

## Estimate and Measure

**Topic**  
Measurement

**Grades**  
PreK-2

**Site**  
Indoors

**Duration**  
20 minutes

### Materials

- Construction paper
- Pencils
- Scissors
- Thick and thin yarn
- Rulers
- Yardsticks
- Tape measures

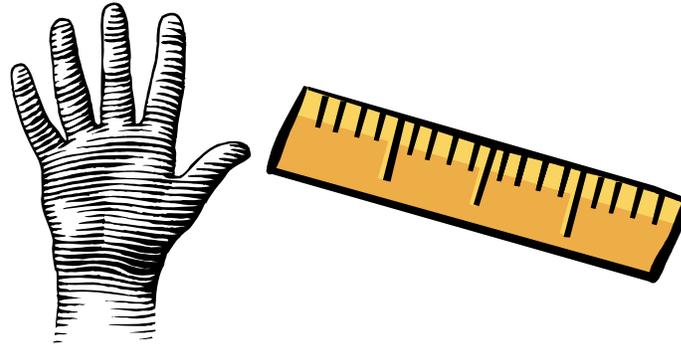
### Vocabulary

estimate, length

### National Science Education Standards

*Science as Inquiry* (K-4)

Ability to do scientific inquiry



### Overview

*How many of your hands would it take to measure the length of a desk or book? Students estimate the size of various things using non-standard measurement, such as a paper “hand” or piece of yarn. They use some simple calibrated tools, like rulers and yardsticks, to get accurate answers then compare their findings with their partners or their families.*

### Objectives

Students will be able to:

- Estimate the length of three common objects using non-standard measurement.
- Compare a standardized measurement to a non-standard measurement using a calibrated tool.

### Background

The size of objects can be **estimated** using non-standard measurement. Young students can use this method of measurement when first beginning to explore the concept of measurement. Non-standard measurement can include using a piece of string or a body part, such as a hand or arm, to estimate the **length** of an object.

Non-standard measurement is a useful tool for eventually understanding the concept of calibrated measurement, which is based on concrete and familiar units. Calibrated tools (like rulers, yardsticks or measuring tapes) and standardized measurements are used to make accurate and consistent measurements. These tools give people the means to gain the same measurement results. For example, a pound always equals 16 ounces and a yard equals three feet. A foot-long ruler, whether it’s plastic, wood or metal, is marked in twelve inch-long increments. A one-cup measuring cup equals eight ounces, while a coffee cup might hold more or less liquid. The ability to make comparisons to non-standard measurement will illustrate the importance of standardized units of measurement.



## VOCABULARY

**Estimate:** a rough guess or approximation of measurement

**Length:** measurement from end to end



## ELL TIPS

Use the attached **Family Event Table Label** to engage families in their child's learning. Family support is essential for all learners' success. Events for families introduce potentially new concepts and methods that can be applied to many of their children's academic studies.

Non-standard measurement is also a way to involve parents in a child's learning. Hosting families in the classroom can enlist parent support in the students' learning of new concepts, like measurement. Also, many activities can be extended and practiced at home. Measuring items at home can be a fun family project.

## Teacher Preparation

1. Gather construction paper, scissors and yarn.
2. Cut thin yarn into foot lengths like a ruler and thick yarn into yard lengths.

## Procedure

### 1. DISCUSS MEASUREMENT WITH STUDENTS.

What are different forms of measurement that students can think of? (*clothing size, height, weight, measuring cups, rulers and so on*)

### 2. STUDENTS MAKE THEIR OWN NON-STANDARD MEASUREMENT TOOL.

Pass out paper and scissors. Have students trace their hand on the paper and cut it out carefully.

### 3. STUDENTS USE PAPER HANDS TO MEASURE ITEMS IN THE CLASSROOM OR PLAY AREA.

Challenge students to use their paper hands to find out how many "hands long" an object is. Have them measure three items, such as a book, desk and table.

### 4. STUDENTS MEASURE THE SAME ITEMS WITH YARN PIECES.

After measuring items with their paper hands, have students measure the same items using the foot and yard lengths of yarn.

### 5. AS A CLASS, DISCUSS THE SIMILARITIES AND DIFFERENCE BETWEEN THE MEASUREMENTS.

Ask students which measurements resulted in the same numbers as their peers? (The standardized yarn measurements should be close to the same.) Why or why not? Were paper hand sizes the same as their peers or different?

### 6. DISCUSS THE IMPORTANCE OF STANDARDIZED MEASUREMENT.

Use a ruler and yardstick to measure the yarn pieces in front of the class. Discuss the value of agreed-upon sizes for measurement and the difference between non-standard and standard or accurate measurement. (*consistency, accuracy, simplicity*)

### 7. ENCOURAGE STUDENTS TO INVOLVE THEIR FAMILIES.

Invite families into the classroom. Use the **Family Event Table Label** and encourage the families to do the measurement activity together. Discuss the different measurements that might occur between an adult and a student using a paper hand. *Are the hands the same size? Whose hand is bigger? Smaller? How many student hands equal one adult's?*

## Extensions

- Have students use other non-standard measurements, such as estimating and comparing with their bodies. Encourage them to find things the length of their arm, the height of their body or the size of their head. Estimate the size of the objects then measure the items with your body.
- Challenge families to practice the non-standard measurement activities at home together.

## Resources

### Books

*Family Math.* Stenmark, Jean, et al. Lawrence Hall of Science, 1986.  
*Inch by Inch.* Lionni, Leo. Harper Collins, 1960.  
*Numbers Everywhere.* Donovan, Barbara. Sadlier-Oxford, 2003.

## Standards

### California Science Standards

Grade K: 1a, 4a, 4d  
 Grade 2: 4a, 4b, 4c, 4g

### California Math Standards

Grades K-2:  
 Number Sense  
 Measurement and Geometry

## Head Start Framework

### Mathematics

- Demonstrates increasing interest and awareness of numbers and counting as a means for solving problems and determining quantity.
- Develops increasing ability to count in sequences to 10 and beyond.
- Begins to use language to compare numbers of objects with terms such as more, less, greater than, fewer, equal.
- Begins to make comparisons between several objects based on a single attribute.
- Shows progress in using standard and non-standard measures for length and area of objects.

### Science

- Begins to use senses and a variety of tools and measuring devices to gather information.
- Develops increased ability to observe and discuss common properties, differences and comparisons among objects and materials.
- Begins to participate in simple investigations to test observations, discuss and draw conclusions and form generalizations.
- Develops growing abilities to collect, describe and record information through a variety of means.

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 AQUARIUM  
 IS TO INSPIRE  
 CONSERVATION OF THE  
 OCEANS.**

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**Family Event Table Label**

**Estimate and Measure**

1. Make a hand card for measuring! Put your four fingers together and separate your thumb as if you are wearing a mitten. Trace around your fingers and thumb on a piece of construction paper. Cut out your hand shape. Ask a parent or sibling to make a hand card, too.
2. Estimate how many hands long a book is. Ask your partner to guess. Now use your hand cards to measure the book. Are your results the same or different from your estimates? From your partner's?
3. Guess how many hands long other objects are, such as your shoe or desk. Measure the items with your hand card. Have your partner measure the same items and compare your findings.
4. Measure the length of one of the pieces of yarn using your hand card. How many of your hands long is it? Is the answer the same using your partner's hand?
5. Use the pieces of yarn to estimate the size of some larger items, such as a table or rug. Now measure the items with a ruler, yardstick or tape measure. What did you discover?

**La Estimación y La Medida**

1. Haga una tarjeta de mano para tomar medidas. Ponga sus cuatros dedos juntos y separe su dedo gordo como si tuviera puesto un mitón. Trace alrededor de su mano y su dedo gordo en un pedazo de papel. Corte el papel en la forma de su mano. Pídale a un padre o hermano que haga una tarjeta de mano también.
2. Calcule cuantas manos mide un libro. Pídale a su compañero que adivine. Ahora, use su tarjeta de mano y mida el libro. ¿Son los resultados diferentes o los mismos de sus estimaciones? Compare los resultados con los de su compañero.
3. Adivine cuantas manos mide otros objetos, como su zapato o su mesa. Mida los objetos con su tarjeta de mano. Pídale a su compañero que meda los mismos objetos y compare sus resultados.
4. Mide la largura de uno de los pedazos de hilado con sus manos. ¿Cuántas manos mide el hilado? ¿Es el resultado el mismo usando la mano de su compañero?
5. Use los pedazos de hilado para estimar el tamaño de otros objetos más grandes, como el piso. Ahora, mide los mismos objetos con una regla, un patrón o una cinta de medir. ¿Qué descubrió?