Unit 6

Measuring Length, Time, Liquid Volume, and Weight

Essential Questions

- How can we represent length data on a line plot?
- How can we estimate, measure, and solve problems about volumes of liquids and weights of objects?
- How do we tell time to the minute and solve problems about elapsed time?

Unit Story: Just Stick With It, Sasha

You can read the Unit Story with your student by visiting the Unit Story page on the Caregiver Hub.

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Unit Investigation

Lesson 1 is the Unit Investigation. Students explore describing and comparing the growth of 3 fictional chicks using precise mathematical language to build curiosity and apply their own knowledge of precise measurements in a variety of ways. Use the **Caregiver Connection** to help students continue to explore the math they will see in the unit.

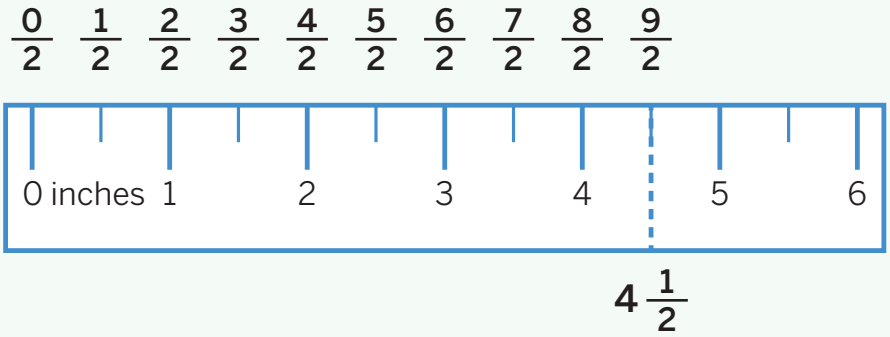
Caregiver Connection

Students may enjoy going on a "measurement hunt" to find objects that fit certain criteria (e.g., about 7 in., about 10 in.). Students can estimate the length and then measure to see if they are right. You can ask:

- "How did you find the length of the object?"
- "How could you describe the object's length?"
- "Could you find something else that is slightly shorter/longer than this object?"

Summary | Lesson 2

You can use rulers to measure in half inches. Numbers that combine whole numbers and fractions less than 1 are called **mixed numbers**.



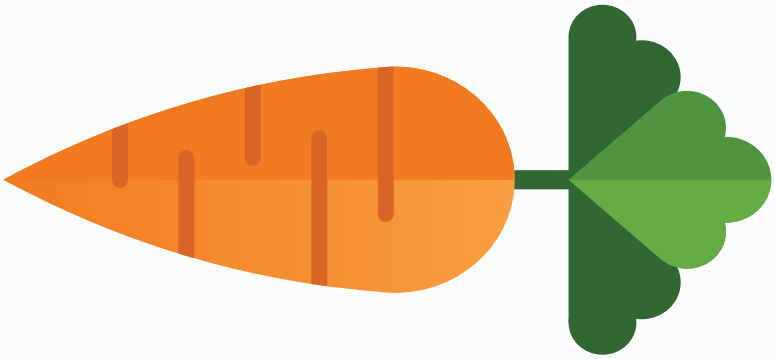
$\frac{9}{2}$ can be written as $4\frac{1}{2}$.

Try This

For Problems 1 and 2, measure the length of the object to the nearest half inch using a ruler.

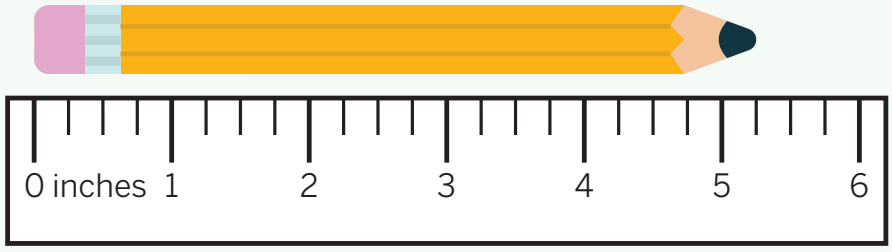
1

2



Summary | Lesson 3

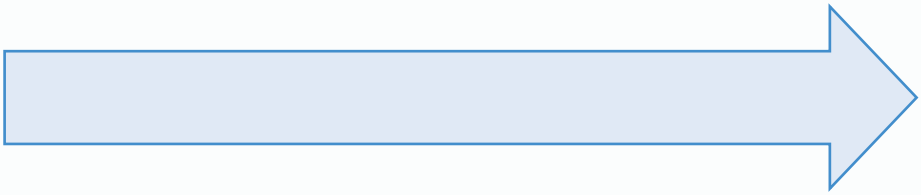
You can measure length in fourths of an inch. When you measure length to the nearest fourth of an inch, you can use the quarter-inch, half-inch, and whole-inch marks on a ruler.



Try This

For Problems 1 and 2, measure the length of the arrow to the nearest fourth of an inch using a ruler.

1



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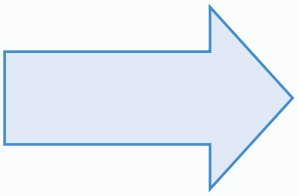
2



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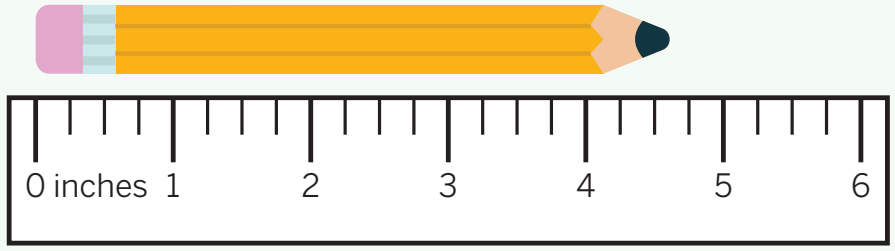
Summary | Lesson 4

Describing length using the smallest unit is often more precise. The length of an object can be described in more than 1 way using equivalent fractions.



nearest whole inch: 5

nearest half inch: $4\frac{1}{2}$ or $4\frac{2}{4}$

nearest quarter inch: $4\frac{3}{4}$

Try This

1 The lengths of 4 different rectangles are shown in inches.

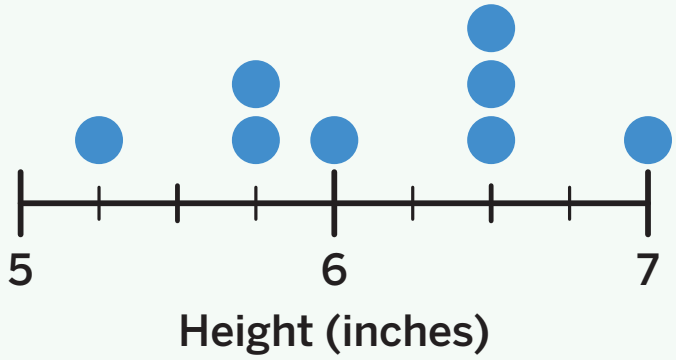
$3\frac{2}{4}$	$\frac{6}{2}$	$3\frac{1}{2}$	$3\frac{3}{4}$

Which lengths are equivalent? Explain your thinking.

Summary | Lesson 5

Line plots can show length measurement data in whole, half, and quarter inches.

Heights of Mrs. Wilson's Chicks



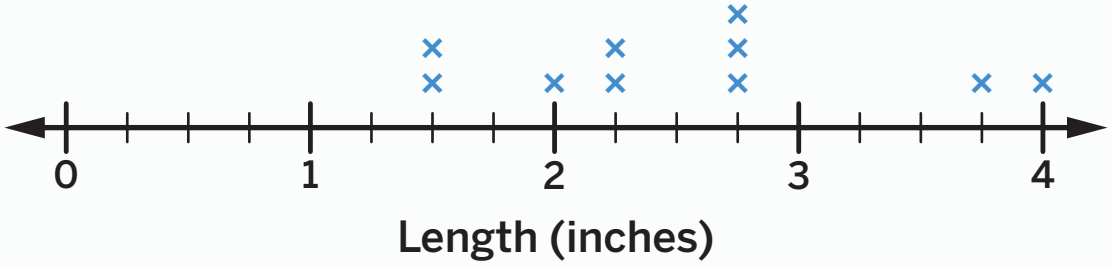
Chick Heights (in.)

$6\frac{1}{2}$	$5\frac{3}{4}$
6	$5\frac{1}{4}$
$6\frac{1}{2}$	$6\frac{1}{2}$
$5\frac{3}{4}$	7

Try This

1 Use the line plot to determine which statement is true.

Tomato Lengths



(A) The largest tomato is $2\frac{3}{4}$ inches long.

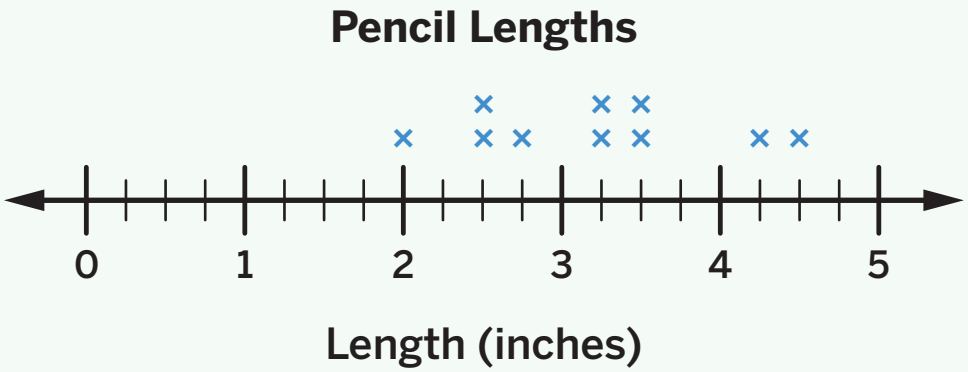
(B) 5 tomatoes are longer than $2\frac{3}{4}$ inches.

(C) The smallest tomato is $2\frac{3}{4}$ inches long.

(D) The most common tomato length is $2\frac{3}{4}$ inches.

Summary | Lesson 6

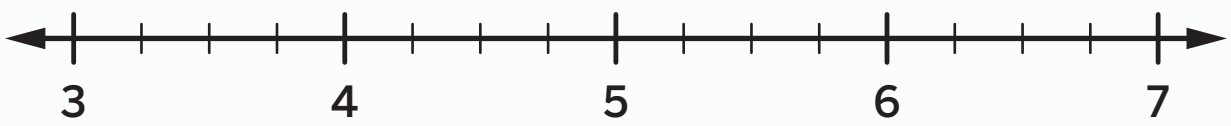
Length measurement data can be displayed on a line plot that shows fractions of an inch. The scale of the line plot can be chosen based on the data.



Try This

1 The lengths of some straws are shown in inches. Represent the data on a line plot.

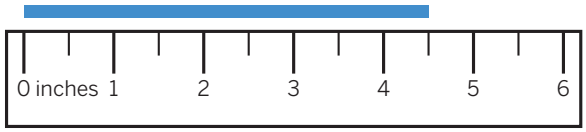
$4\frac{3}{4}$ $5\frac{1}{2}$ $4\frac{1}{4}$ $5\frac{2}{4}$ $4\frac{1}{2}$ $3\frac{3}{4}$ $5\frac{1}{4}$ $4\frac{2}{4}$ 5 $4\frac{1}{4}$ $4\frac{1}{2}$



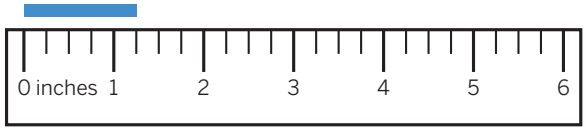
Sub-Unit 1 | Summary

In this sub-unit . . .

- We used rulers to measure lengths in halves and fourths of an inch and represented them using fractions, whole numbers, or **mixed numbers**.

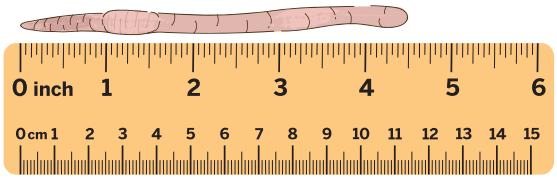


$\frac{9}{2}$ or $4\frac{1}{2}$ inches



$\frac{5}{4}$ or $1\frac{1}{4}$ inches

- We used equivalent fractions to describe length measurements.

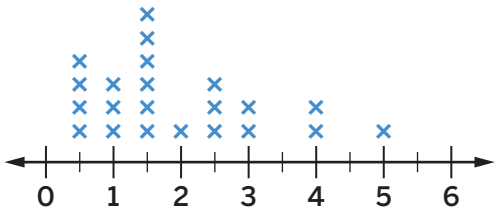


Math tip: You can measure lengths in half inches with a ruler marked with quarter inches because $\frac{2}{4}$ inches is the same length as $\frac{1}{2}$ inches.

- We made sense of measurement data on a line plot and created our own line plots from length data we generated.

Heights of seedlings (inches)

$\frac{1}{2}$	1	1	$\frac{1}{2}$
$1\frac{1}{2}$	$2\frac{1}{2}$	4	$\frac{1}{2}$
3	$1\frac{1}{2}$	5	$1\frac{1}{2}$
$1\frac{1}{2}$	$2\frac{1}{2}$	3	$\frac{1}{2}$
$2\frac{1}{2}$	$1\frac{1}{2}$	1	$1\frac{1}{2}$
4	2		



Summary | Lesson 7

You can use what you know about **grams** and **kilograms** to help estimate the **weight** of an object.

I know a paper clip is about 1 gram. The crayon feels heavier than 1 paper clip but lighter than 10 paper clips. I think the crayon weighs about 6 grams.

I know a basket of apples is about 1 kilogram. A laptop feels about as heavy as 2 baskets of apples. So, I think the laptop is about 2 kilograms.

Try This

1 Which 2 objects could have a weight of about 1 gram?

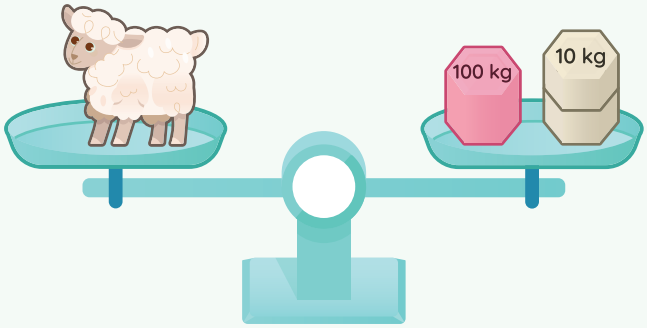
(A) a piece of gum
(B) a chair
(C) a pen
(D) a dollar bill

2 Which 2 objects could have a weight of about 1 kilogram?

(A) a stapler
(B) a pineapple
(C) a rabbit
(D) a packed suitcase

Summary | Lesson 8

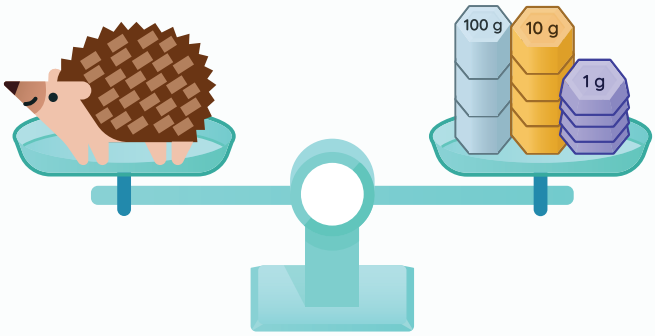
When a balance is level, the weight of the objects on both sides is the same. You can use what you know about leveled and unleveled balances to solve problems involving weight.



The sheep weighs 120 kilograms because the balance is level.

Try This

1 What is the weight of the hedgehog?



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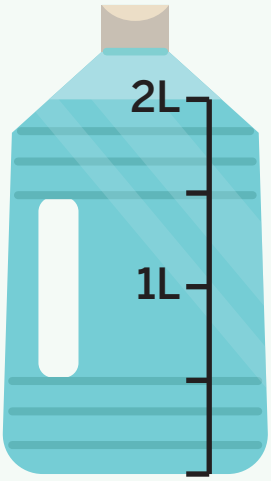
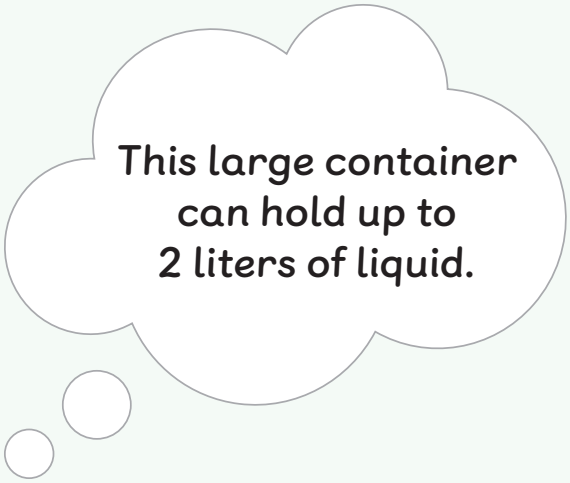
Summary | Lesson 9

Liquid volume is the amount of space that a liquid takes up. A **liter** is one of the many standard units that can be used to measure liquid volume.





Try This

1 Select 2 containers that hold less than 1 liter of liquid.

(A) a cooking pot

(B) a juice cup

(C) 1 tablespoon

(D) a bucket

2 Which container holds about 1 liter of liquid?

(A) a water bottle

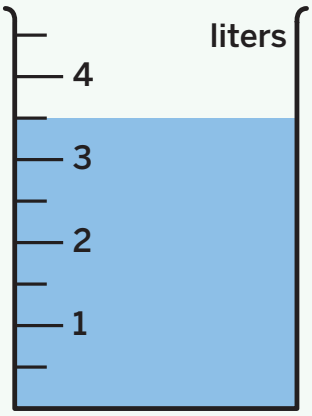
(B) a measuring spoon

(C) a sink

(D) a toilet tank

Summary | Lesson 10

You can use your understanding of 1 liter or other known volumes to estimate and measure liquid volume in whole liters or fractions of a liter.

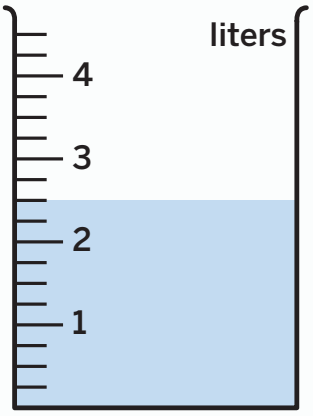


The liquid volume is $3\frac{1}{2}$ liters because it is halfway between 3 and 4 liters.

Try This

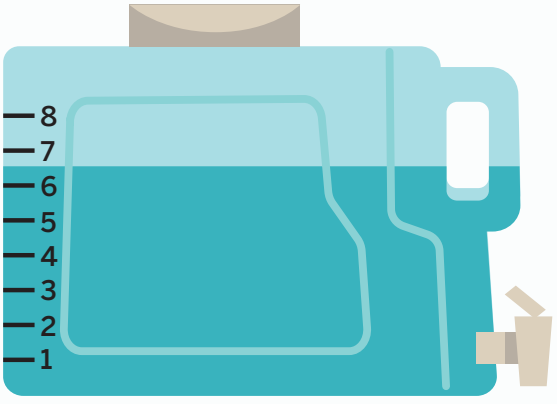
For Problems 1 and 2, determine the volume of liquid shown in the container. The containers are marked in liters.

1



answer: _____

2



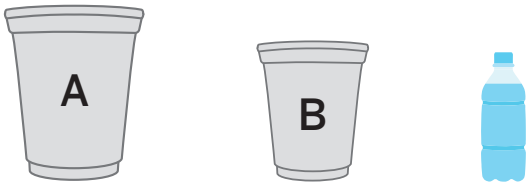
answer: _____

In this sub-unit . . .

- We estimated and measured the **weight** of objects in **grams** and **kilograms**.

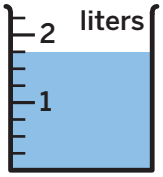
A paper clip weighs about 1 gram. A basket of apples weighs about 1 kilogram. I estimate that a pencil weighs between 1 gram and 100 grams.

- We explored **liquid volume** by estimating and comparing the amount of space a liquid takes up in different containers.



Container A holds more liquid because it takes 10 unit containers to fill it. Container B only takes 8 unit containers.

- We estimated and measured liquid volumes in **liters** to the nearest quarter liter.



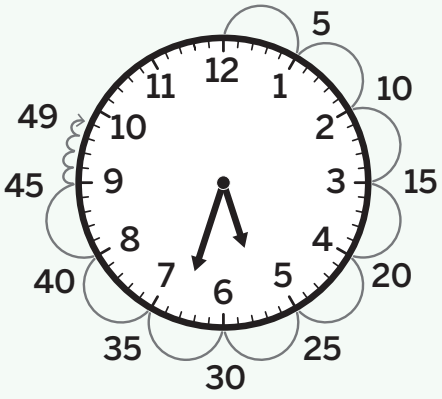
There are $1\frac{3}{4}$ liters of water in the container.

Math tip: Liquid volume can be represented as fractions, whole numbers, or mixed numbers.

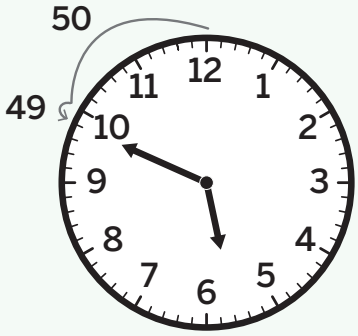
Summary | Lesson 11

Each tick mark around the clock represents 1 minute. The hour hand reaches the next hour when the minute hand reaches 60 minutes. Understanding the structure of the clock and how the hands move can be helpful when determining a strategy to tell time.

Count on from 5:00



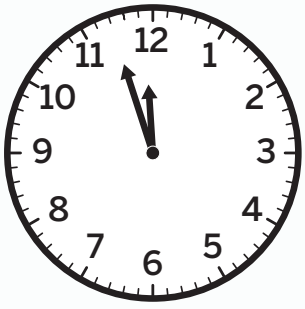
Count back from 6:00



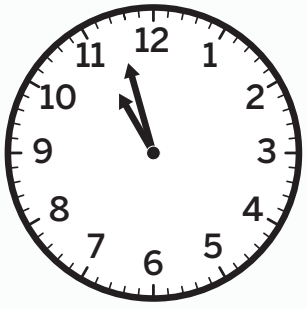
Try This

1 Which clock shows 10:57?

A



B

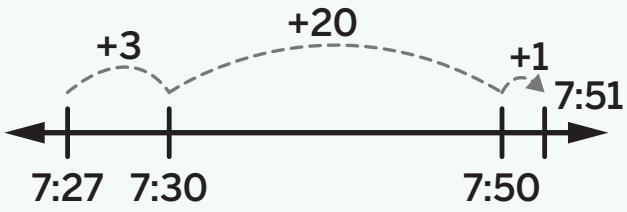


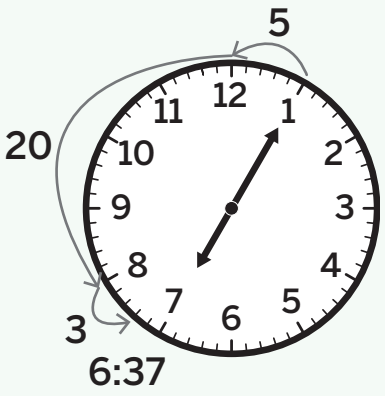
C

D

Summary | Lesson 12

When solving problems about time, you can count on or back to determine an unknown end time or start time. Sometimes when counting on or back, you will need to cross the hour.

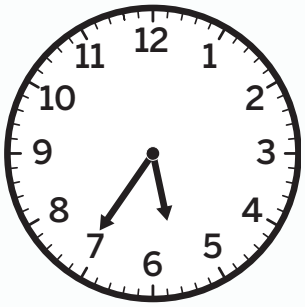




Try This

1 It took Jada 24 minutes to walk her dog. She began her walk at 5:36. What time did she finish her walk?

Use the clock if it is helpful.



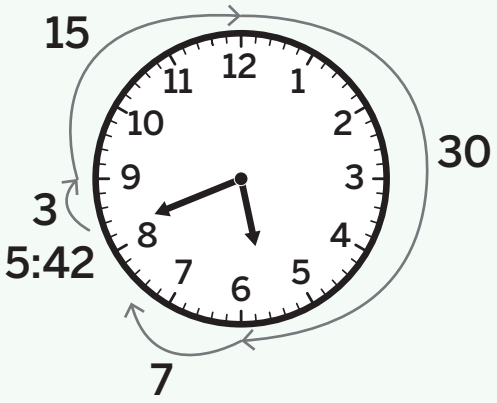
Show or explain your thinking.

answer: _____

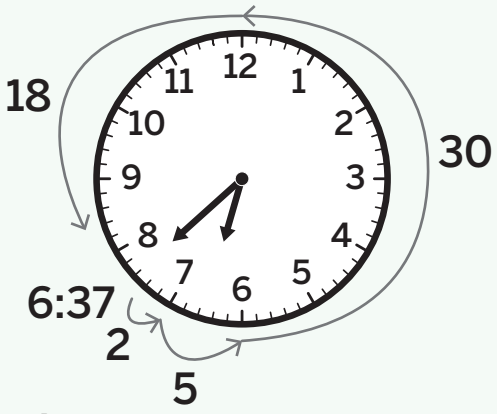
Summary | Lesson 13

When given the start and end times, whether they are in the same hour or different hours, you can count up or count back to determine the elapsed time.

Count up from the start time



Count back from the end time

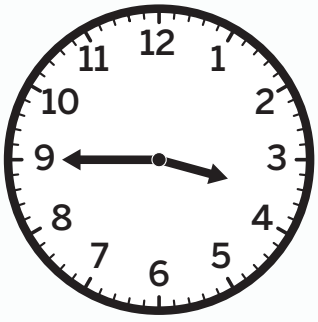


Elapsed time: 55 minutes

Try This

1 How long was Priya's haircut? Use the clocks if it is helpful.

Time the haircut began



Time the haircut ended

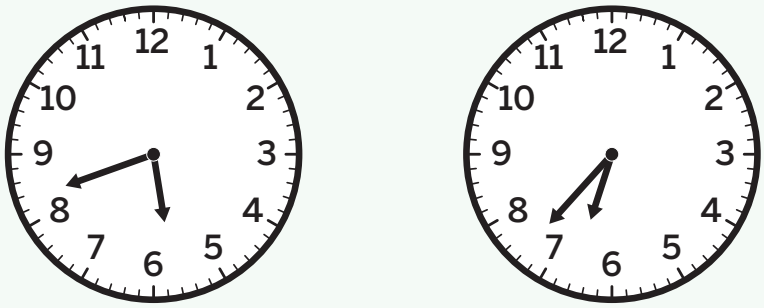
Show or explain your thinking.

answer: _____

Summary | Lesson 14

The unknown in a time problem can be the start time, the end time, or the elapsed time. When solving and writing time problems, it is important to consider what times are reasonable.

Start time **End time**

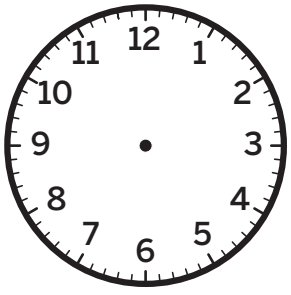


Elapsed time: 55 minutes

Try This

1 Priya's ballet lesson started at 4:25 p.m. The lesson lasted 32 minutes. What time did the lesson end? Use the clock if it is helpful.

Show or explain your thinking.

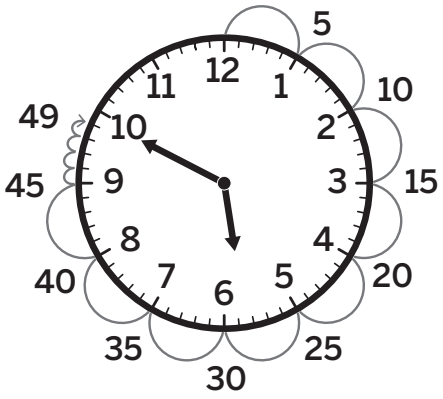


answer: _____

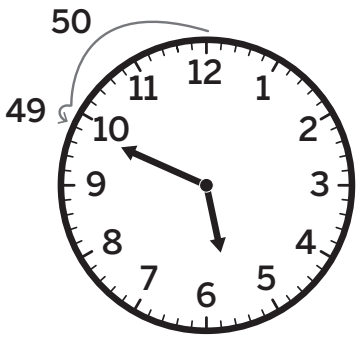
In this sub-unit . . .

- We used strategies to tell time to the nearest minute.

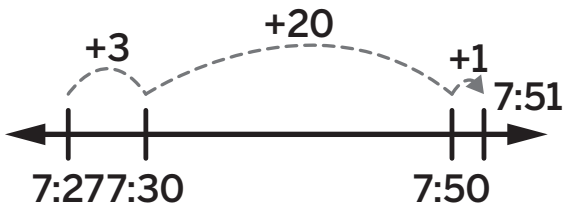
Counting on from 5:00

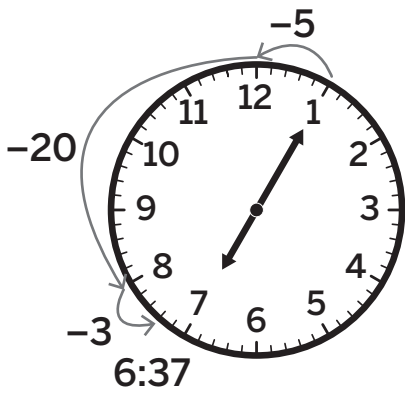


Counting back from 6:00



- We solved elapsed-time problems within and across the hour.



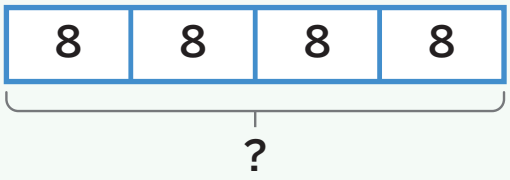


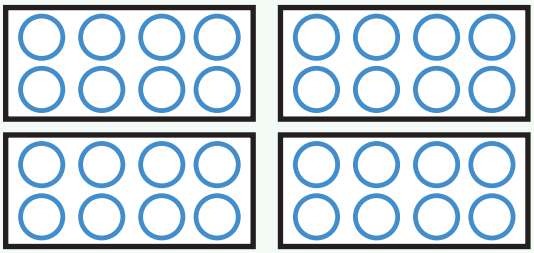
Math tip: When problems start and end in different hours, you can count up or count back to reach the hour and then continue to count on or back from the hour to help you solve.

- We solved problems involving unknown start times, end times, and elapsed times.

Summary | Lesson 15

You can ask and answer questions about liquid volume using the 4 operations. There are many different representations you can use to show the problem.





$4 \times 8 = ?$

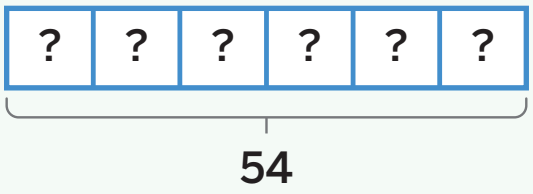
Try This

1 Write 1 mathematical question that could be answered about the milk jug and the drinking glasses.

Summary | Lesson 16

You can use the same strategies you are familiar with to help you solve real-world problems about weight.

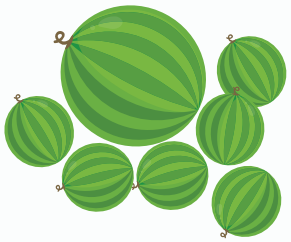
My pumpkin's weight increased the same amount each day for 6 days. My pumpkin's weight increased 54 kilograms during that time.



$6 \times ? = 54$

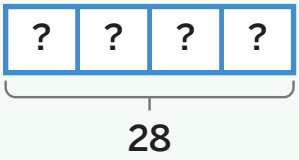
Try This

1 Write 2 mathematical questions that could be answered about the watermelons.



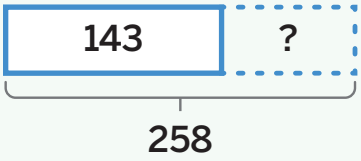
Summary | Lesson 17

All 4 operations can be used to solve problems involving measurement of time, liquid volume, and weight.



$4 \times ? = 28$

$28 \div 4 = ?$



$143 + ? = 258$

$258 - 143 = ?$

Try This

Represent the story problem and solve using any strategy.

1 Jada started playing games at 1:25 p.m. She played games for 44 minutes. What time did she finish playing games?

Show or explain your thinking.

answer: _____

Sub-Unit 4 | Summary

In this sub-unit . . .

- We asked mathematical questions about situations involving liquid volume and weight.

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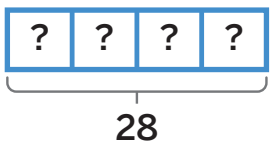
sergey lavrishchev/Shutterstock.com

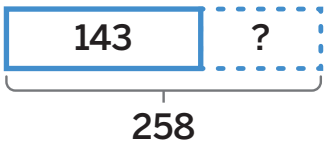
How much do the pumpkins weigh together?

How much liquid can the containers hold?

- We used different representations to help choose an operation and strategy to solve story problems involving measurement.



$4 \times ? = 28$
$28 \div 4 = ?$



$143 + ? = 258$
$258 - 143 = ?$

Math tip: Because of the relationship between addition and subtraction and the relationship between multiplication and division, sometimes you can choose between 2 different operations to solve the same problem.

- We solved one-step story problems involving measurement using addition, subtraction, multiplication, and division.

$237 + 306 = ?$
The cow weighed 543 kilograms.

$254 - 162 = ?$
On Day 1, he used 92 liters of water.

$6 \times ? = 54$
The pumpkin grew 9 kilograms each day.

$54 \div 6 = ?$
The pumpkin grew 9 kilograms each day.

Try This | Answer Key

Lesson 2

1 $3\frac{1}{2}$ inches

2 4 inches

Lesson 3

1 $4\frac{3}{4}$ inches

2 $1\frac{2}{4}$ inches

Lesson 4

1 Sample explanation shown.

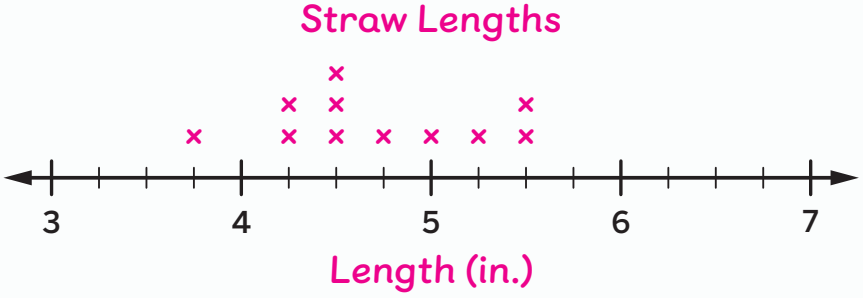
$3\frac{2}{4}$ and $3\frac{1}{2}$ are the same length because $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions.

Lesson 5

1 D

Lesson 6

1 Sample response shown.



Lesson 7

1 A and D

2 B and C

Lesson 8

1 344 grams

Lesson 9

1 B and C

2 A

Try This | Answer Key

Lesson 10

1 $2\frac{1}{2}$ liters

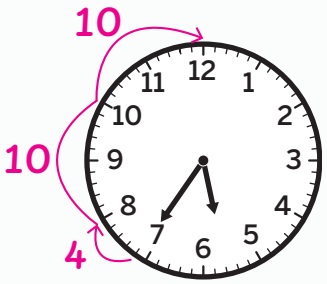
2 $6\frac{1}{2}$ liters

Lesson 11

1 B

Lesson 12

1 Sample work shown.



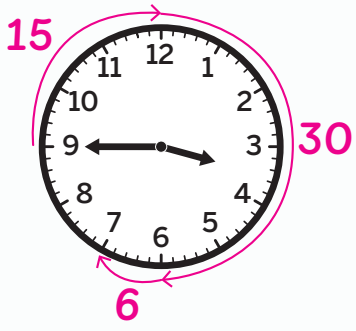
4 + 10 + 10 = 24, so 24 minutes.

answer: 6:00

Lesson 13

1 Sample work shown.

Time the haircut began



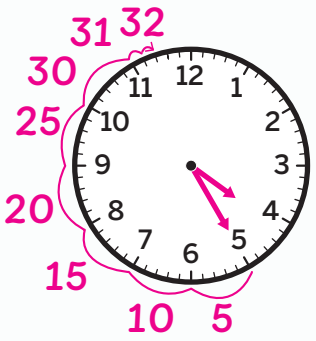
Time the haircut ended

15 + 30 + 6 = 51

answer: 51 minutes

Lesson 14

1 Sample work shown.



answer: 4:57 p.m.

Lesson 15

1 Sample response shown.

If you used all the milk in the jug, how many glasses of milk could you pour using the smaller glass?

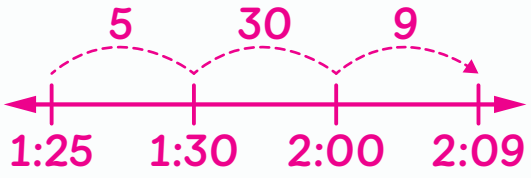
Lesson 16

1 Sample response shown.

Do all the smaller watermelons weigh more than the 1 large watermelon? Which smaller watermelon weighs the most?

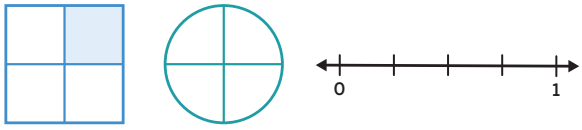
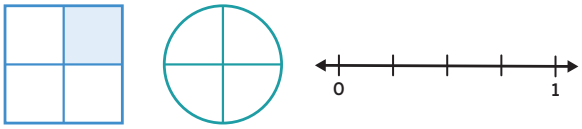
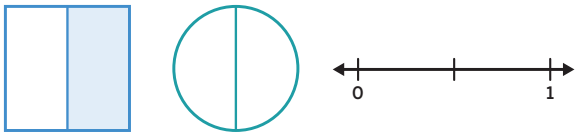
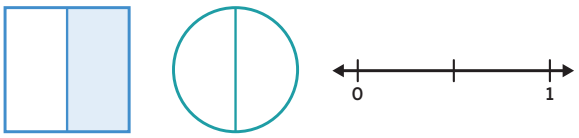
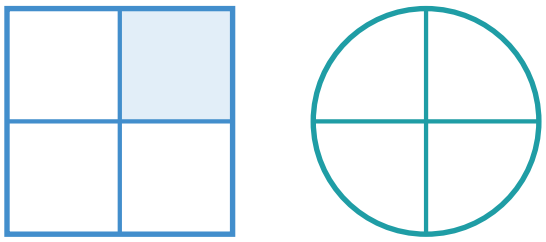
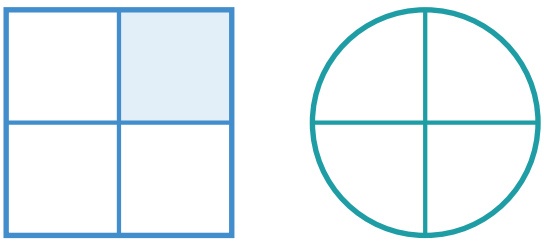
Lesson 17

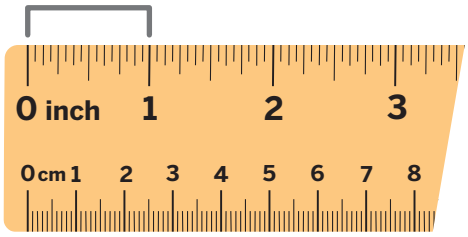
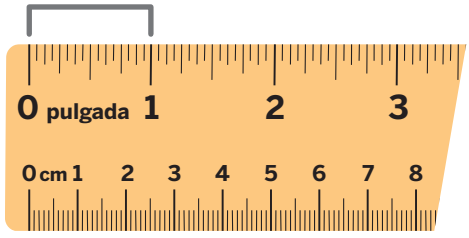
1 Sample work shown.



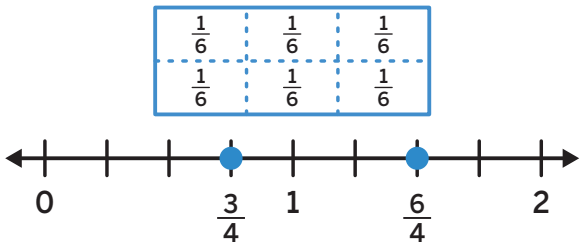
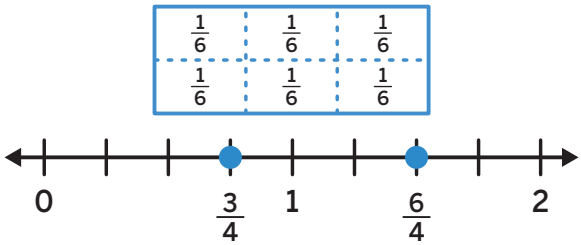
answer: 2:09 p.m.

Grade 3 Unit 6 Glossary/3.er grado Unidad 6 Glosario

English	Español
A	
a fourth/fourths Each part of a whole that is split into 4 equal parts. The plural of *fourth* is *fourths*.	**un cuarto/cuartos** Cada parte de un entero que se divide en 4 partes iguales. El plural de *cuarto* es *cuartos*.
	
a half/halves Each part of a whole that is split into 2 equal parts. The plural of *half is halves*.	**una mitad/medio/mitades** Cada parte de un entero que se divide en 2 partes iguales. El plural de *mitad* es *mitades*.
	
a quarter/quarters Each part of a whole that is split into 4 equal parts. The plural of quarter is quarters.	**un cuarto/cuartos** Cada parte de un entero que se divide en 4 partes iguales. El plural de cuarto es cuartos.
	

English	Español
a.m. The period of time from midnight to noon.	**a.m.** El período de tiempo entre la medianoche y el mediodía.
add Combine numbers to find the sum.	**sumar** Combinar números para hallar la suma.
an inch/inches A length unit in the U.S. customary measurement system. There are 12 inches in a foot. 	**una pulgada/pulgadas** Unidad de longitud del sistema de medida estándar de los Estados Unidos. Hay 12 pulgadas en un pie. 
D	
data Information about the things or people in a group. Example: If you have a box of colored pencils, then the lengths and colors of each of the pencils are data about the pencils in the box.	**datos** Información sobre las cosas o personas de un grupo. Ejemplo: Si tienes una caja de lápices de colores, entonces las longitudes y los colores de cada uno de los lápices son datos sobre los lápices de la caja.

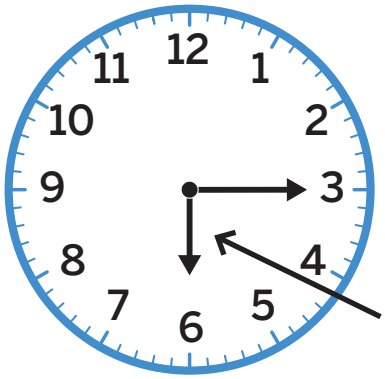
Grade 3 Unit 6 Glossary/3.er grado Unidad 6 Glosario

English	Español
divide To make equal groups from a total amount.	**dividir** Hacer grupos iguales a partir de una cantidad total.
F	
fraction A number that describes the parts of a whole that has been partitioned into equal parts. 	**fracción** Un número que describe las partes de un entero que se ha dividido en partes iguales. 
G	
gram A weight unit in the metric measurement system. There are 1,000 grams in 1 kilogram.	**gramo** Unidad de peso del sistema de medida métrico decimal. Hay 1,000 gramos en 1 kilogramo.

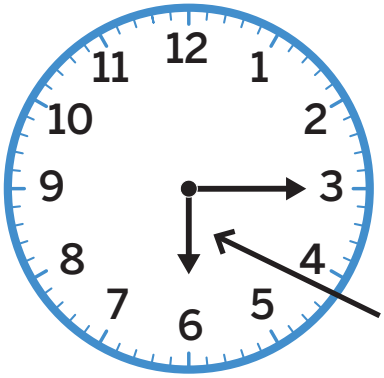
English	Español

H

hour hand The short arrow on a clock that moves from hour to hour.



manecilla de horas La aguja corta de un reloj que avanza de hora en hora.



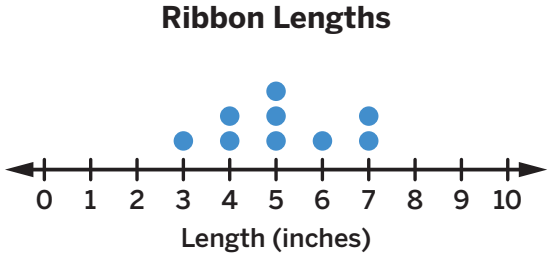
K

kilogram A weight unit in the metric measurement system. There are 1,000 grams in 1 kilogram.

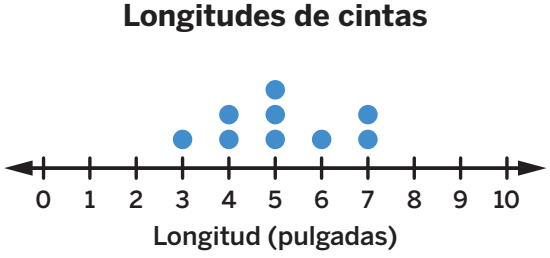
kilogramo Unidad de peso del sistema de medida métrico decimal. Hay 1,000 gramos en 1 kilogramo.

L

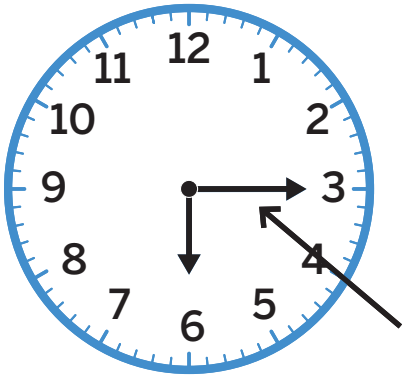
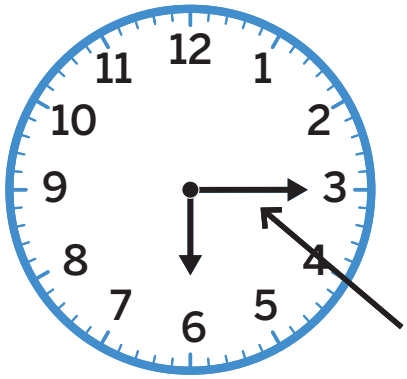
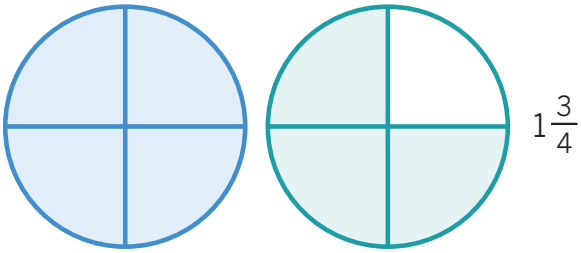
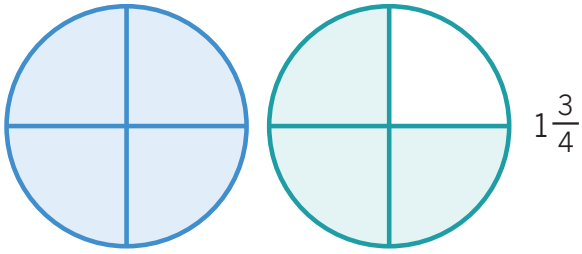
line plot A graph that shows symbols, such as dots, to show how many of each measurement.



gráfica de puntos Un diagrama que muestra símbolos, como puntos, para indicar cuánto hay de cada medida.



Grade 3 Unit 6 Glossary/3.er grado Unidad 6 Glosario

English	Español
liquid volume The amount of space that a liquid takes up.	**volumen líquido** El espacio que ocupa un líquido.
liter A liquid volume unit in the metric measurement system.	**litro** Unidad de volumen de líquido del sistema de medida métrico decimal.
M	
minute hand The long arrow on a clock that moves around the whole circle in an hour.	**manecilla de minutos, minutero** La aguja larga de un reloj que recorre el círculo completo en una hora.
	
mixed number A number expressed as a whole number and a fraction less than 1.	**número mixto** Un número expresado como un número natural y una fracción menor que 1.
	

English	Español
multiply To determine the total amount in equal groups.	**multiplicar** Determinar la cantidad total en grupos iguales.
P	
p.m. The period of time from noon to midnight.	**p.m.** El período de tiempo entre el mediodía y la medianoche.
R	
ruler A tool used to measure length that shows the distance from 0 in equal length units.	**regla** Una herramienta que se usa para medir la longitud y muestra la distancia a partir del 0 en unidades de longitud iguales.
S	
subtract Find the difference between numbers.	**restar** Hallar la diferencia entre números.
W	
weight A measurement of how heavy something is.	**peso** Medida que indica qué tan pesado es algo.