UNIT 4

Measurement

Eat Your Veggies

Learning Goals

- use non-standard and standard units to measure the passage of time
- use a calendar
- measure length, width, and height in centimetres and in metres
- measure perimeter in centimetres and in metres
- measure the mass of an object in grams and in kilograms

Yoko and Sandar like to grow their own vegetables. They care for their garden all summer.

How could they measure the length of a carrot? The height of a corn stalk? The distance around a garden?

How else could they measure?

Key Words

- unit
- hour (h)
- minute (min)
- second (s)
- calendar
- length
- width
- height
- centimetre (cm)
- metre (m)
- referent
- perimeter
- mass
- kilogram (kg)
- gram (g)

LESSON 1

Measuring the Passage of Time

Which takes more time?
- tying your shoes
- getting dressed to go out in the snow

Which takes less time?
- making bannock
- eating a piece of bannock

How could you find out?

Explore

You will need a length of string and a washer.

➤ Make a pendulum timer.
Practise making
the pendulum swing as you
count the swings.

➤ Use your pendulum.
Measure how long it takes your
partner to do each activity.
- say the alphabet
- draw 10 happy faces
- print your name 5 times
- do an activity of your choice

Record your work.

Activity	Number of Swings
say the alphabet	
draw 10 happy faces	

Show *and* Share

Which activity took the most time? The least time?
How do you know?
Compare your results with another pair of classmates.
Why might your results be different?

Connect

We can measure how much time an activity takes using different units.

It takes Sam 15 pendulum swings to do up his mukluks.

It takes 1 song on the radio to get to the store.

It takes Hana 1 TV show to brush her dog.

It takes 2 recesses to build a snow fort.

Practice

Work with a partner for questions 1 to 3. Use your pendulum timers.

1. Measure how long it takes to do the activity.
- **a)** counting by 5s to 50
- **b)** drawing a snowman
- **c)** taking off your shoes and putting them on again
- **d)** writing the numbers 1 to 30

2. Find an activity that takes about 25 pendulum swings.
Record your activity in pictures or words.

3. Which activity takes more time?

a) clapping 6 times or counting to 20

b) drawing a clown face or hopping 10 times

c) finding page 237 in your math book or saying the alphabet

4. Which unit would you use to measure the time it takes for each activity? Explain each choice.

a) going to the library
- pendulum swings or TV shows?

b) brushing your hair
- TV commercials or TV shows?

c) singing "O Canada"
- pendulum swings or recesses?

d) putting on snowshoes
- TV shows or pendulum swings?

5. Choose the better estimate.

a) doing your homework
- 1 TV show or 5 TV shows?

b) playing a board game
- 1 recess or 3 recesses?

c) making your bed
- 1 TV commercial or 4 TV commercials?

6. Name 2 ways that you measure how long an activity takes.

At Home

Choose an activity you do at home. What unit could you use to measure how long it takes? Estimate how long you think it will take, then check.

Reflect

Explain how you choose which unit to use to measure how much time it takes to do an activity.

LESSON 2

Exploring Units of Time

About how long is a minute? The red hand goes around the clock once in one **minute**. It goes from one mark to the next in one **second**.

Explore

You will need a clock or a watch with a second hand.
Take turns to time your partner.

➤ What can you do in one minute?
- How high can you count by ones?
- How many hearts can you draw?
- How many times can you tie a shoe?

Activity	Kim	Kerri
Counting	123	108
Drawing hearts	59	
Tying a shoe		

➤ What can you do in one second?
- Can you print your name?
- Can you blink twice?
- Can you touch your toes 5 times?

Show *and* Share

Share your results with another pair of students.
Are they the same or different?
Why do you think that is?

Connect

Time is measured in different units.

The **minute** (min) is a short unit of time.
It takes one minute (1 min) for the **minute hand** to move from one mark on the clock to the next.

It takes about 1 min to brush your teeth.

It takes about 5 min to fill a bathtub.

It takes about 15 min to eat lunch.

The **hour** (h) is a longer unit of time. It takes one hour (1 h) for the **hour hand** to move from one number on the clock to the next.

The **second** (s) is a very short unit of time.
It takes one second (1 s) for the **second hand** to move from one mark on the clock to the next.

Here are ways that some units of time are related.
One minute = sixty seconds (1 min = 60 s)
One hour = sixty minutes (1 h = 60 min)

Practice

1. Would you use minutes or hours to measure how long it takes to
- **a)** make a sandwich?
- **b)** read a chapter book?
- **c)** build a birdhouse?
- **d)** take a shower?

2. Choose the better estimate.
- **a)** Drink a glass of milk.
  - 5 min or 45 min?
- **b)** Count to 100.
  - 1 min or 50 min?
- **c)** Make your bed.
  - 2 min or 45 min?

3. **a)** Name 2 activities that could be done in 1 min.
b) Name 2 activities that could be done in 1 h.

4. **a)** Name 2 activities you would not measure in minutes.
b) Name 2 activities you would not measure in hours.

5. Suppose you do not have a clock or other timer.
Use pictures, words, or numbers to show your thinking.
a) How would you be able to tell when about 5 min has passed?
b) How would you be able to tell when about 1 h has passed?

6. Ned visited his grandpa for 1 h.
They spent 40 min ice fishing.
They spent the rest of the time snowshoeing.
How long did Ned and his grandpa spend snowshoeing?

7. It took Aki 46 s to draw a walrus.
It took Oliver 1 min to draw a walrus.
Who took more time to draw the walrus?
How much more time?

Math Link

Your World

Raymond Saunders is a Canadian clockmaker. He made the famous Gastown Steam Clock in Vancouver, and he made steam clocks in Whistler and Port Coquitlam.

You can see inside the clock through its glass sides. The clock whistles every 15 min when steam comes out of its vents.

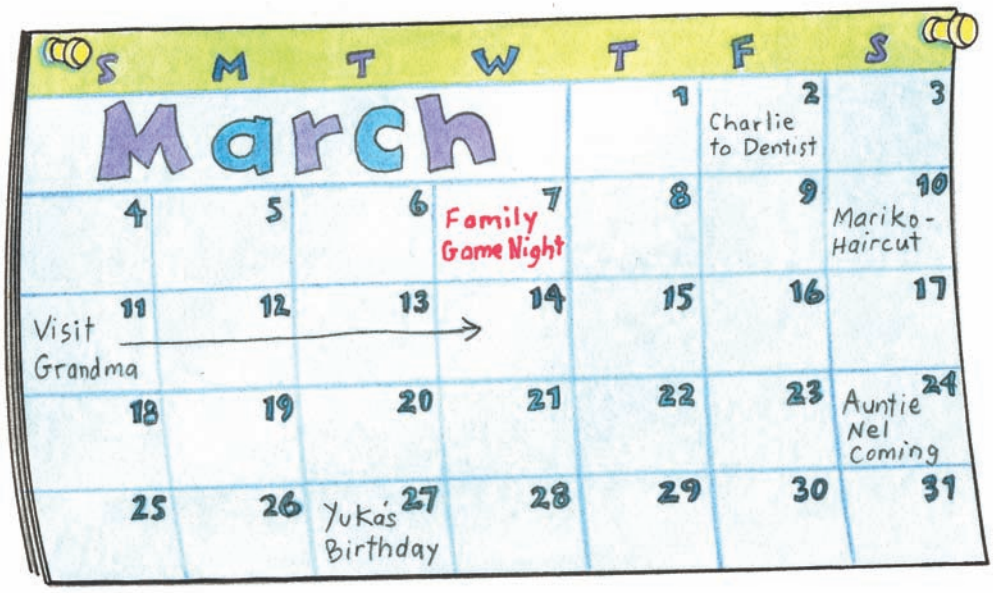
Reflect

How could you explain to a Grade 1 student how long 10 min is?

LESSON 3

Exploring the Calendar

Tell what you know from looking at this **calendar** page.

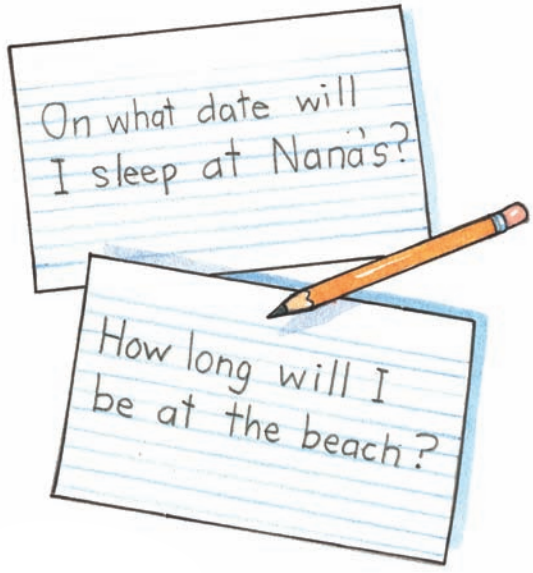


Explore

You will need a blank calendar page and 4 index cards.

➤ Choose a month.

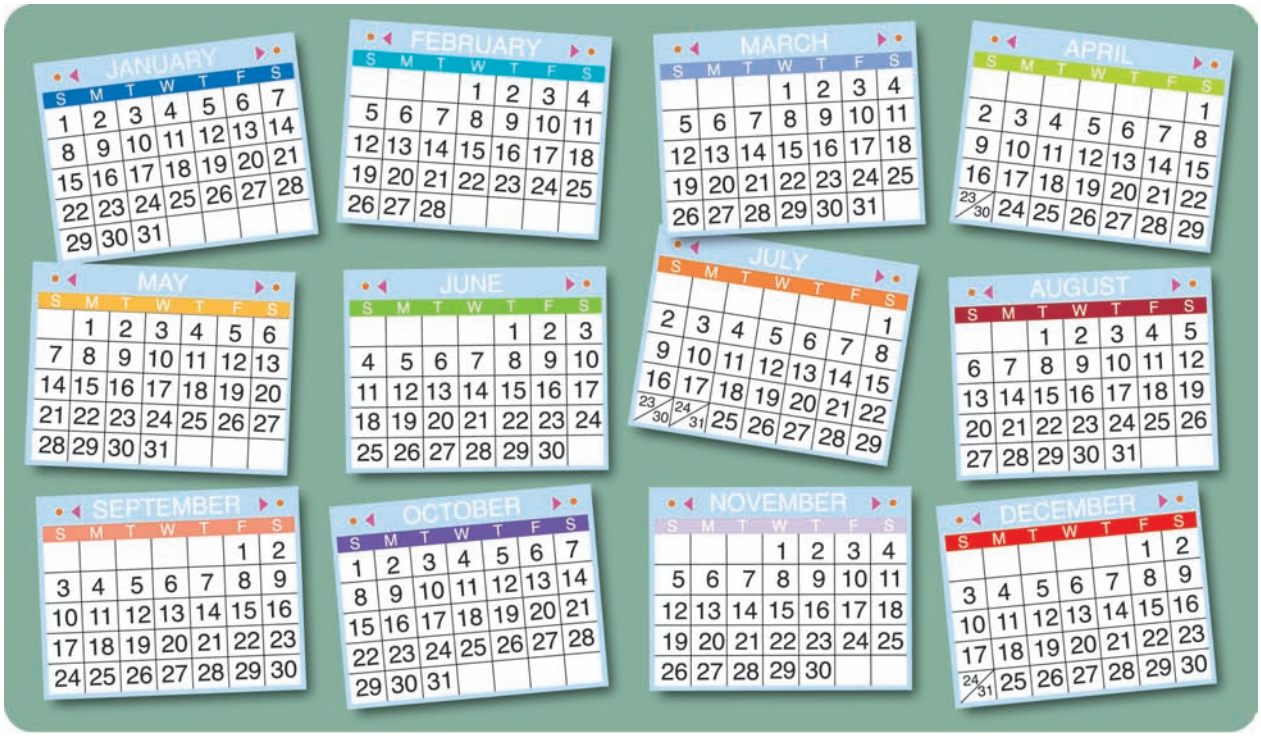
- Create a calendar for that month.
- Plan activities for that month. Record the activities on the calendar.
- Write 4 questions on index cards about your calendar activities.



Show *and* Share

Trade calendars and questions with another pair of classmates.
Answer their questions using their calendar.

Connect

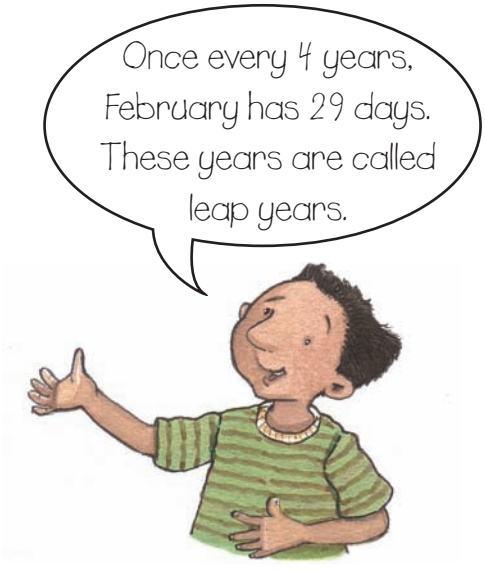


Each calendar page shows the days and weeks of 1 month of the year.

Days, weeks, months, and years are units of time.

The calendar pages show that:

- there are 7 months with 31 days
- there are 4 months with 30 days
- February has 28 days



Practice

1. Name something you can do in:
a) 1 day **b)** 1 week **c)** 1 month **d)** 1 year

2. Which unit would you use to measure?
Choose days, weeks, months, or years.
a) how long it takes an apple seed to grow as tall as you
b) how long it takes to learn to ride a bike
c) how long you can borrow a book from the library
d) how long a weekend is
e) how long each season lasts
f) the time from your seventh birthday to your eighth birthday

3. Which is longer? How do you know?
a) 1 month or 2 weeks
b) 1 week or 5 days
c) October or June
d) 16 days or 2 weeks

4. Aliy Zirkle was the first female to win the Yukon Quest sled dog race.
She took 10 days, 22 hours, and 57 minutes.
Did she take more than 2 weeks or less than 2 weeks? Explain.

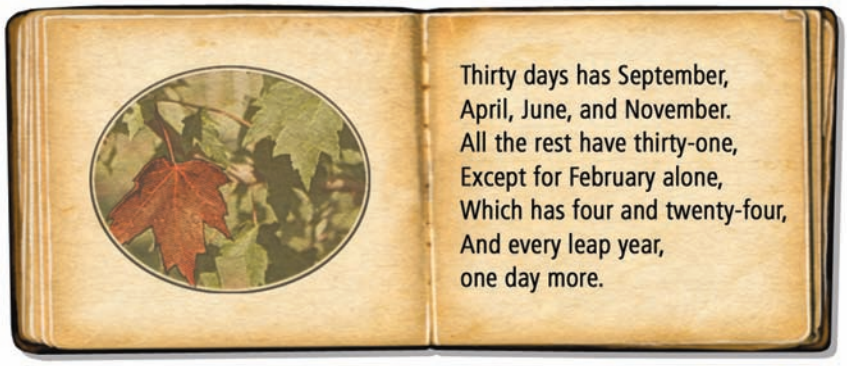
Use a calendar to answer questions 5 to 8.

5. Suppose the Yukon Quest begins on February 9th.
The winner crosses the finish line 12 days later.
a) On what day of the week does the race begin?
b) On what date does the winner cross the finish line?

Math Link

Social Studies

There are many forms of this old poem.
It can help you remember the number of days in each month.
Do you know any other ways to remember?



6. **a)** Name the months with 31 days.
b) Name the months with 30 days.
c) How many Mondays are in July for this year?
d) If you love Saturdays, which are your favourite months? Explain.

7. Hassan promised to do the dishes every day in March.
Today is March 22, and he just finished the dishes.
How many more days will Hassan do the dishes?

8. Canada celebrates National Aboriginal Day on June 21st.
How long is it until the next National Aboriginal Day?

9. Tim and his family will go camping all July and August.
How many days will they be gone? Show your thinking in pictures, numbers, or words.

Reflect

How would you find how much time has passed since your last birthday?
Explain what units you would use and why.

LESSON 4

Using a Ruler

Why did Leo and Angie get different measurements?
What can they do so they both get the same measurement?

Explore

You will need a long strip of tagboard, green and yellow strips of paper, and glue.

➤ Make a tagboard ruler. Glue the colour strips along the top edge of the tagboard. Use the pattern green, yellow, green, yellow, ... Make the strips touch one another without overlapping.

➤ Use your tagboard ruler to measure the length of
- a pencil
- a desktop
- your hand
- your shoe
- an object of your choice

What We Measured	Length
a pencil	almost 3 units
a desktop	

LESSON FOCUS | Use a ruler to measure length.

Show *and* Share

Share your results with another pair of classmates.

Why is it important for everyone to use the same units to measure lengths?
Which way do you prefer to measure? Explain.

- using objects
- using a tagboard ruler

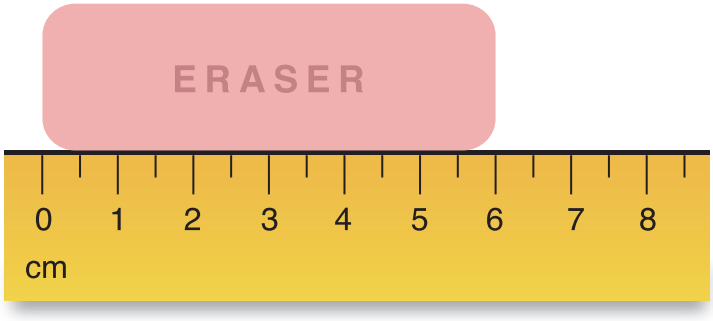
Connect

A ruler is a tool for measuring length.

➤ The tagboard ruler uses paper strip units.

The pencil case is about 4 units long.

➤ This ruler is marked in **centimetres** (cm).

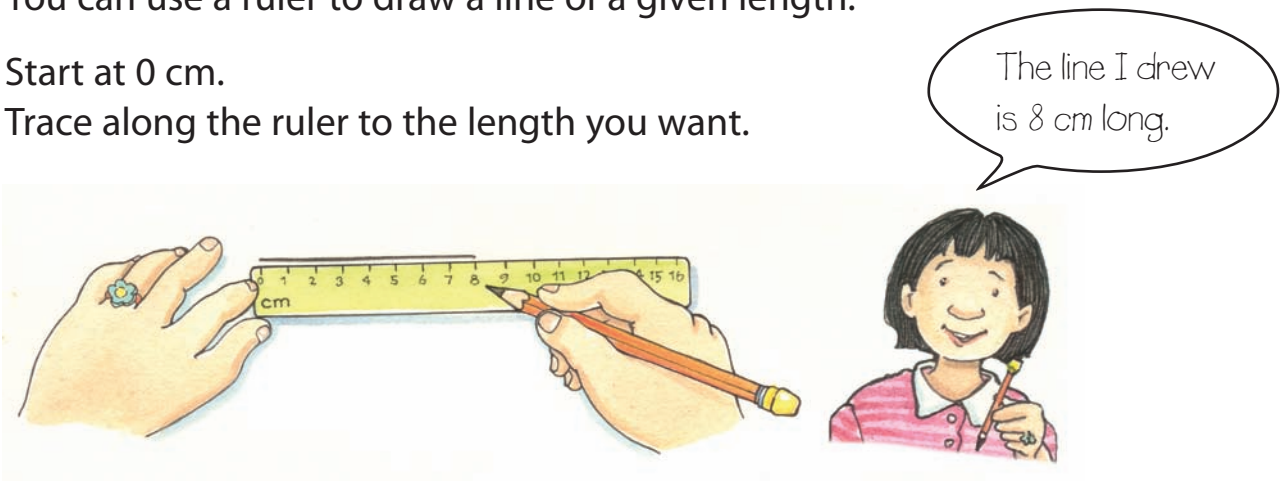


The eraser is 6 cm long.

Centimetres are standard units used to measure length.
They help us to understand everybody's results.

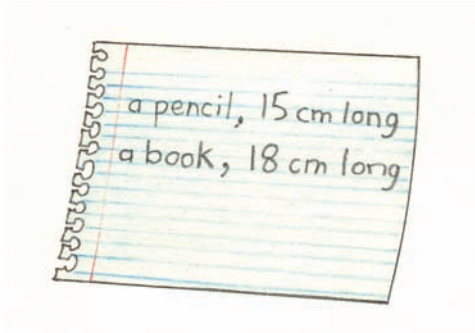
You can use a ruler to draw a line of a given length.

Start at 0 cm.
Trace along the ruler to the length you want.



Practice

Use a centimetre ruler for questions 1 to 4.



1. Find 2 objects that are each between 10 cm and 20 cm long.
Measure each object.
Record your results.

2. Find 3 classroom objects so that
- 1 is less than 25 cm long
- 1 is greater than 25 cm long
- 1 is very close to 25 cm long

Record your results.

3. Measure the length of each shape.

a)

b)

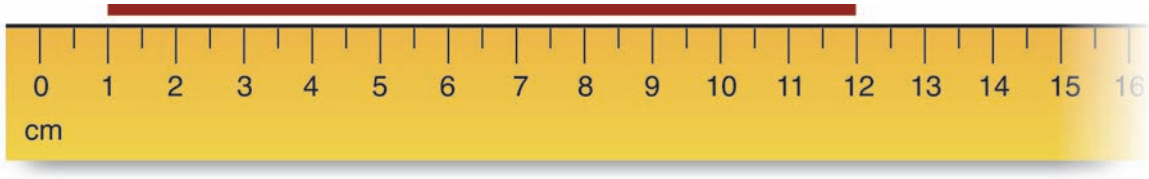
c)

4. Draw a line for each fact to show how long or how high.
Label each line.

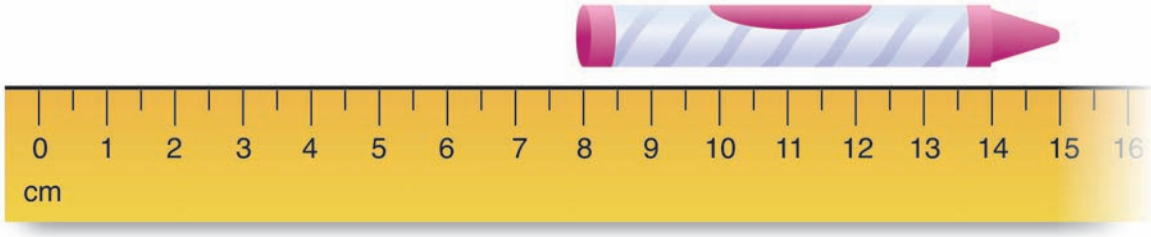
a) A grasshopper is about 6 cm long.
b) It can jump up to a height of about 25 cm.
c) In Canada, beetles grow to about 3 cm in length.
d) They can jump almost 11 cm high.
e) In South America, beetles can grow more than 13 cm long.

5. Without using a ruler, draw a line that is about
a) 11 cm **b)** 3 cm **c)** 10 cm
Then measure each line to see how you did.

6. Arlo says that this line is 12 cm long.
Do you agree with Arlo? Explain.



7. Marcella says that this crayon is 8 cm long.
Is she right? How do you know?

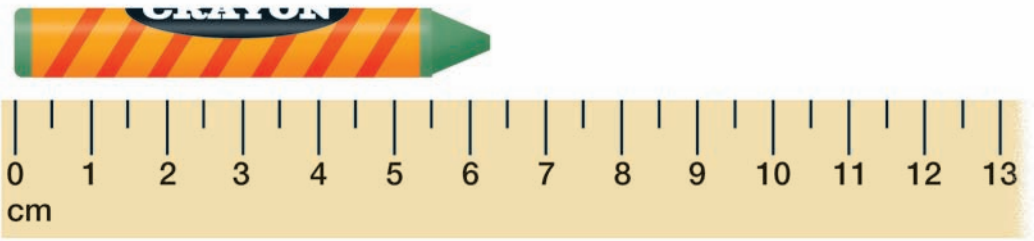


Reflect

What are some good reasons for measuring length using centimetres instead of other units such as paper strips? Use pictures or words to give your reasons.

LESSON 5

Estimating and Measuring with Centimetres



This crayon is **longer** than 6 cm but **shorter** than 7 cm.
The crayon is about 6 cm long.

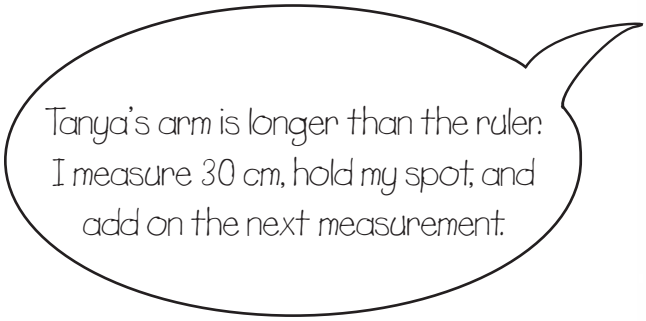
Explore

You will need a 30-cm ruler or a measuring tape.

➤ Estimate, and record, the length of
- your hand
- your thumb
- your arm
- your foot

➤ Measure, and record, the length of each body part.
How close were your estimates?

Here are 2 ways to record your work.
- Draw and label a picture.
- Make a list.



Show *and* Share

Talk to your partner.

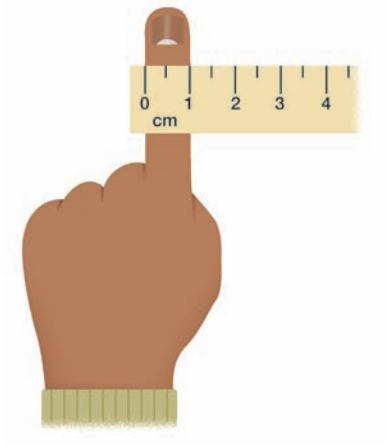
Suppose you lost your ruler.
How could you use your measurements to find the width of your textbook?

Connect

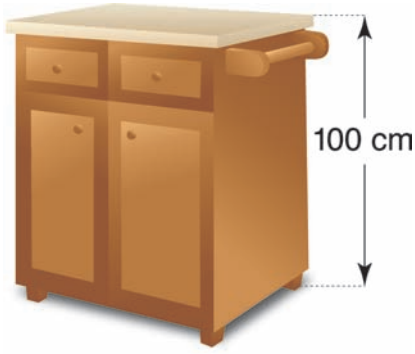
Centimetres can be used to measure how long, how tall, or how wide an object is.
Here are some referents to help you think about centimetres.

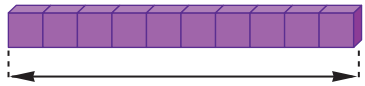
A **referent** is an object you can think about to help you estimate a measurement.

Your finger is about 1 cm wide.
Its **width** is 1 cm.



The counter is about 100 cm tall.
Its **height** is 100 cm.





A Base Ten rod is 10 cm long.
Its **length** is 10 cm.

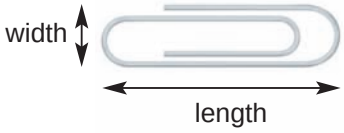
A referent helps you estimate even if you cannot reach the object.

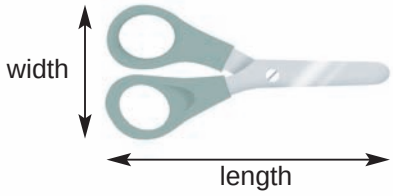
Practice

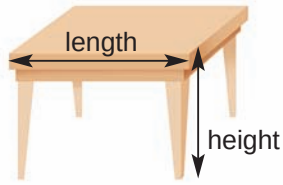
1. Choose a referent you could use for 1 cm.
Explain your choice.

2. Use your referent from question 1.
Find each object below.
Estimate its length or width.
Explain how the referent helped you.
a) a classmate's shoe **b)** a bulletin board **c)** a marker

3. Find each object.
Measure its length and its width or height.
Record each measurement.
a) a paper clip **b)** scissors **c)** a tabletop







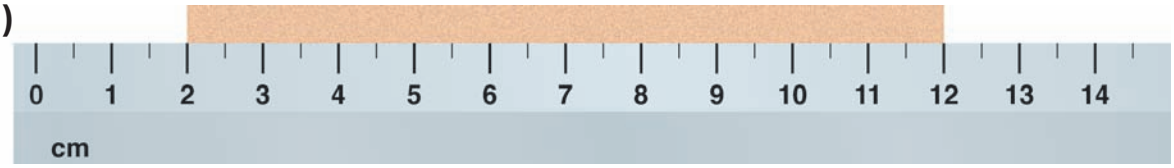
4. Choose an object.
Measure its height, length, and width.
Record your results.

Object	Height	Length	Width
bookshelf			

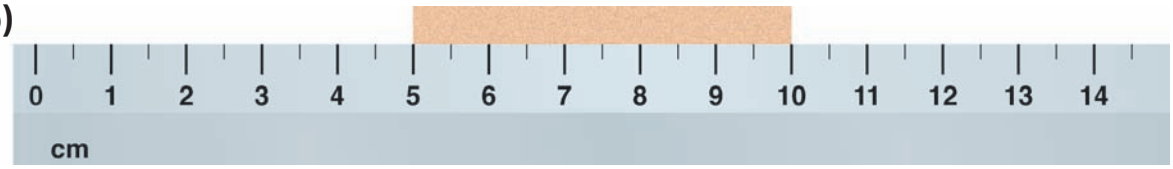
5. **a)** Name an object that is about 10 cm long.
b) Name an object that is about 50 cm high.
How do you know your estimates are close?

6. What is the length of each strip of paper? How do you know?

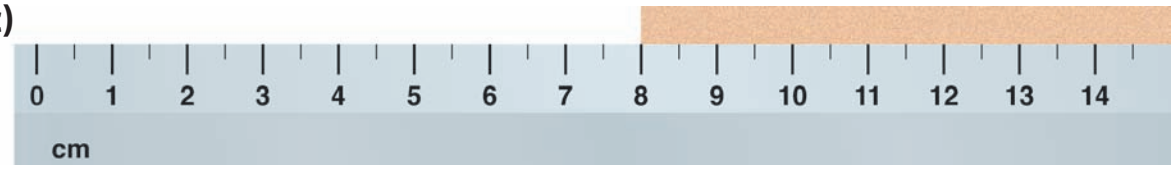
a)



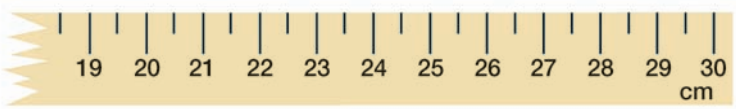
b)



c)

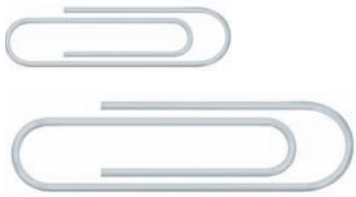


7. Daniel broke his ruler.



How can Daniel use his broken ruler to measure the length and width of his desk?

8. A small paper clip is about 3 cm long.
A large paper clip is about 5 cm long.
How many of each paper clip would fit along a 30-cm ruler?
How do you know?



Reflect

Suppose you do not have a ruler.
How can you tell if a pencil is longer or shorter than 10 cm?
Use words, pictures, or numbers to explain.

At Home

You know that your finger is about 1 cm wide. Use your fingers to measure some things at home. Draw pictures to show what you measured.

Button to Button

You will need 2 buttons and a ruler or measuring tape.

The object of the game is to make the closer estimate of the distance between 2 buttons.

- Take turns. One player places the buttons any distance apart on a table.
- Both players estimate the number of centimetres between the buttons.
- Work together to measure the distance between the buttons.
- The player who is closer without going over scores a point.
- Play until one player has scored 5 points.
  Play again if you wish.

LESSON 6

Estimating and Measuring with Metres

Danika and Cara wanted to measure some longer objects. They found a measuring stick in the classroom.

The measuring stick is one **metre** long. We call it a metre stick. They found the bookcase is about two metres long.

Explore

Use a metre stick or a metre strip, and Base Ten rods.
Find how centimetres and metres are related.

Show *and* Share

Talk to another pair of students. Tell what you found out about centimetres and metres.

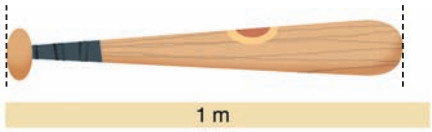
How can you use the metre stick to measure the classroom door? To measure your desk?

Connect

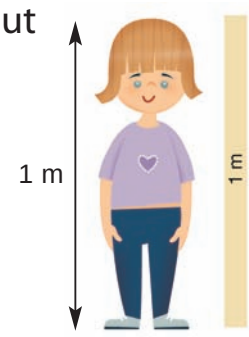
One **metre** (m) is a length of 100 cm.

1 m = 100 cm

Here are some referents for the metre.
A baseball bat is about 1 m long.



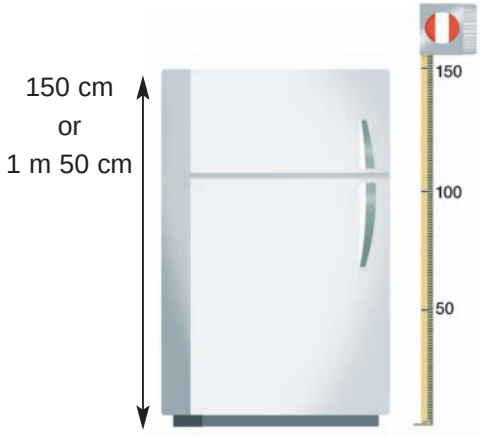
Lindsay is 3 years old.
She is about 1 m tall.



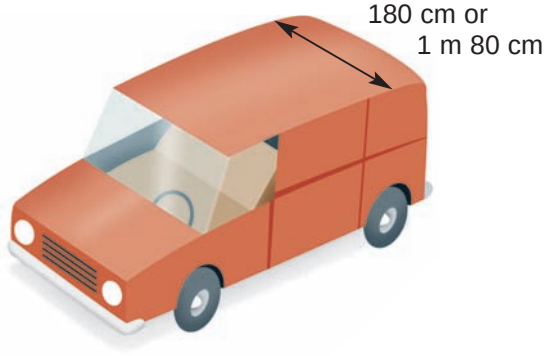
A **referent** can help you to estimate the length of an object you cannot reach.

I know the doorknob is about 1 m above the floor. I cannot reach the top of the bookshelves, but I can imagine them beside the door. They must be about 2 m tall.

A refrigerator is about 150 cm tall.
You can write this as 1 m 50 cm.



A minivan is about 180 cm wide or 1 m 80 cm wide.



Practice

1. Name 2 objects in your classroom that are taller than 1 m but shorter than 2 m.

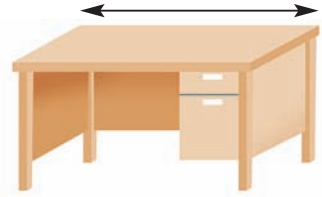
2. Name an object that you can use as a referent for 1 m. Explain your choice.

3. Choose centimetres or metres to measure each item. Record your results.

a) the height of your desk
b) the length of a hallway
c) the width of a hallway
d) the length of your shoe

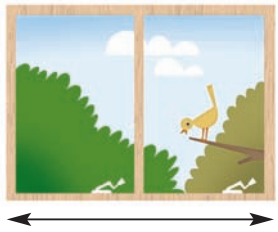
4. Use a measuring tape or metre stick. Find each object in your classroom. Measure and record.

a) the length of the teacher's desk



b) the height of the classroom door

c) the width of a window



5. Copy and complete this table.
How could you use skip counting? What patterns do you see?

Metres	1	2	3	4	5	6	7	8	9	10
Centimetres	100									

6. Is the object a good referent for centimetres, or for metres?

a) the height of a hockey net

b) the width of a popsicle stick

c) the width of a staple

d) the width of a door

7. Suppose you found a stick that was 178 cm long.
Is its length closer to 1 m or 2 m?
How do you know?

8. The boys drew a chalk line on the sidewalk that was longer than 1 m but shorter than 2 m.
How long might the line be?
How do you know?

9. Suppose you do not have a metre stick, measuring tape, or metre strip.
How can you tell if an object is about 1 m long?

10. A pencil is 18 cm long.
About how many pencils like this would fit end to end along a metre stick?
Explain your thinking.

Reflect

When would you *not* use metres to measure?
Use words, pictures, or numbers to explain.

At Home

Cut a piece of string 1 m long. Bring your metre string home and find 3 objects to measure with it.

LESSON 7

Strategies Toolkit

Explore

An ant crawled 6 m from its anthill to some crumbs. It picked up a crumb, crawled back to the anthill, and went back to the crumbs to pick up 1 more. Then the ant crawled back home. How far did the ant travel altogether?

Work together to solve this problem.

Show *and* Share

Describe the strategy you used to solve the problem.

Connect

Abby, Baba, Carl, and Dee live along the same hallway.
Abby's and Dee's doors are 20 m apart.
Baba's and Carl's doors are between Abby's and Dee's.
It is 8 m from Abby's door to Baba's door.
It is 4 m from Carl's door to Dee's door.
How far is it from Baba's door to Carl's door?

What do you know? It is:

- 20 m from Abby's door to Dee's.
- 8 m from Abby's door to Baba's.
- 4 m from Carl's door to Dee's.

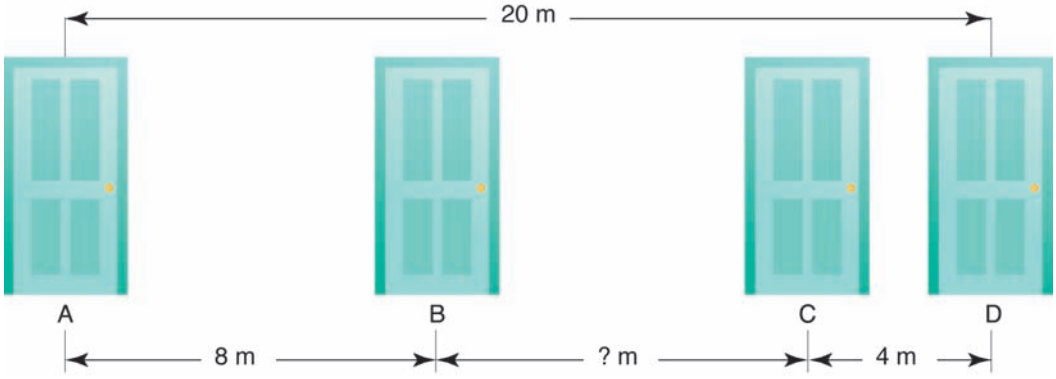
Think of a strategy.

- You can **draw a picture** of the hall.
- Show each person's door in the hall.

Strategies

- **Make a chart.**
- **Use a model.**
- **Draw a picture.**
- **Solve a simpler problem.**
- **Work backward.**
- **Guess and test.**
- **Make an organized list.**
- **Use a pattern.**

On the picture, record the distances you know.
Find how far it is from Baba's door to Carl's door.



Do the distances from A to B and B to C and C to D add up to 20 m?

How could you have solved this problem a different way?

Practice

Choose one of the **Strategies**

1. Winnie is 6 cm taller than Xenia.
   Xenia is 10 cm taller than Zack.
   Winnie is 132 cm tall.
   How tall is Zack?

2. Mia's garden has 3 sides. Its sides are 5 m, 7 m, and 5 m long.
   Mia planted zinnias 1 m apart around the edge of the garden.
   How many zinnias did Mia plant?

Reflect

Explain how drawing a picture helps you solve a problem.

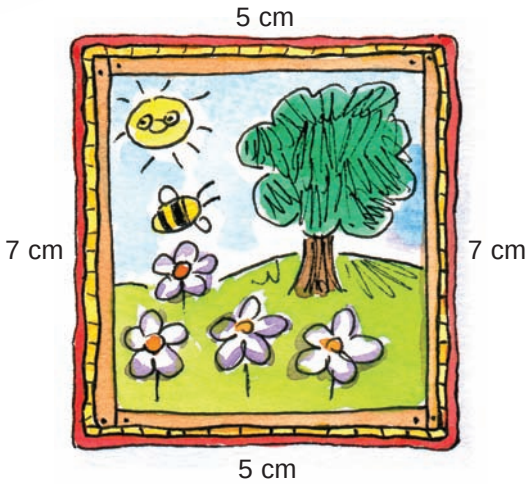
LESSON 8

Measuring Perimeter in Centimetres

Ellen is gluing coloured wool around this picture frame.

What length of wool does Ellen need to go around the frame?

The distance around the frame is its **perimeter**.



Explore

You will need a ruler.

- Look at 12 cm on the ruler. Look for something that you think has a perimeter of 12 cm. Measure the object to check your estimate.
- Look for another object with a perimeter of 12 cm.
- Now, look for objects with a perimeter of
  - 20 cm
  - 50 cm

Record your work.

Show *and* Share

Share your work with another pair of classmates.
Show how you measured a perimeter.

Connect

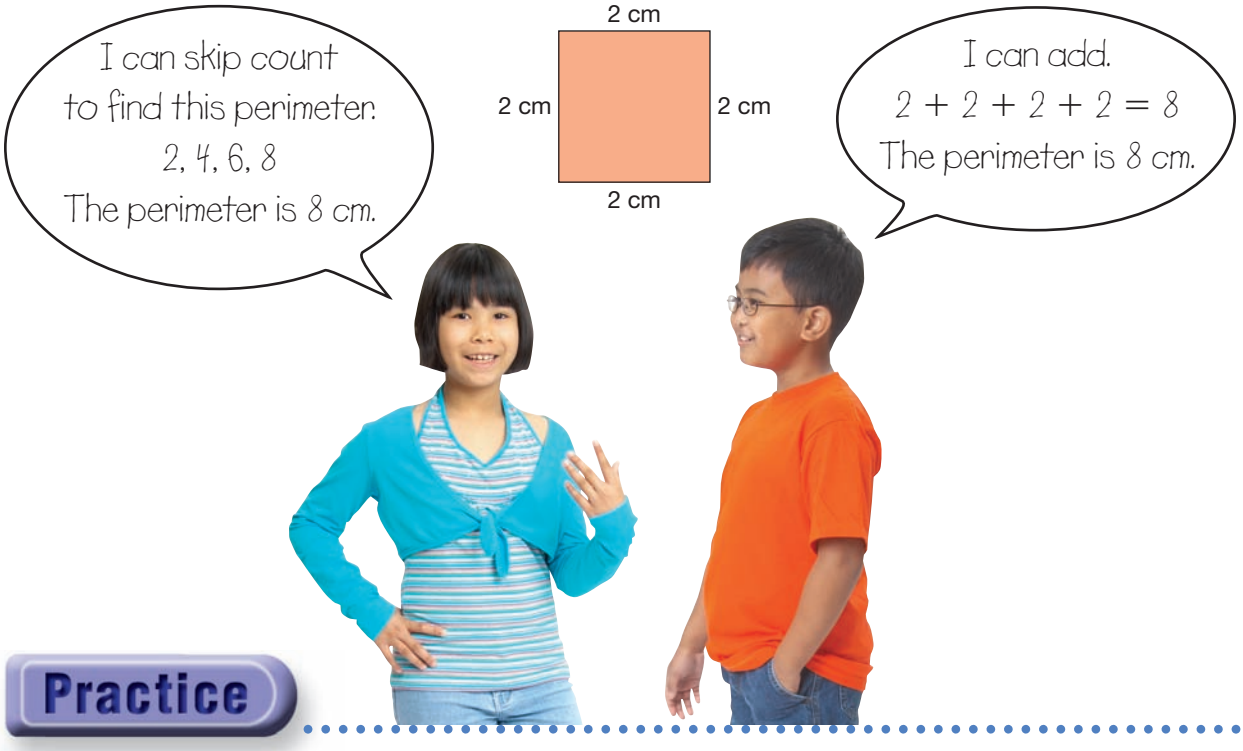
➤ Kay's group found the perimeter of a hockey card.
Each one in the group found a different way to measure.

I measured each side, and then I added.
9 + 5 + 9 + 5 = 28
The perimeter is 28 cm.

I started at 1 corner, and turned my ruler at each corner until I got to my starting point. I measured off 28 cm altogether.

I wrapped my measuring tape along the edges of the card. I measured off 28 cm altogether.

➤ Jeff's group found the perimeter of a square tile.



Practice

Use a ruler when you need to.

1. Estimate the perimeter of each shape.

a) 

b) 

c) 

Measure to check each estimate.

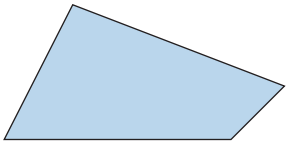
2. Use 1-cm grid paper. Draw a shape with each perimeter.

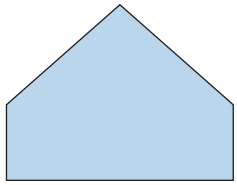
a) 8 cm **b)** 12 cm **c)** 10 cm **d)** 14 cm

3. Measure and record the perimeter of each shape.
Explain the strategy you used.

a) 

b) 

c) 

d) 

4. The perimeter of a square is 24 cm.
How long is each side?
How do you know?

5. Choose 3 different books.
Estimate, then measure the perimeter of each book cover.
Write the perimeters in order from least to greatest.

6. Find 2 objects so that the perimeter of one is about 10 cm shorter than the perimeter of the other.
Record the name of each object.
Record the perimeters.

7. Trace your shoe on paper.
Find a way to measure the perimeter of your tracing.
Explain your method.

Reflect

Suppose an ant travelled along the perimeter of your pencil case. Use words, pictures, or numbers to explain how you can find the distance the ant travelled.

LESSON 9

Measuring Perimeter in Metres

Look around your classroom for something that you think has a perimeter greater than 1 m.

- Look at the doors and windows.
- Look at the floors and ceilings.

What did you find?

Explore

You will need metre sticks, metre strips, or measuring tapes.
Choose a region of the school.
You could look in

- your classroom
- the gym
- the library
- a hallway

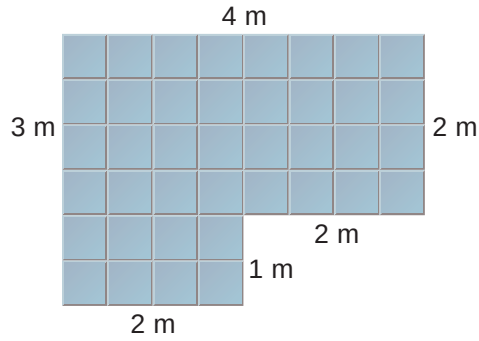
Estimate the perimeter of the region in metres.
Plan how to find its perimeter.
Find its perimeter.
Record your results.

Show *and* Share

Share your work with another group.
Show the group how you found the perimeter.
Describe any estimation strategies you used.

Connect

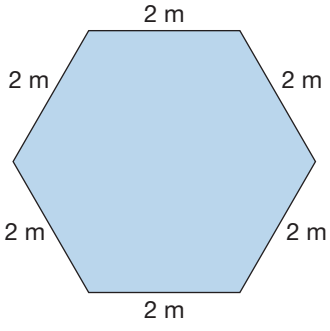
➤ One group found the perimeter of this floor.

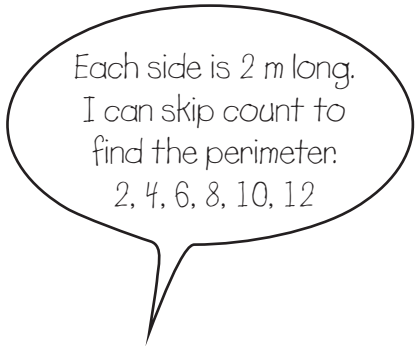


4 + 3 is 7.
Add on 2 is 9.
Add on 1 is 10.
10 + 2 is 12,
and 12 + 2 is 14.

The perimeter of the floor is 14 m.

➤ Another group found a shape on the Kindergarten floor.
They measured to find its perimeter.





The perimeter of the shape is 12 m.

Practice

1. Work with your group from *Explore*.
Use metre sticks or metre strips.
Form a shape with perimeter 6 m.
Make a drawing of your shape, and label it.

2. Think of a referent for 1 m.
Use your referent to estimate the perimeter of each item.
a) your classroom floor
b) a bulletin board
c) a tabletop
d) the classroom door

3. Choose an item from question 2.
Find the perimeter, to the closest metre.
Was your estimate high or low?

4. Liam bought 20 m of fencing to enclose his rectangular garden.
How long and how wide could his garden be?
Find at least 2 answers.
Draw a picture to show your answers.

5. Would you use metres to find the perimeter of each item?
Why or why not?
a) a playing card
b) your bedroom
c) a playground
d) your math book

Reflect

How do you decide whether to use centimetres or metres to measure perimeter? Use words, pictures, or numbers to explain.

LESSON 10

Exploring Shapes with Equal Perimeters

Explore

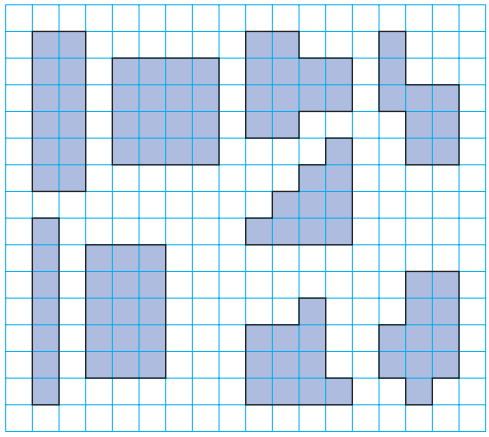
You will need square tiles and grid paper.
Make as many different shapes as you can with perimeter 12 units.
Colour squares on grid paper to show your shapes.

Show *and* Share

Show 2 classmates the shapes you made. What is the perimeter of each shape? How do you know each shape is different?

Connect

Different shapes can have the same perimeter.
Each of these shapes has perimeter 16 units.

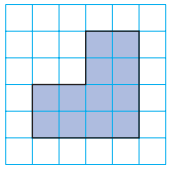


Practice

Use 1-cm grid paper for each question.

1. **a)** Draw different shapes with perimeter 18 cm.
b) Draw different shapes with perimeter 8 cm.
c) Draw different shapes with perimeter 14 cm.

2. Copy this shape on grid paper.
Find its perimeter.
Draw a different shape with the same perimeter.



3. Laila's garden has an unusual shape, but all of its corners are square.
She has 24 m of fencing to put around the garden.
Draw 3 different shapes on grid paper to show what Laila's garden might look like.

4. Draw a shape with perimeter 20 cm on 1-cm grid paper.
Draw 2 more different shapes that also have perimeter 20 cm.

5. Work in a small group.
You will need square tiles.
Make as many shapes as you can with perimeter 10 units.
Draw a picture of each shape.

Reflect

Use words, pictures, or numbers to show that many different shapes can have the same perimeter.

LESSON 11

Exploring Mass: The Kilogram

Some foods are sold by the **kilogram**.
This bag of rice measures one kilogram (1 kg).

Do you think you could lift this bag of rice?
Do you think you could lift 10 bags of rice like this?

Explore

You will need a balance scale, and objects like the ones in the picture.

- Choose an object.
  Estimate. Do you think it is
  - lighter than 1 kg?
  - heavier than 1 kg?
  - about the same as 1 kg?

  Use the scale to check your estimate.
- Repeat with other objects.
- Record your work.

Show *and* Share

Talk about how you estimated.
Which objects were a little heavier than 1 kg?
Which were a lot heavier?
How could you tell?

Lighter than 1 kg	About 1 kg	Heavier than 1 kg
ball shoe	book	

Lesson Focus | Estimate and measure mass in kilograms.

Connect

When you measure how heavy an object is, you measure its **mass**.
The kilogram (kg) is a unit of mass.

This chapter book has a mass of about 1 kg.

This case of iced tea has a mass of about 9 kg.

Practice

1. In your classroom, find an object that has a mass of about 1 kg.
Use it as a referent to estimate the mass of each.

a) your math book
b) a dictionary
c) your backpack
d) your shoe

2. In your classroom, find

- 3 objects that are less than 1 kg
- 3 objects that are more than 1 kg

Record your results.

Less than 1 kg	More than 1 kg

3. This giant frog lived at the time of the dinosaurs.
It had a mass between 4 kg and 5 kg.
Find something that has about the same mass. What can you tell about the size of the frog? Use words, pictures, or numbers to describe your ideas.

Reflect

Do bigger objects always have a greater mass than smaller objects? Explain your thinking.

LESSON 12

Exploring Mass: The Gram

Hold a centimetre cube in your hand.
How would you describe its mass?
A centimetre cube has a mass of about one **gram**.
You write: 1 g

Explore

You will need objects like the ones in the picture.

- Choose an object. Estimate its mass in grams. Measure to check your estimate. Record your work. Repeat with other objects.
- Put a 1-kg mass on the balance scale. Estimate how many grams it takes to balance 1 kg. Check your estimate. Write about what you found.

Show *and* Share

How did you decide which masses to use to balance an object?

Object	Estimate of Mass	Mass
Nickel	9 g	4 g
Scissors	150 g	225 g

Connect

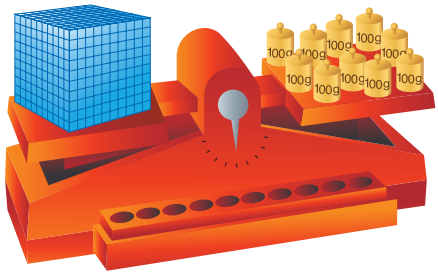
The gram is a small unit of mass.
The mass of an object you can hold in the palm of your hand is usually measured in grams.

The bean seed has a mass of about 1 g.

A banana has a mass of about 200 g.

It takes 1000 g to balance 1 kg.

1000 g = 1 kg



Practice

1. Name an object that has a mass of about 1 g.
Explain your choice.
Use your object as a referent to estimate the mass of each.

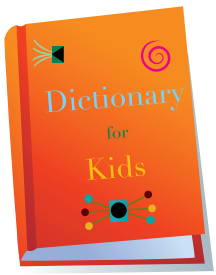
a) a roll of 25 pennies
b) a baseball
c) an apple
d) a mouse

2. Sort the objects into 2 groups

- ones you would use as a referent for 1 g
- ones you would use as a referent for 1 kg

a counter

a book



a bottle of water

a dime

3. Would you use grams or kilograms to measure? Why?

a) an eraser **b)** a chair

c) a computer **d)** a pencil case

4. Name 2 objects that each have a mass of about 100 g.

5. Use a balance scale.
Find the mass of an orange and a tennis ball.
What did you discover?

6. **a)** Make a ball out of modelling clay.
Use a balance scale to find its mass.

b) Roll the ball of modelling clay between your hands to make a snake.
Find the mass of the snake.

c) What did you find out?

7. Bert's cookie recipe calls for 500 g of nuts.
Will two 200-g bags be enough?
Show your work.

8. Janet needs 1 kg of birdseed for her feeder.
The store had only these sizes of bags:

Find 2 different ways Janet could buy the birdseed.
Show your work.

Reflect

Suppose you estimate the mass of an object.
How do you know if its mass will be measured in grams or kilograms?
Use words, pictures, or numbers to explain.

Unit 4 Show What You Know

LESSON

1 2

1. Which unit of time would you use to measure each activity?

a) Playing a game of chess
- pendulum swings or TV shows?

b) Singing "Down by the Bay"
- pendulum swings or recesses?

c) Building an Inukshuk
- seconds or minutes?

d) Learning to ride a bike
- days or months?

2 3

2. Choose the better estimate of time for each activity.

a) Taking a shower, 5 min or 1 h?

b) Building a snowman, 2 min or 15 min?

c) Going on a camping trip, 5 days or 6 h?

d) Growing tomatoes, 1 week or 3 months?

e) Printing your name, 10 s or 1 min?

3

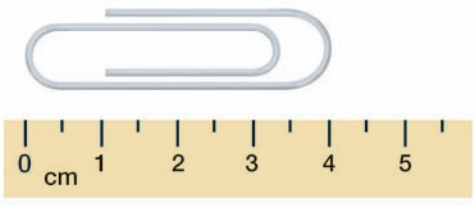
3. Yoshio's grandmother came to visit from Japan.
She arrived on March 1st and left on June 30th.
How many days did she visit?

4

4. Use a ruler. Draw a line 17 cm long.

5. How long is each object?

a)



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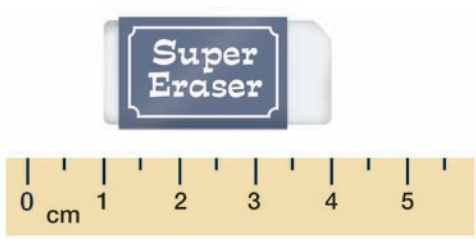

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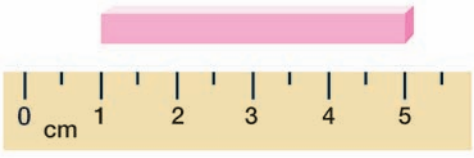


LESSON

5 6

6. Use a ruler or a metre stick. Estimate.
Find an object that is
a) longer than 20 cm
b) shorter than 10 cm
c) longer than 1 m
Measure each object you found.
Record the name of each object and its length.

8 9

7. Find the perimeter of each object.
a) the cover of your math book
b) the longest tabletop in the classroom

8

8. Joe measured his garden and found its perimeter is 2000 cm.
What is another way of describing the perimeter of Joe's garden?

10

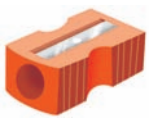
9. Use 1-cm grid paper.
Draw as many shapes as you can with perimeter 16 cm.

11 12

10. Which unit would you use to measure each mass?
a) a bag of oranges
b) a marble
c) a desk
d) a colour marker

11. Estimate the mass of each object.

a)



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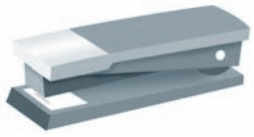


c)

d)

UNIT 4 **Learning Goals**

- ☑ use non-standard and standard units to measure the passage of time
- ☑ use a calendar
- ☑ measure length, width, and height in centimetres and in metres
- ☑ measure perimeter in centimetres and in metres
- ☑ measure the mass of an object in grams and in kilograms

Unit Problem

Eat Your Veggies

Part 1

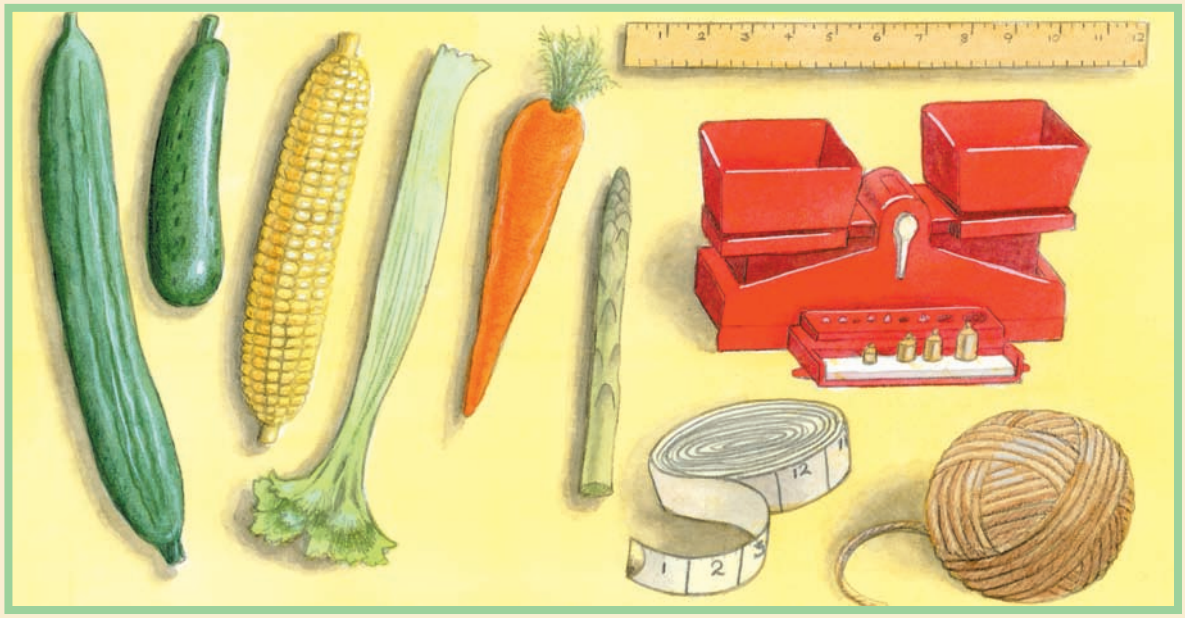
Carrots are Yoko and Sandar's favourite vegetable.
What unit of time would they use to measure the time it takes for each activity?

- planting a carrot seed
- building a scarecrow for the garden
- growing a carrot
- digging up a row of carrots
- peeling a carrot
- eating a raw carrot
- baking a carrot cake

Part 2

➤ Choose a vegetable.
Measure the vegetable in as many ways as you can.
Record your work in a chart.

➤ Repeat with 2 more vegetables.



Part 3

➤ Suppose you want to plant a vegetable garden in the spring.
You need fencing around the garden to keep the rabbits out.
You have 18 m of fencing.
You want to use all of it.

➤ Use 1-cm grid paper.
Draw as many different gardens as you can that have perimeter 18 cm.

➤ Which garden shape would you choose? Why?

Check List

Your work should show

- ☑ how you used what you know about measuring
- ☑ your measurements recorded correctly, including units
- ☑ at least 3 different garden shapes drawn on grid paper
- ☑ a clear explanation of the garden shape you chose

Reflect on Your Learning

Write what you know about measuring time, length, perimeter, and mass.

Investigation

How Many Buttons?

You will need the objects you see in this picture.

Don't have any buttons?
Choose another large collection like beads or counters.
Fill a box with your collection.

Part 1

- Look at the photo. What tools can you use to estimate the number of objects?
- Find as many ways to estimate as you can. Use words, numbers, or pictures to explain your plans.

Part 2

- Which way do you think will provide the best estimate? Why?
- Try it out. Get any materials you need.
  Record your work.

Part 3

- Count the number of objects.
  How can you group the objects to count them?
- How does your estimate compare with your count? Explain.
- How would you estimate differently next time? Explain.

Display Your Work

Report your findings using words, pictures, or numbers.

Take It Further

- Make a story problem based on your results.
  Solve your problem.
- Trade problems with your partner.
  Solve each other's problem.
  Compare solutions.