Previously, you used different units to measure length. Use what you know to try to solve the problem below.

A quarter is about 1 inch across, so it is a good estimate for 1 inch.

Ty wants to estimate the length of his toy car. What is a good estimate for its length in inches?

**TRY IT**

**Math Toolkit**

- play quarters

**DISCUSS IT**

Ask your partner:
How did you get started?

Tell your partner:
At first, I thought . . .
1 **LOOK BACK**

What is a good estimate for the length of Ty’s car? .............. inches

2 **LOOK AHEAD**

You can use other objects to help you estimate lengths.

- 1 centimeter
- 1 inch
- 1 foot
- 1 meter

- Your little finger is about 1 centimeter across
- A quarter is about 1 inch across
- About the length of a loaf of bread
- A door is about 1 meter across

Julia knows a marker is about 14 centimeters long. Is the length of the pencil case more or less than 14 centimeters? Explain how you know.

3 **REFLECT**

Hannah estimates that Julia’s pencil case is 28 centimeters long. Is this a good estimate? Explain.
1. Think about what you know about estimating. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

2. Balin knows the stapler is about 15 centimeters long. Is the length of the glasses more or less than 15 centimeters? Explain.
Solve the problem. Show your work.

Since a quarter is about 1 inch across, it is a good estimate for 1 inch.

Gena wants to estimate the length of the toy boat. What is a good estimate for its length in inches?

Solution

Check your answer. Show your work.
Read and try to solve the problem below.

1 centimeter is a good estimate for the distance across your little finger.

What is a good estimate for the length of this stamp?

**TRY IT**

- play quarters
- centimeter cubes

**DISCUSS IT**

Ask your partner:
Why did you choose that strategy?

Tell your partner:
I’m not sure how to find the answer because . . .
Explore different ways to understand estimating length.

1 centimeter is a good estimate for the distance across your little finger.

What is a good estimate for the length of this stamp?

**PICTURE IT**

You can use other objects you know to estimate lengths.

Think about the distance across the middle of the quarter and the length of the stamp.

Think about the distance across your little finger and the length of the stamp.
CONNECT IT

Now you will use the problem from the previous page to help you understand how to estimate length.

1. Look at **Picture It** on the previous page. What is a good estimate of the length of the stamp in inches?

   The stamp is about ________ inch(es) long.

2. Look at **Picture It** on the previous page. What is a good estimate of the length of the stamp in centimeters?

   The stamp is about ________ centimeter(s) long.

3. You can use a ruler to measure the length. What is the length of the stamp to the nearest centimeter?  
   

4. REFLECT

   Look back at your **Try It**, strategies by classmates, and **Picture It**. Which models or strategies do you like best for estimating length? Explain.

   ………………………………………………………………………………………………………………………………………………………………………

   ………………………………………………………………………………………………………………………………………………………………………

   ………………………………………………………………………………………………………………………………………………………………………
APPLY IT

Use what you just learned to solve these problems.

Use the hair clip and ribbon to answer problems 5 and 6.

5 Estimate the length of the ribbon.
   The ribbon is about ________ inches long.

6 Use an inch ruler to measure the length of the ribbon.
   What is the actual length? ________ inches long

7 Estimate the length of your teacher’s desk in feet.
   Then find its actual length.
   Estimate: about ________ feet   Actual: ________ feet

8 Estimate the length of a classroom wall in meters.
   Then find its actual length.
   Estimate: about ________ meters   Actual: ________ meters
Study the Example showing how to estimate length. Then solve problems 1–8.

**EXAMPLE**

Estimate the length of the yarn. Then find the actual length.

Use the paper clip to estimate the length of the yarn. It looks like about 2 paper clips would fit above the yarn. So, the estimate is about 6 centimeters.

Then use the ruler to measure the actual length of the yarn. So, the actual length is 5 centimeters.

1 Use the eraser to estimate the length of the marker.

The marker is about ............ inches long.

2 Use a ruler to find the actual length of the marker.

What is the actual length? ............ inches

**Vocabulary**

*estimate (noun)*
a close guess made using mathematical thinking.

*estimate (verb)*
to make a close guess based on mathematical thinking.
3 Use your little finger to estimate the length of the sticker.

The sticker is about __________ centimeters long.

4 Use the centimeter ruler to measure the length of the sticker.

What is the actual length? __________ centimeters

5 Estimate the height of your front door in feet.

_________ feet

6 Estimate the length of a wall in your home in meters.

_________ meters

7 Which is the best estimate for the length of a park bench?

10 inches  24 feet  2 meters

8 Which is the best estimate for the length of a piano keyboard?

12 inches  5 feet  20 centimeters
Apply It

1. A sticky note is about 3 inches long. Use a sticky note to estimate the length of an object you see in your classroom.

   What did you measure? What is your estimate?

   Explain how you found your estimate.
2 Measure the actual length of your object in problem 1.
What is the actual length of your object?
How does the actual length compare with your estimate?

3 Which is the best estimate for the length of a car in the school parking lot?

How will you choose a tool to use for finding the actual length?

How does each measurement compare to the length of an actual car?

Kyle chose A as an answer. How did Kyle get his answer?
1 Use the paper clip to estimate the length of the string.

The string is about \( \square \) inches long.

2 Use the ruler to find the actual length of the string in inches. Was your estimate in problem 1 a good estimate for the length of the string? Explain.

Pedro’s science book is about a foot long. Which of these objects are about a foot long?

- A a sheet of notebook paper
- B a desk
- C a stamp
- D an egg carton
- E a finger

How many inches are equal to 1 foot?
4. Choose Yes or No to tell if each measurement is a good estimate for the length of a second-grader’s shoe.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 inches</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>2 inches</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>20 centimeters</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>2 feet</td>
<td>G</td>
<td>H</td>
</tr>
</tbody>
</table>

Which is the best estimate for the length of a dog?

A  8 feet
B  15 inches
C  3 meters
D  95 centimeters
APPLY IT
Solve the problems.

1. Estimate the length of your arm. Use centimeters, inches, feet, or meters to make your estimate. Explain how you made your estimate.

2. The length of a license plate is about a foot. Which of these objects have a length that is about a foot?
   
   A. a house
   B. a newspaper
   C. a hand
   D. a loaf of bread
   E. a quarter
3 Choose Yes or No to tell if each measurement is a good estimate for the height of a door.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 inches</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>2 meters</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>20 centimeters</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>3 feet</td>
<td>G</td>
<td>H</td>
</tr>
</tbody>
</table>

4 What is the best estimate for the length of a desk?

- A 10 inches
- B 20 centimeters
- C 3 meters
- D 3 feet

5 MATH JOURNAL

Explain why you might estimate a length rather than measuring it.

✔ SELF CHECK Go back to the Unit 4 Opener and see what you can check off.
Previously, you have measured lengths of objects. Use what you know to try to solve the problem below.

What is the difference between the length of the spoon and the length of the fork in centimeters?

TRY IT

Math Toolkit
- centimeter ruler

DISCUSS IT
Ask your partner: Can you explain that again?
Tell your partner: I don’t understand how . . .
1LOOK BACK

Explain how to find the difference between the length of the spoon and the length of the fork in centimeters.

2LOOK AHEAD

You can find how much longer or shorter one object is than the other by lining up the objects above a ruler. Then you can measure the difference.

The ........ piece of yarn is ........ centimeters longer than the ........ piece of yarn.

3REFLECT

How does measuring help you find the difference between two lengths?
Prepare for Comparing Lengths

1. Think about what you know about comparing lengths. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

   What Is It?                      What I Know About It
   
Examples

2. A pencil is 5 inches long. A crayon is 4 inches long. What is the difference between their lengths?
3 Solve the problem. Show your work.

Boone found this pencil and glue stick in his desk.

What is the difference between the length of the pencil and the length of the glue stick in centimeters?

Solution

4 Check your answer. Show your work.
Read and try to solve the problem below.

Nate and Jen each have a piece of tape.

Who has the longer piece of tape?
How many centimeters longer is it?

**TRY IT**

**DISCUSS IT**
Ask your partner:
Why did you choose that strategy?
Tell your partner: The strategy I used to find the answer was . . .
Explore different ways to understand finding differences between lengths.

**Nate and Jen each have a piece of tape.**

Who has the longer piece of tape? How many centimeters longer is it?

**MEASURE IT**
You can measure each piece of tape.

Measure each piece of tape using centimeters.

**MODEL IT**
You can make a bar model.

You can make a bar model to compare the lengths.

<table>
<thead>
<tr>
<th>Length of Nate’s tape</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Jen’s tape</td>
<td></td>
</tr>
</tbody>
</table>
CONNECT IT

Now you will use the problem from the previous page to help you understand how to find differences between lengths.

1. Write the lengths in the bar model.

2. Who has the longer piece of tape? Explain how you know.

3. Write an equation you can use to find the difference in the lengths. Then find the difference.

4. Complete the sentence to compare the lengths.

   \[
   \text{\underline{Nate’s tape}} \quad \text{\underline{\ldots \ldots \ldots \ldots centimeters}}
   \]

   \[
   \text{\underline{Jen’s tape}} \quad \text{\underline{\ldots \ldots \ldots \ldots centimeters}} \quad ?
   \]

   …………… tape is ……….. centimeters longer than ………….. tape.

5. REFLECT

   Look back at your Try It, strategies by classmates, Measure It and Model It. Which models or strategies do you like best for finding differences between lengths? Explain.

   ………………………………………………………………………………………………………………………………………………………………………………..

   ………………………………………………………………………………………………………………………………………………………………………………..

   ………………………………………………………………………………………………………………………………………………………………………………..
APPLY IT

Use what you just learned to solve these problems.

Use these stickers for problems 6 and 7.

6. Circle the sticker that is longer.

7. Measure and write the length of each sticker in centimeters. How much longer is the long sticker than the short sticker?

8. Choose Yes or No to tell if you can use the equations to compare the lengths of the worms.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>? = 5 + 2</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>5 = 2 + ?</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>? = 5 − 2</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>2 = 5 − ?</td>
<td>G</td>
<td>H</td>
</tr>
</tbody>
</table>
Practice Finding Differences Between Lengths

Study the Example showing how to find the difference between two lengths. Then solve problems 1–8.

**EXAMPLE**

How much longer is the pink hair clip than the blue hair clip?

Write an equation.

\[ 3 + ? = 5 \quad \text{or} \quad 5 - 3 = ? \]

So, the pink hair clip is 2 centimeters longer.

1. Write the length of each ribbon.

\[ \text{centimeters} \quad \text{centimeters} \]

2. Complete the equation to compare the lengths.

\[ \text{centimeters} - \text{centimeters} = ? \]

3. How much longer is the red ribbon than the blue one?

\[ \text{centimeters} \]
4. How much longer is the purple paper clip than the green paper clip? Show your work.

\[ \text{centimeters} \]

Use these pencils for problems 5–8.

Aruna measures a green pencil and an orange pencil using a centimeter ruler.

5. What is the length of the green pencil?

\[ \text{centimeters} \]

6. What is the length of the orange pencil?

\[ \text{centimeters} \]

7. Write an equation you can use to find the difference in lengths.

8. How much longer is the green pencil than the orange pencil?

\[ \text{centimeters} \]
Read and try to solve the problem below.

How much shorter in inches is the eraser than the crayon?

TRY IT

DISCUSS IT
Ask your partner:
Do you agree with me? Why or why not?

Tell your partner:
I agree with you about . . . because . . .
LESSON 24 DEVELOP

Explore different ways to understand comparing lengths.

**How much shorter in inches is the eraser than the crayon?**

**MEASURE IT**
You can measure each object and find the difference.

**MODEL IT**
You can measure the difference.

Line up one end of the eraser and the crayon. Then use a ruler to measure the difference.
CONNECT IT
Now you will use the problem from the previous page to help you understand different ways to compare lengths.

1. Look at Measure It. Explain how to find how much shorter the eraser is than the crayon.

2. How much shorter is the eraser than the crayon?

3. What is measured in Model It?

4. REFLECT
Look back at your Try It, strategies by classmates, and Measure It and Model It. Which models or strategies do you like best for comparing lengths? Explain.

..........................................................................................................................

..........................................................................................................................

..........................................................................................................................
APPLY IT
Use what you just learned to solve these problems.

5 Henry has two paper clips.
Circle the paper clip that is shorter.
How many inches shorter is it?

6 Sharon has two pieces of ribbon. What is the difference in the lengths of the pieces of ribbon, in centimeters?
Show your work.

7 Explain how you could find the difference between the length of the bean and the length of the carrot in two different ways.

First way:

Second way:
Practice Ways to Compare Lengths

Study the Example showing two ways to find the difference between lengths. Then solve problems 1–4.

**EXAMPLE**

How much shorter is the paper clip than the pencil?

- Measure each object.
  Pencil: 4 inches
  Paper clip: 1 inch
  \(4 - 1 = ?\) or \(1 + ? = 4\)

- Or measure the difference.
  Line up the two objects.
  Measure the difference.

So, the paper clip is 3 inches shorter than the pencil.

1. How many inches shorter is the hair clip than the marker?

The hair clip is \(\ldots\ldots\) inches shorter than the marker.
2 How much longer is the crayon than the paper clip?

The crayon is ________ inches longer than the paper clip.

3 How much shorter is the eraser than the pen?

The eraser is ________ inches shorter than the pen.

4 Do you like the method shown in problem 2 or in problem 3 better? Explain why.
Complete the Example below. Then solve problems 1–3.

**EXAMPLE**

Jonah is 52 inches tall. His sister Sophia is 43 inches tall. How much taller is Jonah than Sophia?

You can use a bar model and equation.

\[ 52 - 43 = 9 \]

**Solution**

**APPLY IT**

1. Anna measures the paper strips below in centimeters. What is the difference in the lengths of the paper strips? Show your work.

The difference in the lengths of the paper strips is how much longer or shorter one is than the other.

**Solution**
2 Circle the nail that is shorter. Then tell how much shorter it is. Use a ruler. Measure using centimeters. Show your work.

Solution

3 Tim has a piece of yarn that is 3 inches long. Which piece of yarn is 1 inch shorter than Tim’s yarn?

A

B

C

D

Ben chose A as the answer. How did Ben get his answer?
Practice Comparing Lengths

1. What is the difference in the lengths of the two pieces of yarn? The ruler shows centimeters. Show your work.

```
   |   |   |   |   |   |   |   |   |
0  1  2  3  4  5  6  7  8  9
  centimeters
```

Solution

2. How much longer is the eraser than the paper clip?

```
inches
0  1  2
```

- A 1 inch
- B 2 inches
- C 3 inches
- D 4 inches

Jane chose C. How did Jane get her answer?
3 Frank drew the line below. Draw a line below it that is 3 centimeters shorter.

4 Keith’s tower is 37 centimeters tall. Ruby’s tower is 45 centimeters tall. Which equations could you use to find out how much taller Ruby’s tower is than Keith’s tower?

A 45 + 37 = ?
B 45 − ? = 37
C 37 + ? = 45
D 45 − 37 = ?
E 37 − 45 = ?

5 Sadie says the marker is 1 inch longer than the pencil. What did Sadie do wrong?
APPLY IT
Solve the problems.

1. How much longer in inches is the bottom bandage than the top bandage?

   [Image of a ruler and two bandages]

   A. 2 inches  
   B. 3 inches  
   C. 4 inches  
   D. 5 inches

2. What is the difference in the lengths of the two straws? Measure using centimeters.

   [Image of two straws]

   A. 3 centimeters  
   B. 4 centimeters  
   C. 7 centimeters  
   D. 10 centimeters
A table is 10 feet long. A desk is 3 feet long. Choose True or False for each statement.

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>The table is 7 feet shorter than the desk.</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>The table is 7 feet longer than the desk.</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>The desk is 7 feet shorter than the table.</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>The desk is 7 feet longer than the table.</td>
<td>G</td>
<td>H</td>
</tr>
</tbody>
</table>

Draw a line that is 6 centimeters longer than the line below.

How long is your line in centimeters? How did you know the length your line should be?

5. **Math Journal**

When you find the difference in length of two objects, why do you get the same answer whether you measure each object and find the difference or you just measure the difference?

**Self Check**

Go back to the Unit 4 Opener and see what you can check off.