

GRADE 4-CONTENT STANDARD #5
EXTENDED LESSON A
Permission Granted

Understanding Inch, Foot, and Yard

Introduction

Objective → Students will be able to measure in inches, feet, and yards. They will determine which measure is most appropriate for a given situation.

Context → Students have worked with both standard and nonstandard units of linear measurement and have been introduced to the measures *inch*, *foot*, and *yard*. They will go on to solve problems requiring the use of units of measurement.

NCTM Standards Focus

Traditionally, once students understand the necessity of using standard units, they are expected to apply this understanding and to answer measurement conversion questions.

In this standards-based lesson, students are actively engaged in measuring relevant classroom lengths, heights, and distances using three customary units of measure. By applying reasoning and proof to determine the most appropriate unit of measure and by communicating their rationale for selecting a certain measure, students grapple with each unit of measure and build their own understanding.

Communication Students work in pairs to measure a selection of classroom objects. They discuss which unit (inches, feet, or yards) most appropriately communicates the measurement for each item. They also communicate with one another the rationale for selecting one measure over another.

Reasoning and Proof Students constantly apply reasoning skills as they determine which unit of measure is most appropriate for a given situation. By conducting and recording actual measurements, they can compare their results to prove which makes the most sense.

Teaching Plan

Materials → Student pages A.91-92; yardsticks; inch/foot rulers; classroom objects

WITH YOUR STUDENTS, create a list of 6 objects and 6 distances they could measure in the classroom. Make sure that 2 or 3 of the objects or distances are greater than a few yards long (e.g., the width of the classroom) and a few others are less than a foot long. Also, try not to include too many of the objects or distances listed on student page A.91.

Assign each student a partner and pass out an inch/foot ruler to each pair of students.

Review the inch unit with them. Point out the markings for , , and  inch.

Explain that when they measure using inches, they should record their measures to the nearest

[Source: [Connect to NCTM Standards 2000-Fourth Grade](#) Creative Publications, Inc. Pages 96-101]

A.87

$\frac{1}{2}$ inch. Hold up your ruler. *How long is the ruler?* (12 inches, 1 foot) *How many inches are in $\frac{1}{2}$ foot?* (3) *How many feet are in $\frac{1}{2}$ foot?* (6) *How many inches are in $\frac{1}{2}$ foot?* (9) Make certain that students understand this relationship. They will be using a similar understanding when measuring in feet to record their measurements to the nearest $\frac{1}{2}$ foot.

After working with the ruler, hold up a yardstick. Point out that the yardstick (1 yard) is equal to 36 inches, or 3 feet. *If a yard is equal to 36 inches, how many inches would $\frac{1}{2}$ yard be?* (9 inches) *How many feet would $\frac{1}{2}$ yard be?* *How many inches?* (18 inches). *How many inches is $\frac{1}{3}$ yard?* (27 inches) When measuring in yards, students will record their measurements to the nearest $\frac{1}{2}$ yard.

Select a couple of objects or distances and demonstrate how to measure each using the three different units. Be sure to give special attention to measuring to the nearest $\frac{1}{2}$ foot and $\frac{1}{2}$ yard. Point out to students that when measuring in feet and yards they will most likely have to record an approximate measurement, rounding to the nearest $\frac{1}{2}$ foot or yard. For example, an object measuring 29 inches would be recorded as 2 $\frac{1}{2}$ feet and $\frac{1}{2}$ yard.

Hand out student page A.91. Tell students to select 8 of the objects or distances from the list of 12 you posted and record them on their sheets. They should then measure each object or distance to the nearest $\frac{1}{2}$ inch, $\frac{1}{2}$ foot, and $\frac{1}{2}$ yard and record their measurements on the sheet. While students work on measuring the objects and distances they chose, observe the different approaches and strategies they use to complete the task.

Methods Students Might Use

- Measure each item three times, first in inches (ruler), next in feet (ruler), and finally in yards (yardstick).
- Use either a yardstick or ruler to measure only in inches, then calculate the measurements in feet and yards by applying the relationships between the measures.

[Source: [Connect to NCTM Standards 2000-Fourth Grade](#) Creative Publications, Inc. Pages 96-101]

A.88

- Select what they think is the most appropriate unit, then measure the item once. Convert to determine the other two measures.

ENCOURAGE STUDENTS TO COMMUNICATE with their partners and with other groups their strategies for completing their measurements. These strategies may change as they measure different objects and identify methods that are more accurate or seem more efficient. Regularly ask students, *What is the most appropriate measure for this object? Why?* Students should be using both their communication and their reasoning skills to choose appropriate measurement units and to discuss their strategies with each other.

After students have recorded their measurements, have student pairs share their results. When a particular object or distance yields differing student responses, select one pair of students to demonstrate their method for measuring this particular object or distance. Use this demonstration to lead students through a questioning process that helps them to reach consensus on the measurements. This is another area in which students will work with the standards of communication and reasoning and proof.

PAIR UP STUDENTS AGAIN, this time with new partners, and pass out student page A.92. Provide each pair with an inch/foot ruler and a yardstick. Explain that this time around, they are to first select what they feel to be the most appropriate unit of measure for the object or distance listed on the sheet, then measure and record their findings.

What Might Happen . . . What to Do	
Students might want to measure first, rather than determine which unit is most appropriate. Have students decide on a unit of measure before actually	conducting their measurements. Encourage them to look at the relative length of the object to select what they feel would be the best unit of measure.

GO OVER THE RESULTS of this measuring exercise with the entire class. Students may end up with slightly different measurements for some of the objects or distances (e.g., length of shoe), but there should be some consistency in their selection of the

[Source: Connect to NCTM Standards 2000-Fourth Grade Creative Publications, Inc. Pages 96-101]

A.89

most appropriate unit of measure. When students disagree on what is the most appropriate measure to use for a particular object or distance, encourage them to explain their reasoning. Although there are no single “correct” units of measure for a given object or distance, students should be able to explain why the unit of measure they selected makes the most sense to them.

Conclude the lesson by having students share their responses to the question at the bottom of page A.92 and discuss the reasoning behind their responses.

Student Pages

Student page A.91 provides a place for students to list the eight objects or distances they choose for this activity. They also record their measurements for three different units of measurement to the nearest $\frac{1}{2}$ unit. Student page A.92 instructs students to choose the most appropriate unit of measure and then find the actual measurements of ten objects and distances. The final written question assesses students’ ability to apply their understanding to a relevant, real-world example.

Assessment

You observed students as they completed measurement tasks using units of length. You listened to them communicate their understandings and strategies. You listened to their reasoning as they described which unit of measure was most appropriate for a given situation. You then assessed their ability to transfer this reasoning process to a new situation where they first selected an appropriate unit of measure, then measured ten different objects or distances.

NCTM Standards Summary

In this lesson, students conducted measurements of several different objects and/or distances using inches, feet, and yards. They first looked closely at each of these measures to identify how they are related to one another. They then applied reasoning and proof to determine the most appropriate unit of measurement for a particular measuring task. They communicated their reasoning process and the results they obtained and used what they learned from these discussions to adapt their own strategies and methods.

Answers

Page A.91

Student choices of objects or distances to measure will vary.

Page A.92

1. Feet or inches
2. Inches
3. Feet or inches
4. Feet or yards
5. Inches
6. Feet or yards
7. Feet or yards
8. Feet or inches
9. Feet or inches
10. Inches or feet
11. Feet. Most pool depths are between 3 and 10 feet. This is too many for inches and too few for yards.

A.90

Name _____

Understanding Inch, Foot, and Yard

Measurement Hunt

Select 8 objects or distances from the class list to measure.

Write each object or distance you choose in the first column.

Record your measurements in each unit, then circle what you think is the most appropriate measure.

Object	Length in Inches	Length in Feet	Length in Yards	Most Appropriate Measure
				in. ft yd
				in. ft yd
				in. ft yd
				in. ft yd
				in. ft yd
				in. ft yd
				in. ft yd
				in. ft yd

Name _____

Understanding Inch, Foot, and Yard

Using Appropriate Measures

Circle the most appropriate measure, then measure each object or distance and record your results.

Object	Most Appropriate Measure			Actual Measurement (to nearest $\frac{1}{4}$ unit)
1. Height of student desk	in.	ft	yd	
2. Length of shoe	in.	ft	yd	
3. Height from heel to knee	in.	ft	yd	
4. Distance across classroom	in.	ft	yd	
5. Length of index finger	in.	ft	yd	
6. Width of chalkboard	in.	ft	yd	
7. Distance from desk to door	in.	ft	yd	
8. Height of chair seat	in.	ft	yd	
9. Length of arm span	in.	ft	yd	
10. Width of math book	in.	ft	yd	

11. Which would be the best unit for measuring the depth of water in a swimming pool?

Explain your reasoning.

[Source: [Connect to NCTM Standards 2000-Fourth Grade](#) Creative Publications, Inc. Pages 96-101]