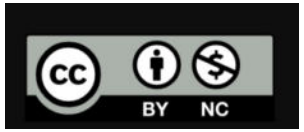
Today's Materials

- calculator
- pencil
- notebook
- glue
- ruler

Scales without Units

Lesson 11

CCSS Standards: Addressing	• 7.G.A.1



Let’s explore a different way to express scales!

Today's Goals

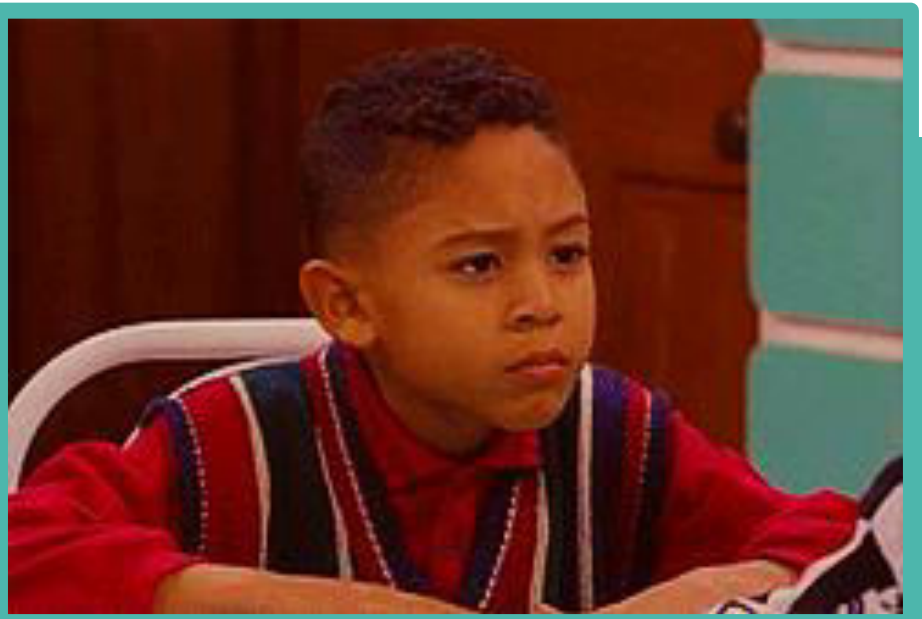
- ❑ I can use scales without units to find scaled distances or actual distances.
- ❑ I can explain the meaning of scales expressed without scaled units.

One to One Hundred

- Warm Up
- Think Pair Share

Until now, we have worked with scales that each specify two units — one for the drawing and one for the object it represents.

Sometimes scales are given without units!



A map of a park says its scale is 1 to 100.

1. What do you think that means?
2. Give an example of how this scale could tell us about the measurements in the park.

Begin thinking on your own. (2 min.)

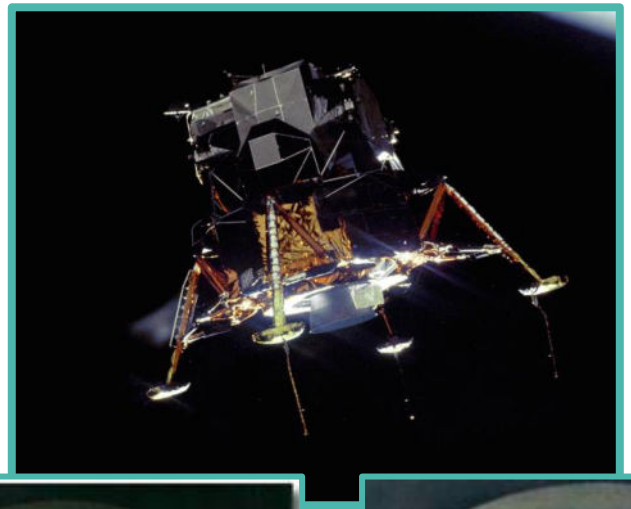
A map of a park says its scale is 1 to 100.

The distances in this case could be in any unit, but because one is expressed as a number times the other, the unit is the same for both!

Apollo Lunar Module

Activity 11.2

- 5 Practices

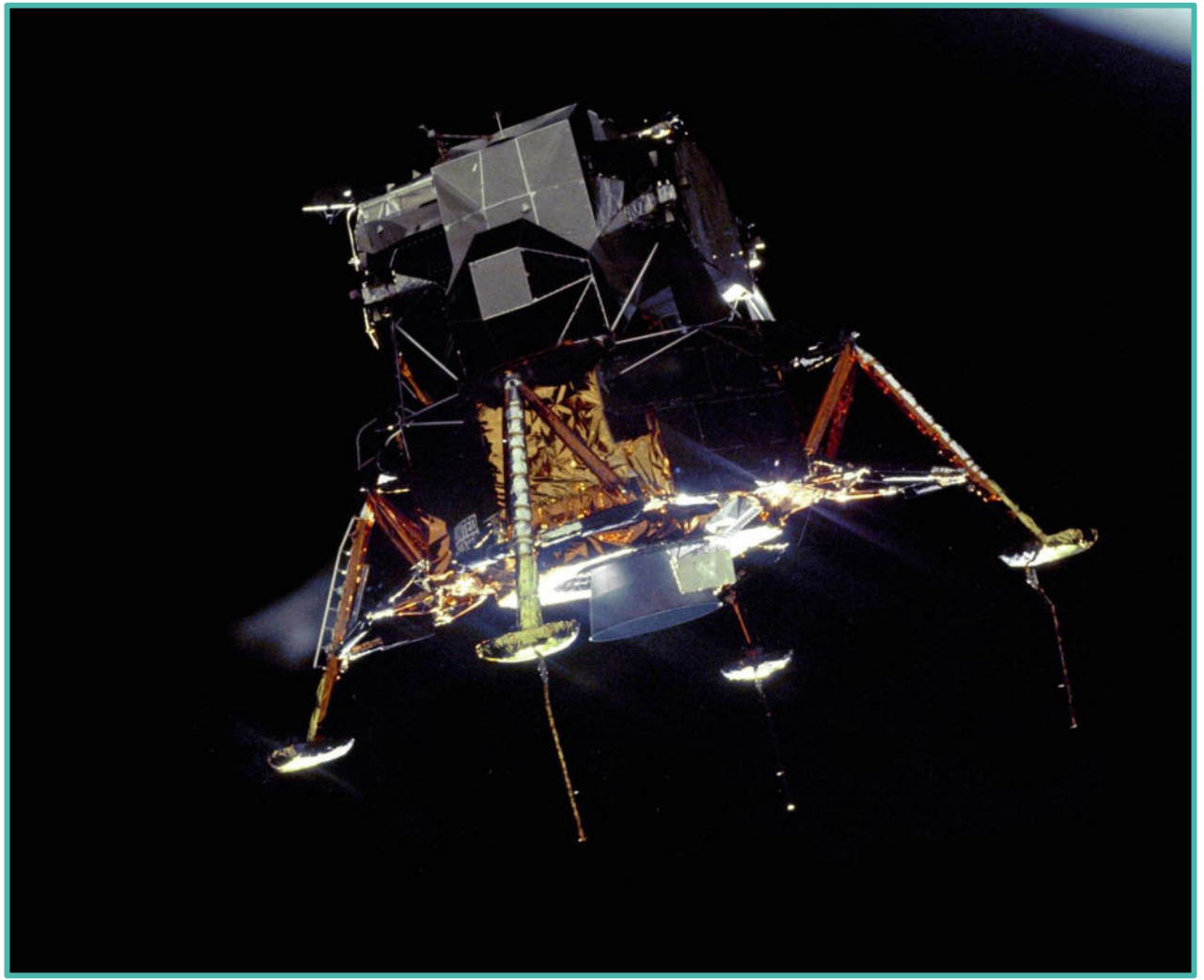


Neil Armstrong and Buzz Aldrin were the first people to walk on the surface of the moon.

The **Apollo Lunar Module** was the spacecraft they used when they landed on the moon in 1969.

The landing module was one part of a larger spacecraft that was launched from Earth.

Predict: What size was the spacecraft? How would the height of a person compare to it?

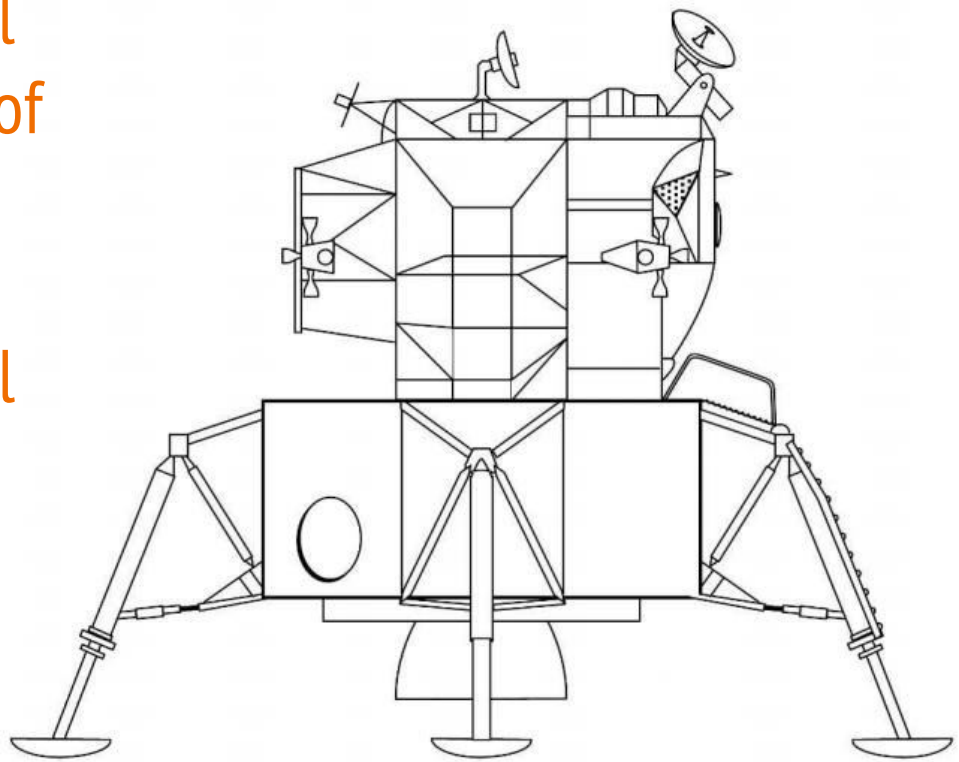


Begin working on this activity on your own.

After answering Question 2, please chat with your partner about your ideas for the first 2 questions.

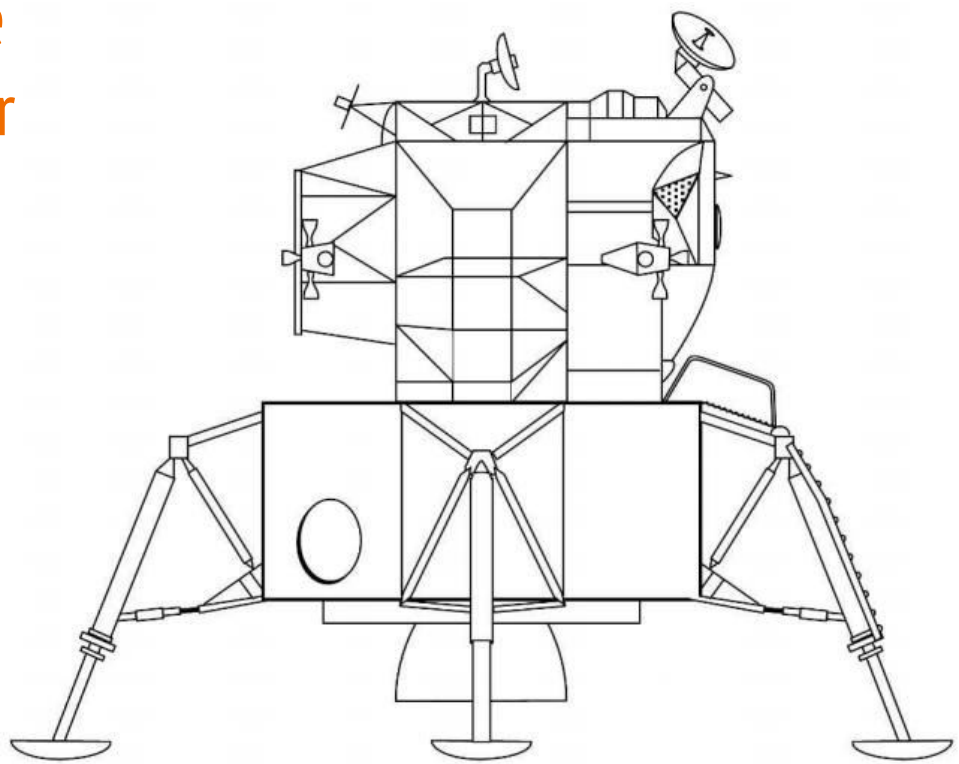
How did you estimate the actual length of each leg on the sides of the spacecraft?

How did you estimate the actual height of the Apollo Lunar Module?



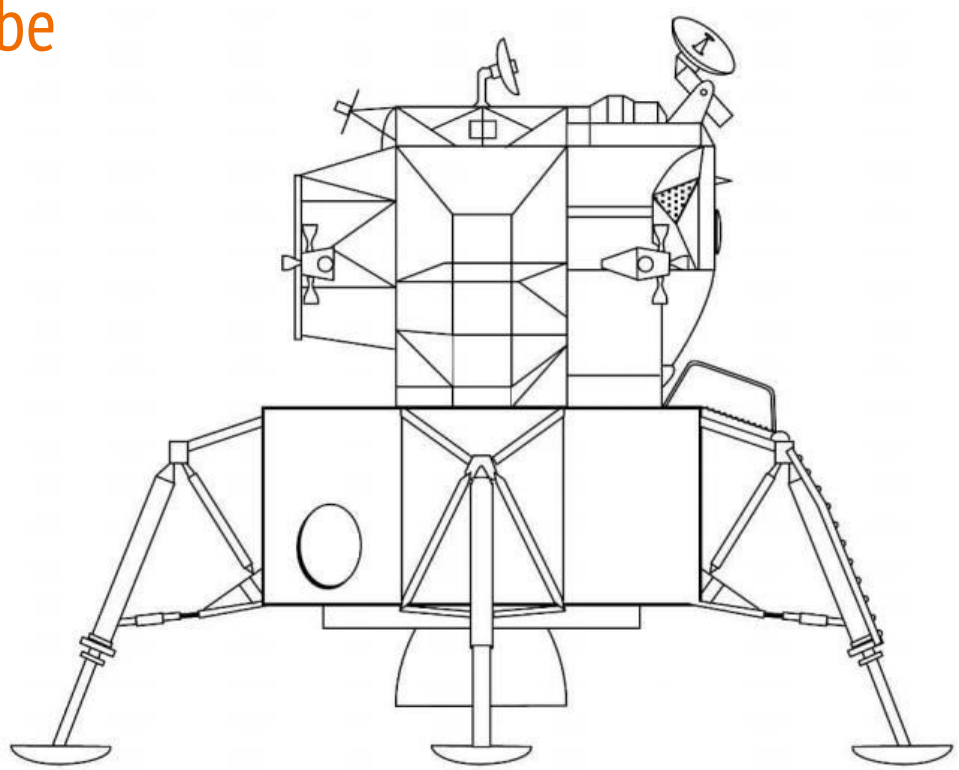
Does it matter what unit we use to measure the drawing? Why or why not?

Which unit is more efficient for measuring the height of the module on the drawing - inches or centimeters?



How tall would Neil Armstrong be in the drawing if he were drawn with his height to scale?

How tall would you be in the drawing?



Let's see how reasonable your sketch is!

“Are you ready for more?”

The table shows the distance between the sun and 8 planets in our solar system.

1. If you wanted to create a scale model of the solar system that could fit somewhere in your school, what scale would you use?
2. The diameter of the Earth is approximately 8,000 miles. What would the diameter of the Earth be in your scale model?

planet	average distance (millions of miles)
Mercury	35
Venus	108
Earth	150
Mars	228
Jupiter	779
Saturn	889
Uranus	1,890
Neptune	2,800

Same Drawing, Different Scales

Activity 11.3

Is it possible to express the 1 to 50 scale of the Lunar Module as a scale with units?

What units would you use?

In your next activity, you will explore how a scale without units and one with units could express the same relationship between scaled lengths and actual lengths!

Begin working as a team to complete the first question.

After that, work on your own for the remainder of the questions.

A rectangular parking lot is 120 feet long and 75 feet wide.

- Lin made a scale drawing of the parking lot at a scale of 1 inch to 15 feet. The drawing she produced is 8 inches by 5 inches.
- Diego made a scale drawing of the parking lot at a scale of 1 to 180. The drawing he produced is also 8 inches by 5 inches.

Explain or show how each scale would produce an 8 inch by 5 inch drawing.

A rectangular parking lot is 120 feet long and 75 feet wide.

- Lin made a scale drawing of the parking lot at a scale of 1 inch to 15 feet. The drawing she produced is 8 inches by 5 inches.
- Diego made a scale drawing of the parking lot at a scale of 1 to 180. The drawing he produced is also 8 inches by 5 inches.

Make another scale drawing of the same parking lot at a scale of 1 inch to 20 feet.

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A rectangular parking lot is 120 feet long and 75 feet wide.

- Lin made a scale drawing of the parking lot at a scale of 1 inch to 15 feet. The drawing she produced is 8 inches by 5 inches.
- Diego made a scale drawing of the parking lot at a scale of 1 to 180. The drawing he produced is also 8 inches by 5 inches.

Express the scale of 1 inch to 20 feet as a scale without units. Explain your reasoning.

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What does it mean when the scale on a scale drawing does not indicate any units?

How is a scale without units the same as or different from a scale with units?

How can a scale without units to used to calculate scaled or actual distances?

When a scale does not show units, the same unit is used for both the scaled distance and the actual distance.

For example, a scale of 1 to 500 means that 1 inch on the drawing represents 500 inches in actual distance.

In other words, the actual distance is 500 times the distance on the drawing.

To calculate actual distance, we can multiply all distances on the drawing by the factor 500, regardless of the unit we choose or are given!

Scaled Courtyard Drawings

Cool Down