Today's Materials

- calculator
- pencil
- notebook
- glue
- ruler

Changing Scales in Scale Drawings

Lesson 10

CCSS Standards: Building on	• 2.MD.A • 6.G.A.1
CCSS Standards: Addressing	• 7.G.A.1
CCSS Standards: Building towards	• 7.G.B.6 • 7.RP.A • 7.RP.A.3

Let’s explore the different scale drawings of the same actual thing!

Today's Goals

- ❑ Given a scale drawing, I can create another scale drawings that shows the same thing at a different scale.
- ❑ I can use a scale drawing to find the actual areas.

Appropriate Measurements

Warm Up

Quiet Think Time: Estimate the size of your foot in centimeters or inches.

Share your guess with your partner.

If a student uses a ruler like this to measure the length of their foot, which choices would be appropriate measurements?

Select **all** that apply. Be prepared to explain your reasoning.

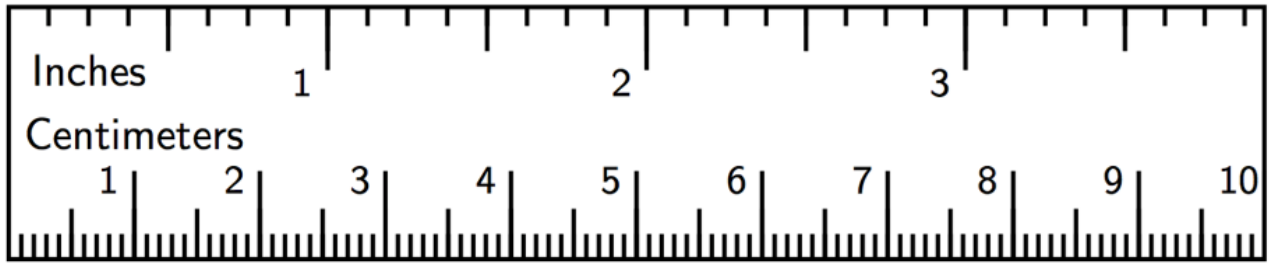
a. **9 ¼ in**

b. **9 5/64 in**

c. **23.47659 cm**

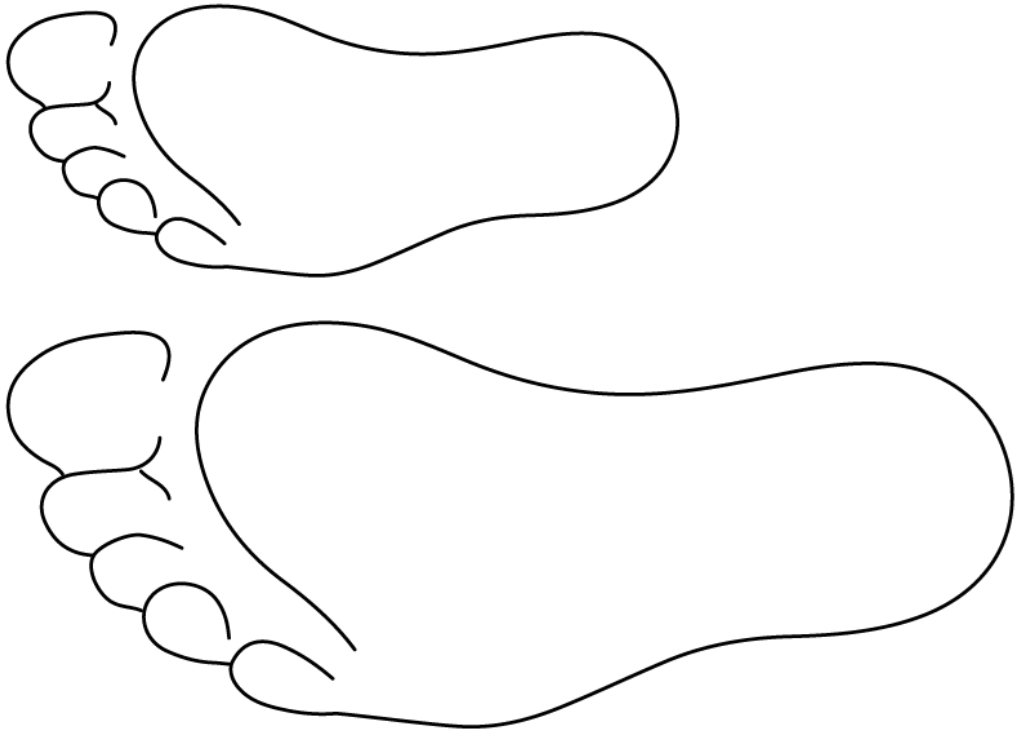
d. **23.5 cm**

e. **23.48 cm**



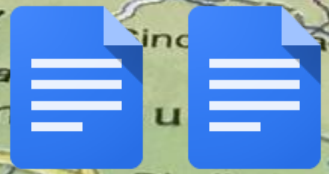
Here is a scale drawing of an average 7th grade student's foot next to a scale drawing of a foot belonging to the person with the largest feet in the world.

Estimate the length of the larger foot.



Same Plot, Different Drawings

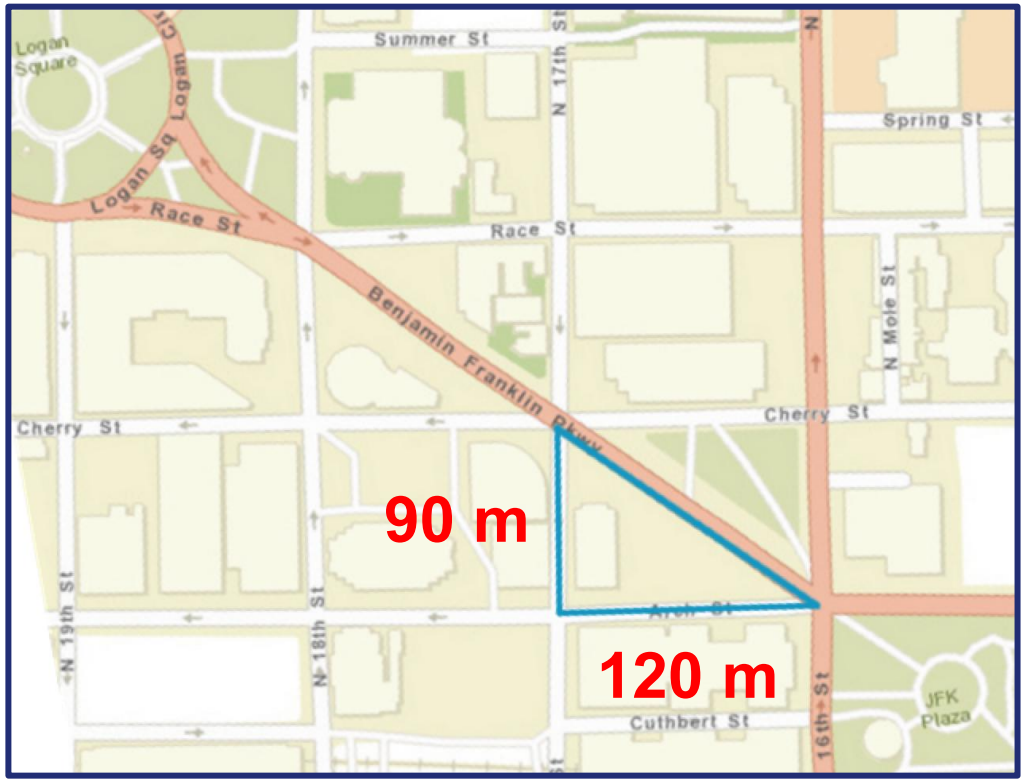
Activity 10.2



Today, you will reproduce a map of the triangular piece of land in Philadelphia at a different scale.

Jot these actual measurements down! →

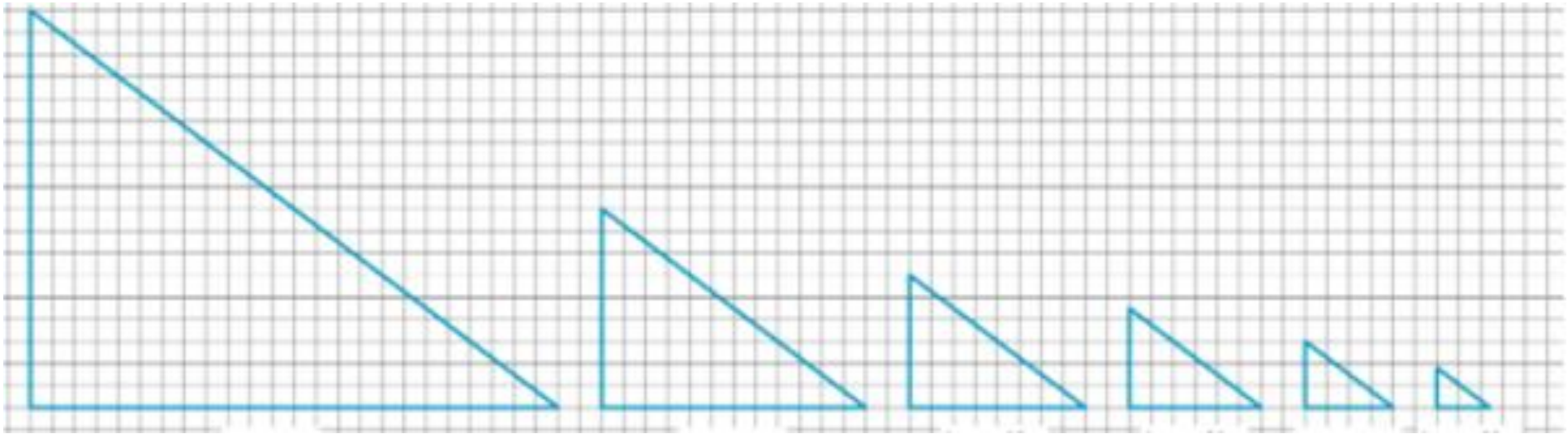
- Each student will be given a different scale to create a scale drawing.
- Work on your own for 5 min. Then, discuss the last question with your team!



How does a change in the scale influence the size of the drawings?

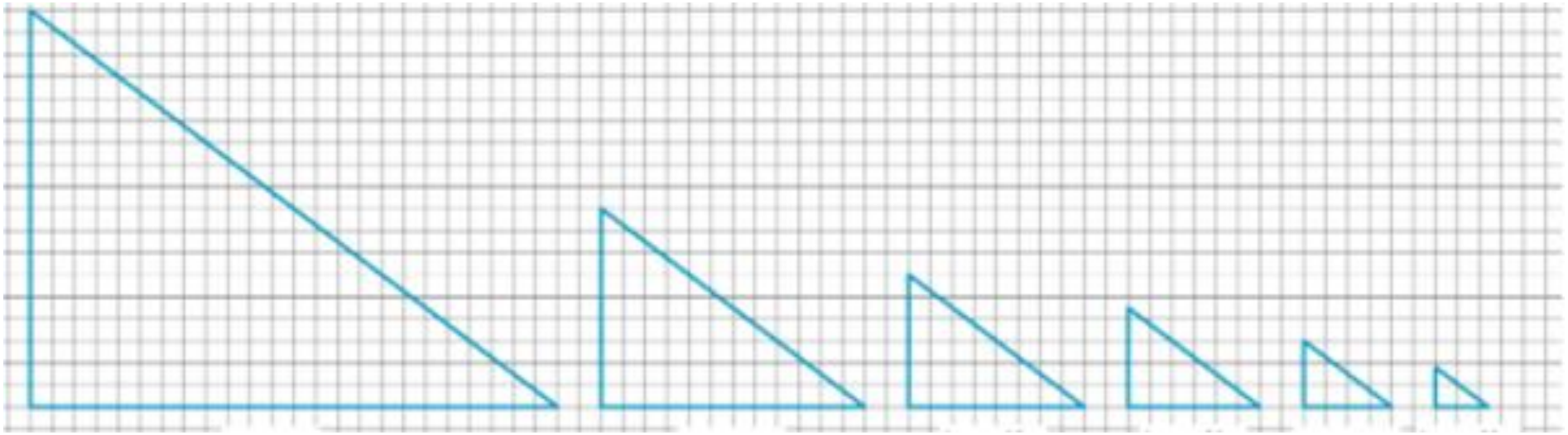
How do the lengths of the scale drawing where 1 cm represents 5 m compare to the lengths of the drawing where 1 cm represents 15 m?

How do the lengths of the scale drawing where 1 cm represents 5 m compare to the lengths of the drawings where 1 cm represents 50 m?

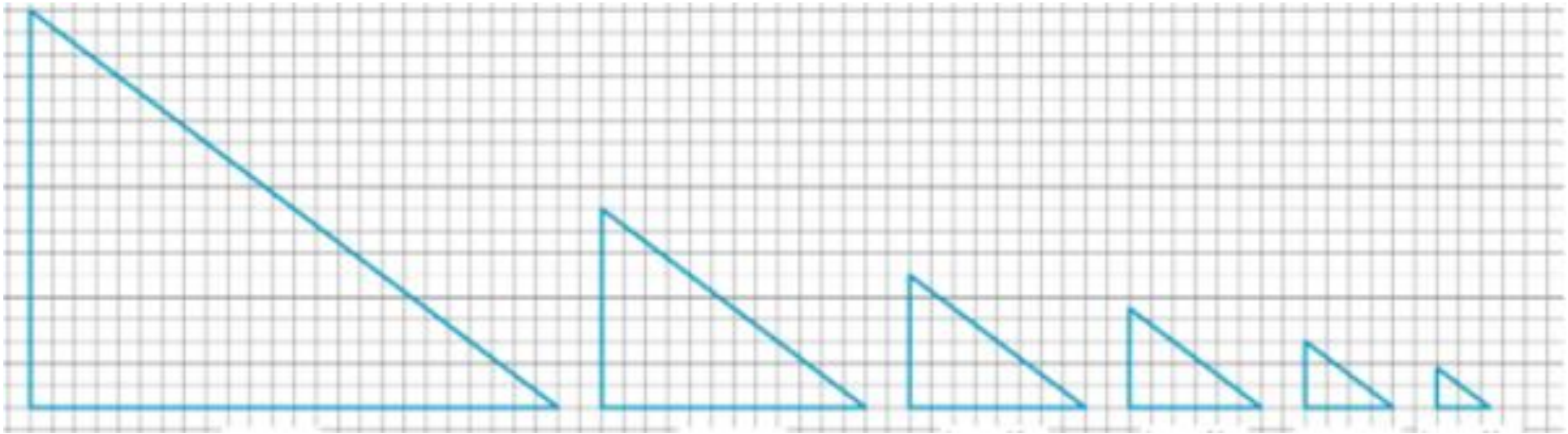


How does the area of the scale drawing where 1 cm represents 5 m compare to the area of the drawing where 1 cm represents 15 m?

How does the area of the scale drawing where 1 cm represents 5 m compare to the area of the drawing where 1 cm represents 50 m?



- As the number of meters represented by one centimeter increases, the lengths in the scale drawing decrease.
- As the number of meters represented by one centimeter increases, the area of the scale drawing also decreases, but it decreases by the square of the factor for the lengths.



“Are you ready for more?”

Noah and Elena each make a scale drawing of the same triangular plot of land, using the following scales. Make a prediction about the size of each drawing. How would they compare to the scale drawings made by your group?

➔ Noah uses the scale 1 cm to 200 m.
➔ Elena uses the scale 2 cm to 25 m.

A New Drawing of the Playground

Activity 10.3

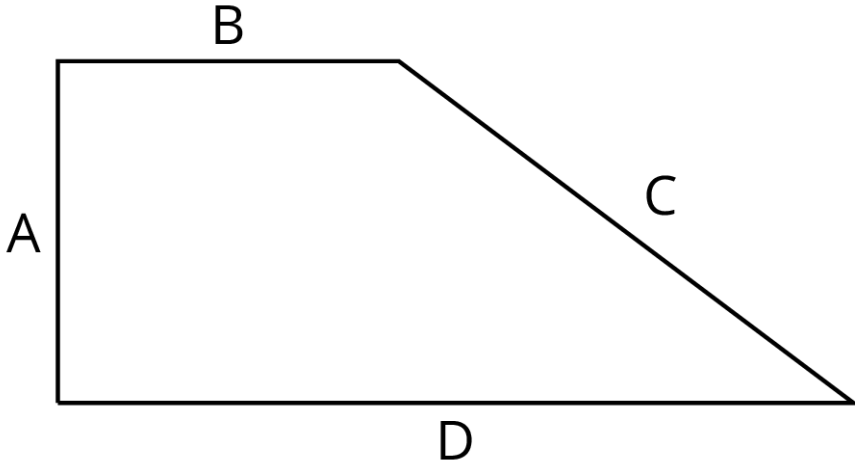
- 5 Practices

In this activity, you'll reproduce a scale drawings using a different scale.

The scale for the given drawing is 1 cm to 30 meters.

You are going to make a new scale drawings at a scale of 1 cm to 20 meters.

Do you think the new drawing will be larger or smaller than the given one?

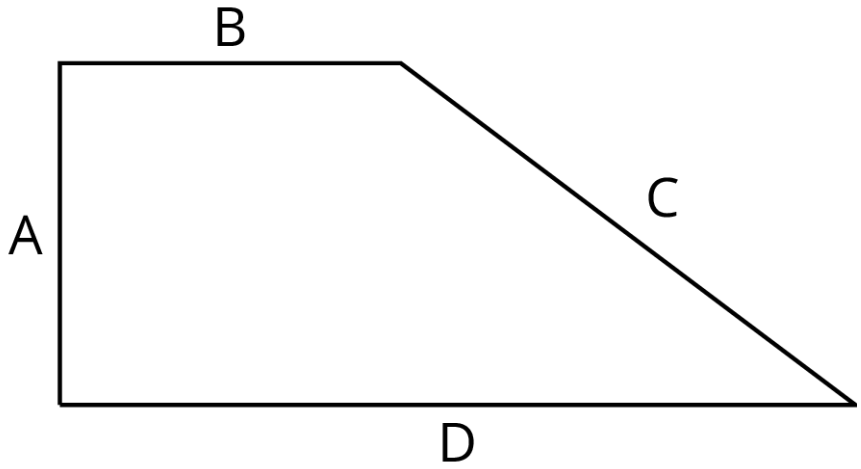


Begin this activity on your own. (5 min.)

Chat with your team and revise your drawings.

Was your prediction about which scale drawing would be larger correct?

Why was the drawings at a scale of 1 cm to 20 m larger than the drawing at a scale of 1 cm to 30 m?



Sometimes we have a scale drawing and want to reproduce it at a different scale.

Two common ways to do this are:

1. Using the original scale drawing to calculate the actual lengths and then using the actual lengths and the new scale to calculate the corresponding lengths on the new drawing.
2. Scaling lengths in the original scale drawing by a factor that relates the scales of the two drawings.

Suppose you have a map that uses the scale 1 cm to 200 m. You draw a new map of the same place using the scale 1 cm to 20 m.

How does your new map compare to your original map?

The lengths are 10 times as long and the area is 100 times as large.

Suppose you have a map that uses the scale 1 cm to 200 m. You draw a new map of the same place using the scale 1 cm to 20 m.

How much actual area does 1 cm^2 on your new map represent?

400 m^2

Suppose you have a map that uses the scale 1 cm to 200 m. You draw a new map of the same place using the scale 1 cm to 20 m.

How much actual area did 1 cm^2 on your original map represent?

40,000 m^2

Today's Goals

- ❑ GIven a scale drawing, I can create another scale drawings that shows the same thing at a different scale.
- ❑ I can use a scale drawing to find the actual areas.

Window Frame

Cool Down