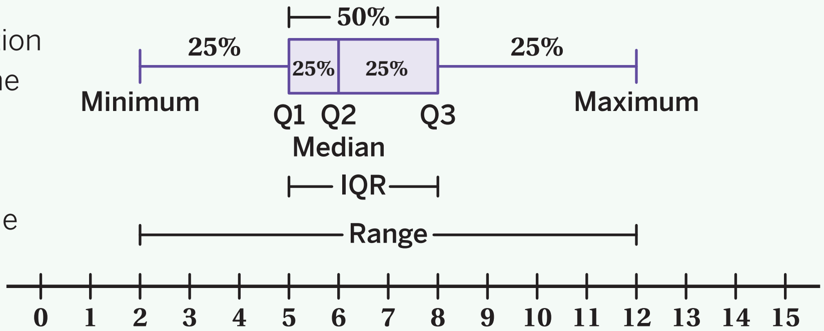
Show your calculations.

c What could you do to be more confident in your estimate?

Summary | Lesson 13

Box plots are one way of displaying data that can be helpful for comparing samples or populations.

They show the data split up into quartiles, with each section representing about 25% of the data in the data set.

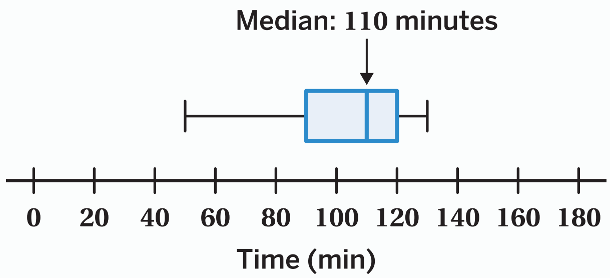


The measure of center on a box plot is the *median* and the measure of spread is the *interquartile range (IQR)*, or the distance between the middle 50% of the data.

One way to make sense of data is to collect and compare multiple samples from the same population. In general, when samples have similar medians or interquartile ranges, predictions about the population are more likely to be accurate. If the medians for two samples are very different, you may be less confident that your predictions about the population are accurate.

Try This

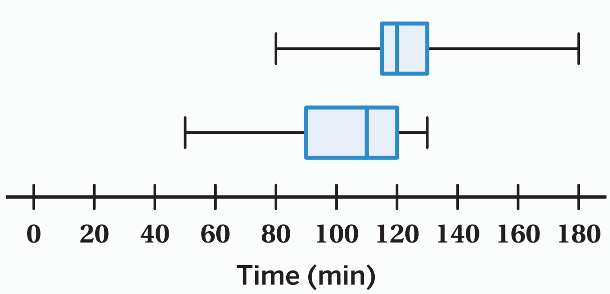
Sai asked 10 random people at their school how many minutes each person exercised every week. Then Sai created a box plot of the answers.



a What is the interquartile range (IQR)?

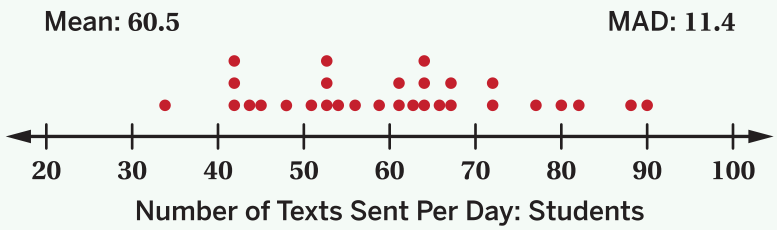
b Sai asked another 10 people. Here are both sets of results.

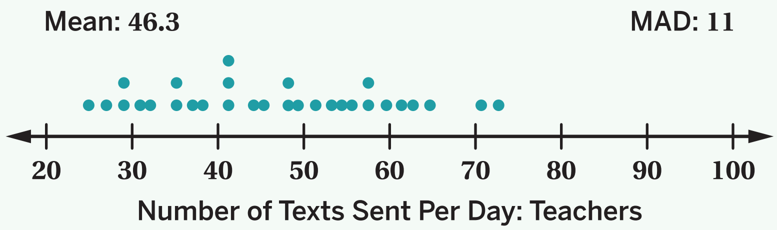
Estimate the population median.



Summary | Lesson 14

In general, it is easier to compare two individuals or objects than it is to compare two populations. For example, you can answer the question, "Which 7th grader is taller?" by measuring the heights of two 7th grade students and comparing them directly. However, to answer the question, "Do middle school students send more texts per day than their teachers?" you need to collect samples and analyze the measures of center and variability.

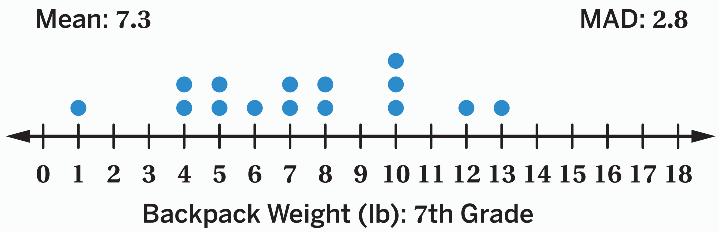


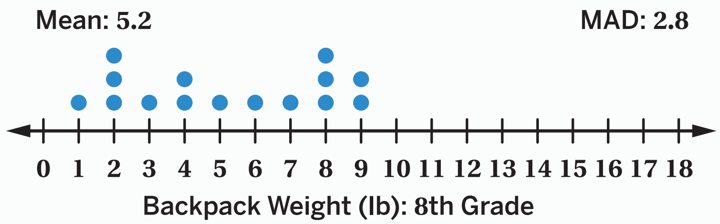


Here are the results of a random sample of 30 students and 30 teachers surveyed about the number of texts they send per day. To decide if the data sets are very different from each other, we can calculate the difference in their means and compare it to the larger MAD. The difference is $60.5 - 46.3 = 14.2$, which is about 1.25 times the MAD of 11.4. When the difference is more than 1 times the larger MAD, the data sets are very different. This suggests that students do send more texts than teachers.

Try This

Nathan compared the weight of backpacks from students in 7th grade and 8th grade. After collecting data from a random sample of 15 students in each grade, he claimed that 7th graders' backpacks are much heavier.





Do you agree with Nathan's claim?

Use the data to support your thinking.

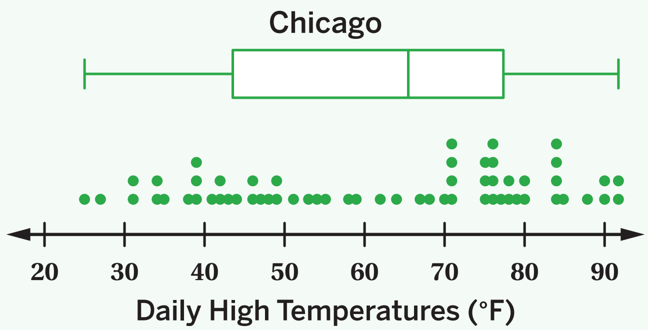
Summary | Lesson 15

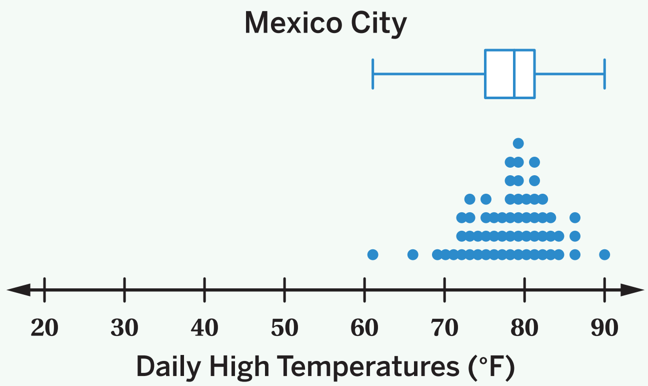
Statistics and sampling, along with visual representations of data, can help you to make sense of real-world topics. The more we understand the world around us, the more we can take action to improve it.

Let's say you want to compare the weather of Chicago and Mexico City. Here is a random sample of the daily high temperature for 60 days in 2023.

The box plots and dot plots let us see patterns in the data. We can also study measures of center and spread.

The mean and median temperatures are higher in Mexico City than in Chicago, so we might say it is generally hotter there. The IQR and MAD add more detail to our comparison. Chicago has greater measures of spread, so it has more variability in its temperature over the year.





	Mean	Median	IQR	MAD
Chicago	61.5	65.5	34	17.4
Mexico City	77.9	78.5	6	3.9

Try This

Here is a sample of asthma rates in adults from Emmanuel's city.

Number of Adults Who Have Asthma (per 1,000)
112
105
93
129
127
125
93

a One of the asthma rates is 105. What does this number mean?

b Why might someone be interested in this data?

c Based on this data, what is the average asthma rate in adults from Emmanuel's city?

Try This | Answer Key

Lesson 1

a. Impossible __d__ R

b. Unlikely __b__ B

c. Equally likely as not __a__ Y

d. Likely __e__ R, B, or G

e. Certain __b__ G

Lesson 2

Responses vary.

P	P	G	G
R	R	R	G

Lesson 3

4 blocks. *Explanations vary.* $\frac{68}{100}$ is 68% and 68% of 6 blocks is about 4 blocks.

Lesson 4

a After 5 spins, the fraction of red spins was 0.8 or $\frac{4}{5}$. In the first 5 spins, 4 were red and 1 was not.

b 0.6 or 60%. *Explanations vary*. As you spin more times, the fraction of spins gets closer to the true probability. On the graph, the fraction of spins is getting closer to 0.6 (or a 60% chance of landing on red).

Lesson 5

a $\frac{1}{2}$ (or equivalent)

b *Responses vary*. Half of the sides are 2s. The other half of the sides are not 2s.

Lesson 6

a *Responses vary.*

	1	2	3	4	5	6
A	A, 1	A, 2	A, 3	A, 4	A, 5	A, 6
B	B, 1	B, 2	B, 3	B, 4	B, 5	B, 6

b $\frac{3}{12}$ (or equivalent)

Lesson 7

39%

Explanation: Here is a strategy to estimate the probability. Add the number of experiments that resulted in 2 or 3 animals being awake. Then divide the sum by the total number of experiments.

$105 + 12 = 117$

$\frac{117}{300} = 0.39 = 39\%$

Lesson 8

Responses vary. Create 5 identical spinners to simulate 5 free throws in a game. Give each spinner two sections: one that says “Make” and one that says “Miss.” Spin each spinner and write down how many free throws Mayra makes in the simulation. Repeat this many times and keep track of the percent of the experiments where “Make” comes up 3 out of 5 times.

Lesson 9

a 21 crackers

Explanation: Here is a strategy to find the mean. Divide the sum of the values by the number of values. $\frac{15 + 19 + 27 + 23 + 21}{5} = 21$

b 3.2 crackers

Explanation: Here is a strategy to find the MAD. First, find the distances between each value in the data set and the mean. Then, calculate the mean of those distances. $\frac{6 + 2 + 6 + 2 + 0}{5} = 3.2$

Lesson 10

a **The population is all the 7th graders at Alisha's school.**

b ***Responses vary.*** **A sample could be all the 7th graders in Alisha's math class.**

Lesson 11

Headline		Sampling Method
a. One Quarter of Working Americans Spend Time Working From Home!	**b**	Ask all 100 employees at one technology company.
b. Most Americans Spend Time Working From Home!	**c**	Ask all the employees at 100 random grocery stores.
c. Almost Nobody Works From Home!	**a**	Call random phone numbers until you ask 100 people.

Lesson 12

a

Flower Type	Count	Percentage (%)
Daisy	14	**56**
White Zinnia	5	**20**
Aster	6	**24**
Total	25	**100**

b **144**

Explanation: Here is one strategy. First, find the percentage of the sample that is asters by dividing the count by the sample size. Then find that percent of the population.

$\frac{6}{25} = 0.24 = 24\%$

$0.24 \cdot 600 = 144$

c ***Responses vary.***

- **You could plant more samples of 25 seeds and see if the results are similar between samples.**
- **You could plant a larger sample, like 100 seeds, because a larger sample might be more accurate.**

Lesson 13

a 30 minutes. Responses between 25 and 35 are considered correct.

b *Responses vary*. The population median is about 115 minutes because the median of both samples is close to 2 hours.

Lesson 14

Responses vary.

- Nathan's claim is incorrect because the difference between the means is $7.3 - 5.2 = 2.1$, which is less than the MAD.
- Nathan’s claim is correct because the mean of the 7th graders’ data is 2.1 pounds heavier than the mean of the 8th graders’ data.

Lesson 15

a This number means that 105 out of every $1{,}000$ adults in one community in Emmanuel’s city have asthma.

b *Responses vary.*
- They might want to know how much asthma medication is needed in the city.
- They could be curious about how this affects them and their children.

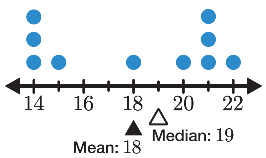
c 112 adults per $1{,}000$

Grade 7 Unit 8 Glossary/7.º grado Unidad 8 Glosario

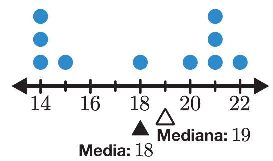
English | **Español**

C

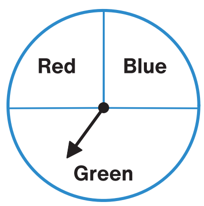
center A single value that can be used to summarize the typical value in a data set. Mean and median are measures of center.



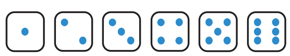
centro Un solo valor que puede utilizarse para resumir el valor típico de un conjunto de datos. La media y la mediana son medidas de tendencia central, o sea, medidas de centro.



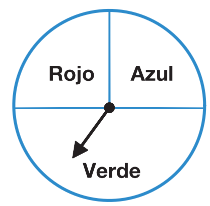
compound (multistep) event An experiment that has two or more events.



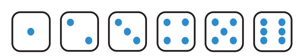
For example, spinning a spinner and then rolling a number cube is a compound event.



evento compuesto (de varios pasos) Un experimento que tiene dos o más eventos.



Por ejemplo, hacer girar una ruleta y luego tirar un dado es un evento compuesto.



constant of proportionality In a proportional relationship, the number used to multiply the values for one quantity to get the values for the other quantity is called the constant of proportionality.

Carpet (sq. ft)		Cost (dollars)
10	$\times\frac{2}{3}$	15.00
20	$\times\frac{2}{3}$	30.00
50	$\times\frac{2}{3}$	75.00

In this table, one constant of proportionality is $\frac{2}{3}$.

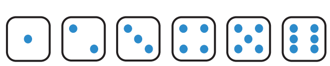
constante de proporcionalidad En una relación proporcional, una constante de proporcionalidad es el número que se puede usar para multiplicar los valores de una cantidad para obtener los valores de la otra cantidad.

Alfombra (pies cuadrados)		Costo (dólares)
10	$\times\frac{2}{3}$	15.00
20	$\times\frac{2}{3}$	30.00
50	$\times\frac{2}{3}$	75.00

En esta tabla, una constante de proporcionalidad es $\frac{2}{3}$.

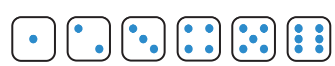
E

event A set of one or more outcomes in a chance experiment.



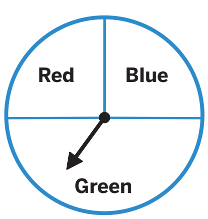
For example, if we roll a number cube, there are six possible outcomes.

evento Un conjunto de uno o más resultados en un experimento de azar.



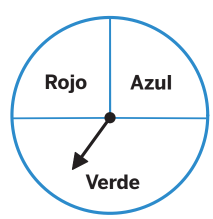
Por ejemplo, si tiramos un dado, hay seis resultados posibles.

experiment An action or activity that you can do over and over again without knowing what the outcome will be each time.



For example, each time you spin the spinner, it could land on red, blue, or green.

experimento Una acción o actividad que se puede llevar a cabo una y otra vez sin saber cuál será el resultado en cada ocasión.

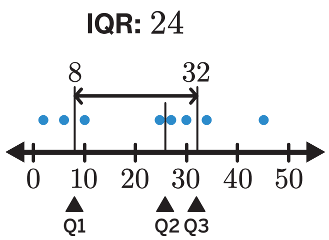


Por ejemplo, cada vez que se gira la ruleta, podría caer en rojo, azul o verde.

English	Español

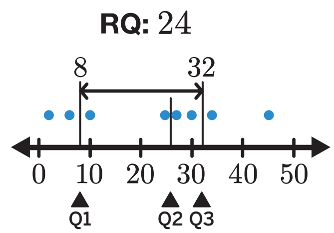
I

interquartile range (IQR) One way to measure how spread out a data set is. We also call this the IQR. The IQR is calculated as the distance from the first quartile (Q1) to the third quartile (Q3).



For example, the IQR of this data set is 24 because $32 - 8 = 24$.

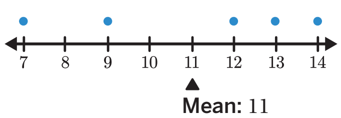
rango intercuartílico (RQ) Una forma de medir cuán disperso está un conjunto de datos. También lo denominamos RQ. El RQ se calcula como la distancia entre el primer cuartil (Q1) y el tercer cuartil (Q3).



Por ejemplo, el RQ de este conjunto de datos es 24 porque $32 - 8 = 24$.

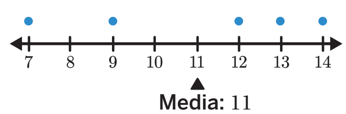
M

mean A way to measure the center of a data set. If you equally distribute a set of items into different groups, the mean is the number of items in each group. It is also the balance point of a dot plot. To calculate the mean, you can add the values of all the data points, then divide by the number of data points.



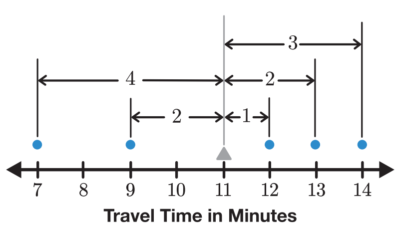
For example, for the data set $7, 9, 12, 13, 14$, the mean is 11 because $7 + 9 + 12 + 13 + 14 = 55$ and $\frac{55}{5} = 11$.

media La media es una forma de medir el centro de un conjunto de datos. Si se distribuye equitativamente un conjunto de elementos en diferentes grupos,la media es la cantidad de elementos encada grupo. También es el punto de equilibrio de un diagrama de puntos. Para calcular la media, se pueden sumarlos valores de todos los puntos de datos y luego dividir por la cantidad de puntos de datos.



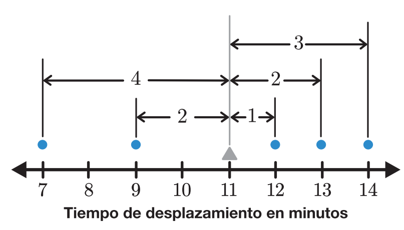
Por ejemplo, en el conjunto de datos $7, 9, 12, 13, 14$, la media es 11 porque $7 + 9 + 12 + 13 + 14 = 55$ y $\frac{55}{5} = 11$.

mean absolute deviation (MAD) One way to measure how spread out a data set is from the mean. Sometimes we call this the MAD. To calculate the MAD, add the distances between each data value and the mean. Then divide by the number of data values in the set.



For example, the MAD is 2.4 minutes because $4 + 2 + 1 + 2 + 3 = 12$ and $\frac{12}{5} = 2.4$.

desviación media absoluta (DMA) Una forma de medir cuán disperso está un conjunto de datos con respecto de la media. A veces se denomina DMA. Para calcular la DMA, se suman las distancias entre cada valor y la media. Luego se divide por la cantidad de puntos de datos (valores) del conjunto.



Por ejemplo, la DMA es 2.4 minutos porque $4 + 2 + 1 + 2 + 3 = 12$ y $\frac{12}{5} = 2.4$.

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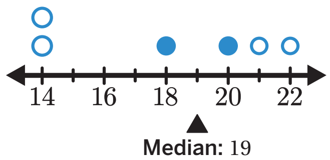
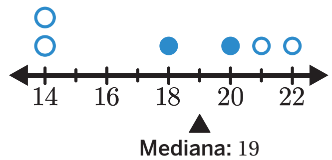
English | **Español**

median A measure of center. The median is the middle value of a data set when the values are in numerical order. When there is an even number of data points, the median is the average of the two middle values.



The median of this data set is 19 because it is the average of the two middle values: 18 and 20.

mediana Una medida de tendencia central. La mediana es el valor del medio de un conjunto de datos cuando los valores se clasifican en orden numérico. Cuando hay un número par de puntos de datos, la mediana es el promedio de los dos números centrales.



La mediana de este conjunto de datos es 19 porque es el promedio de los dos valores centrales: 18 y 20.

O

outcome One of the possible results of an experiment.

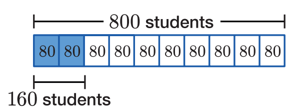
For example, the possible outcomes of tossing a coin are heads and tails.

resultado Uno de los posibles resultados de un experimento.

Por ejemplo, los posibles resultados de lanzar una moneda son cara y sello.

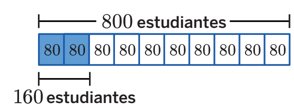
P

percent (percentage) Percent means for every 100. It is represented by the percent symbol: %. We use percentage to represent ratios and fractions.



For example, 20% means 20 : 100. 20% of a number means $\frac{20}{100}$ or $\frac{1}{5}$ of that number. Let's say there are 800 students in a school. If 20% of them are on a field trip, that means 160 students because 20 students are on the trip for every 100 students total.

por ciento (porcentaje) Por ciento significa por cada 100. Se representa con el símbolo de porcentaje: %. Usamos el porcentaje para representar razones y fracciones.



Por ejemplo, 20% significa 20 : 100. 20% de un número significa $\frac{20}{100}$ o $\frac{1}{5}$ de dicho número. Supongamos que hay 800 estudiantes en una escuela. Si el 20% de ellos están en una excursión, entonces eso es 160 estudiantes porque 20 están de viaje por cada 100 estudiantes en total.

population A set of people or things that are being studied.

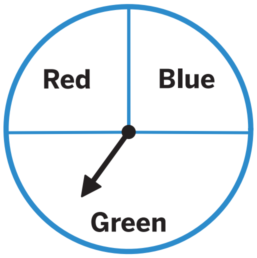
For example, if we want to study the heights of people on different sports teams, the population would be all the people on the teams.

población Conjunto de personas o cosas que se estudian.

Por ejemplo, si queremos estudiar las alturas de las personas de diferentes equipos deportivos, la población sería todas las personas de los equipos.

English

probability A number that tells us how likely an event is to happen. A probability of 1 means the event is certain. A probability of 0 means the event is impossible.



For example, the probability of spinning red is $\frac{1}{4}$.

proportional (relationship) A set of equivalent ratios. The values for one quantity are each multiplied by the same number to get the values for the other quantity.

Carpet (sq. ft.)	Cost (dollars)
$10 \xrightarrow{\times 1.5}$	15.00
$20 \xrightarrow{\times 1.5}$	30.00
$50 \xrightarrow{\times 1.5}$	75.00

For example, every cost in the table is equal to 1.5 times the number of square feet of carpet.

R

random Outcomes of a chance experiment are random if they are all equally likely to happen.

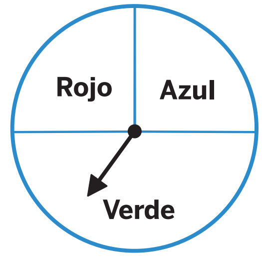
relative frequency The number of times an outcome happens divided by the number of repeated experiments. After several experiments, the relative frequency of an outcome gets close to its probability.

For example, if you spin a spinner 12 times and it lands on red 5 times, that means the relative frequency of landing on red is $\frac{5}{12}$.

representative (sample) A sample is representative if its distribution resembles the population's distribution in center, shape, and spread.

Español

probabilidad Número que indica qué tan probable es que ocurra un evento. Una probabilidad de 1 significa que el evento es seguro. Una probabilidad de 0 significa que el evento es imposible.



Por ejemplo, la probabilidad de girar y que caiga rojo es $\frac{1}{4}$.

(relación) proporcional Un conjunto de razones equivalentes. Cada uno de los valores de una cantidad se multiplica por el mismo número para obtener los valores de la otra cantidad.

Alfombra (pies cuadrados)	Costo (dólares)
$10 \xrightarrow{\times 1.5}$	15.00
$20 \xrightarrow{\times 1.5}$	30.00
$50 \xrightarrow{\times 1.5}$	75.00

Por ejemplo, cada costo en la tabla es igual a 1.5 veces el número de pies cuadrados de alfombra.

aleatorio Los resultados de un experimento de azar son aleatorios si todos tienen la misma probabilidad de suceder.

frecuencia relativa El número de veces que se produce un resultado dividido por el número de experimentos repetidos. Al cabo de varios experimentos, la frecuencia relativa de un resultado se aproxima a su probabilidad.

Por ejemplo, si se hace girar una ruleta 12 veces y cae en rojo 5 veces, la frecuencia relativa de que caiga en 5 es $\frac{5}{12}$.

representativa (muestra) Una muestra es representativa si su distribución se asemeja a la distribución de la población en centro, forma y dispersión.

Grade 7 Unit 8 Glossary/7.º grado Unidad 8 Glosario

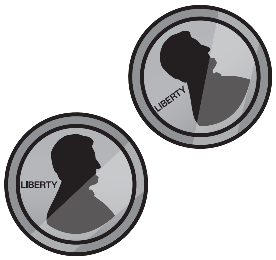
S

English

sample A part of a population.

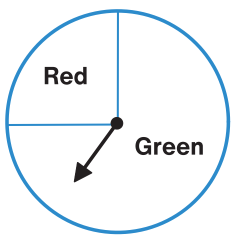
For example, a population could be all the seventh grade students at one school. One sample of that population is all the seventh grade students who are in band.

sample space The list of every possible outcome for a chance experiment.



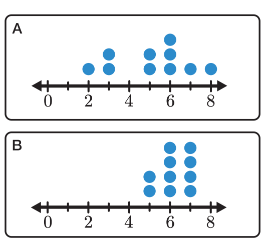
For example, the sample space for tossing two coins is: heads-heads, tails-heads, heads-tails, tails-tails.

simulation An experiment that is used to estimate the probability of a real-world event.



For example, suppose the weather forecast says there is a 25% chance of rain. We can create a simulation of this situation with a spinner. If the spinner stops on red, it represents rain. If not, it represents no rain.

spread A measure of how close together or far apart the values in a data set are from each other and from the center.Range, interquartile range, and mean absolute deviation are measures of spread.



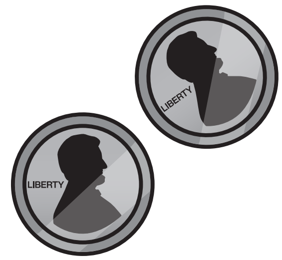
For example, Dot Plot A has a larger spread than Dot Plot B.

Español

muestra Una parte de una población.

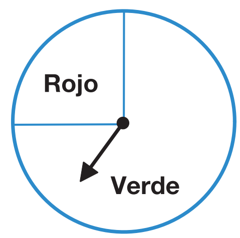
Por ejemplo, una población podría ser todos los estudiantes de séptimo grado de una escuela. Una muestra de esa población son todos los estudiantes de séptimo grado que están en la banda.

espacio muestral La lista de todos los posibles resultados de un experimento de azar.



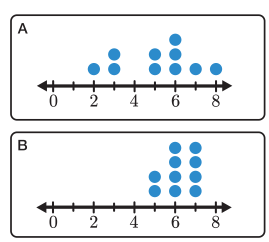
Por ejemplo, el espacio muestral del lanzamiento de dos monedas es: cara-cara, sello-cara, cara-sello, sello-sello.

simulación Un experimento que se emplea para estimar la probabilidad de un evento de la vida real.



Por ejemplo, supongamos que el pronóstico del tiempo dice que hay una probabilidad de lluvia del 25%. Podemos hacer una simulación de esta situación con una ruleta. Si la ruleta se detiene en rojo, representa lluvia. Si no, representa que no hay lluvia.

dispersión Medida de la proximidad o la lejanía de los valores de un conjunto de datos entre sí y con respecto al centro. El rango, el rango intercuartílico y la desviación media absoluta son medidas de dispersión.

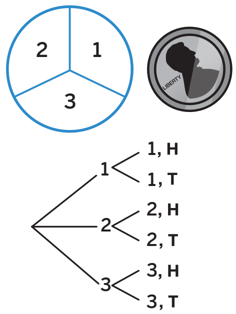


Por ejemplo, el diagrama de puntos A tiene una dispersión mayor que el diagrama de puntos B.

T

English

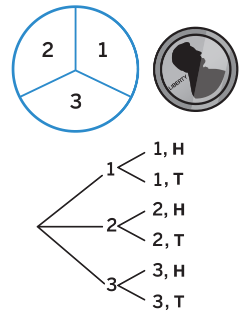
tree diagram
A diagram that represents all the possible outcomes in an experiment. It is often used to represent compound events.



For example, this tree diagram shows the outcomes of spinning a spinner and then flipping a coin.

Español

diagrama de árbol
Diagrama que representa todos los resultados posibles de un experimento. A menudo se utiliza para representar eventos compuestos.



Por ejemplo, este diagrama de árbol muestra los resultados de girar una ruleta y luego lanzar una moneda.