

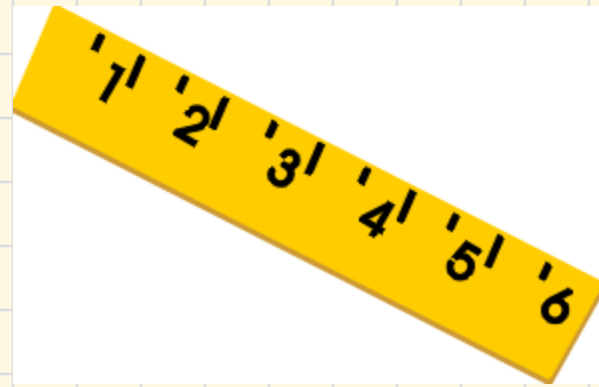
PLC Resource Cover Sheet

Reading Fractions on a Ruler: Measuring in Inches

Type of Material:					
X	Lesson		Resource		Other (please specify)
Title & Names of Attached Files:					
PowerPoint – Reading Fractions on a Ruler: Measuring in Inches					
Program Area(s):					
Any program that uses measurement to fractions of inches.					
X	Autobody/Collision Repair	X	Commercial Art	X	Electrical
X	Automotive Technology		Cosmetology		Health / Medical
X	Carpentry		Culinary	X	Welding
	Other (please specify):				
Task/Competencies and/or Academic Skills Addressed in Lesson/Resource(s):					
Math – reading a ruler to sixteenths, ordering fractions on a number line.					
CC.2.1.HS.F.5 – Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.					
Description (for Lessons):					
Reading Fractions on a Ruler: Measuring in Inches					
Objective(s):	Place Fractions on a Number Line. Estimate an inch. Read a ruler with halves, fourths, eighths, and sixteenths.				
Summary of Lesson:	<p>PowerPoint slides to drive the lesson:</p> <p>Part 1 – Understanding the Fractions of an Inch Each student will tear up a rectangle sheet of construction paper into halves, then quarters, then eighths, and finally sixteenths. Instructor leads the activity and tears up a sheet as an example. Using the pieces as a manipulative, the instructor asks student to show a variety of fractions by displaying the pieces of construction paper (1/2, 1/4, 3/4, 3/8, 5/16, etc.).</p> <p>Part 2 – Make a Fractional Inch Fractions on a number line –Teacher Demonstration, students create a number line on card stock strips and label indicated fractions.</p> <ol style="list-style-type: none"> 1. Use the black marker and draw a number line and label the left end “0” and the right end “1”. 2. Use another color, cut the number line in half and label, 0/2, 1/2, and 2/2 3. Use another color, cut each section in half and label 0/4, 1/4, 2/4, 3/4, and 4/4 4. Use another color, cut each section in half and label 0/8, 1/8, 2/8, etc. to 8/8. 5. Use another color, cut each section in half and label 0/16, 1/16, 2/16, etc. to 16/16. <p>Discussion Questions – orally as a class, in a pair or group; written in a journal individually or partners, etc.</p> <ol style="list-style-type: none"> 1. What patterns do you see on the number line? 2. How did you use the pattern to know what fraction came next? 3. Is there a relationship between the denominator of the fraction and number of sections between 0 and 1? 4. What information does the numerator of a fraction give us? For example, 5/8? 4/16? 1/2? 5. Do any of the fractions fall on the same place on the number line? Why? 6. Where would fractions like: 2/2, 4/4, 8/8, fall on the line? How do we explain this? Do you know any other fractions that would be in the same spot? 7. What other fractions could be in the 1/2 spot? What would happen to the 				

	<p>number of sections?</p> <p>8. What do you know about fractions that fall beyond 1 on the number line? How are they similar and different to the ones between 0 and 1?</p> <p>9. What do you know about the fractions between 2 and 3?</p> <p>10. How many fractions are there on the number line?</p> <p>Part 3 – Estimating an Inch – How big is an inch?</p> <p>Part 4 – Measuring Inches and Fractions of Inches. “How to Read a Ruler” video: http://www.youtube.com/watch?feature=player_embedded&v=f0t0WPHcHUg</p> <p>Discussion Questions – instructor preference for method (oral, written, individual, pair, group, class, etc.):</p> <ol style="list-style-type: none"> 1. How did the video describe the “little lines” on the ruler? 2. Which is a correct measurement – 4/8 inch or 1/2” ? Explain your answer! 3. How is the ruler similar to the fractional number line that you made? <p>Part 5 – Practice using materials that meet the needs of your trade.</p>
Materials, Resources & Technology Needed:	<p>Computer for presentation, student computers, PPT slide presentation: “Reading Fractions on a Ruler”, construction paper, card stock, thin markers, rulers, instructor chosen worksheets and homework with answer keys.</p> <p>Practice reading a ruler using handout worksheets. Create your own to meet the needs of your industry or students. http://www.math-aids.com/Measurement/ http://www.math-drills.com/measurement.shtml#length</p> <p>Ruler Game – http://www.rulergame.net/ (Score goal 1000).</p> <p>Optional - Master Ruler and associated workbook: http://www.themasterruler.com/ The master ruler, materials, ordering information and cost are described on this website.</p>
Assessment of Knowledge / Skill Attainment:	Exit Ticket – written as Focus Free Write or Collins Type 1; Choose a common measuring task from your program area. Describe how you will use the ruler to measure accurately. Teacher choice.
Time needed to complete the lesson:	90 minutes+ overall depending on worksheets and students initial skill level, but can be broken into sections for shorter time periods.
Developed By/Contact Information:	
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Submitted/Updated:	
www.careertechpa.org	
Notes/Comments:	

NOTE: This material was submitted in conjunction with the BCTE PLCs for purposes of colleague sharing and may not be officially endorsed or approved by PDE.

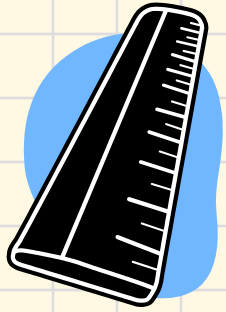


Reading Fractions on a Ruler



Measuring in Inches

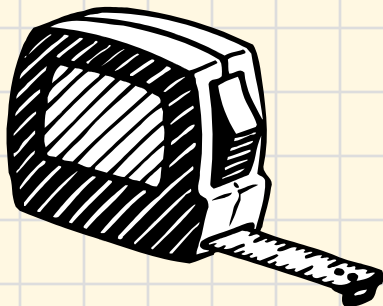




Rationale



- Many professions use rules, rulers or tape measures for measurement.
- Standard Rulers are divided into quarters, halves, eighths, and, sometimes, sixteenths.
- Precision measurement is the standard for quality work.



Objectives

- Place Fractions on a Number Line
- Estimate an inch
- Read a ruler with halves, fourths, eighths, and sixteenths.



Get the Goof

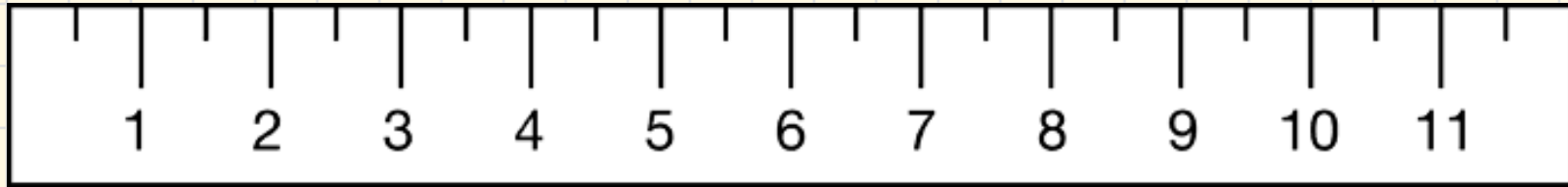
- Joe, Mike, John, and Mary were measuring the length of a _____. Joe said the length was 2 ft 16 ½ in. Mike said the length is 3 ft 4 and 4/8ths inches. John said the length was 3 ft, 3 and 3/2 inches. Mary said the length is 3 ft 4 ½ inches. The instructor said Mary was correct. Where is the “goof” in the other measurements?
- Name some other measurements that would be “accurate, but wrong”.



Tear up a Rectangle

- Tear a sheet of construction paper into halves, quarters, eighths, and sixteenths.
- Notice the size of each rectangle.
- Recombine to make various fractions of an inch ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{5}{16}$, etc.)



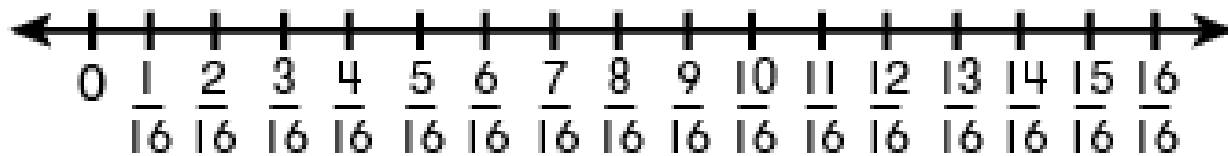
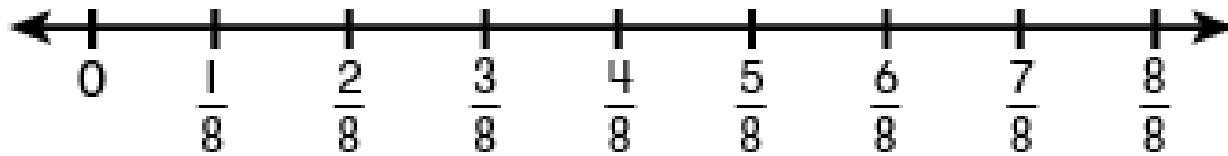
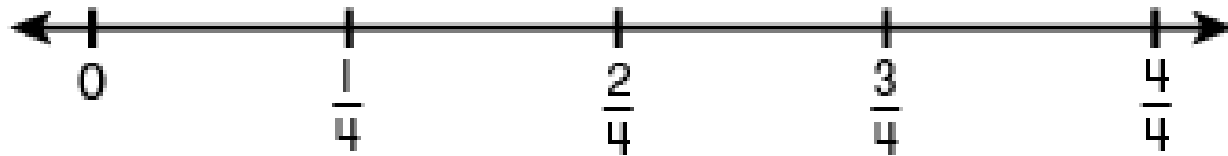
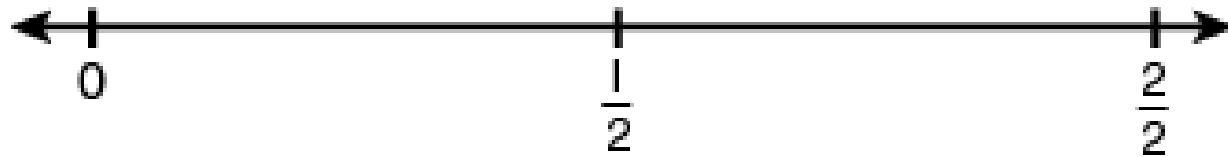


Demonstration using card stock strip and markers (one black and 4 colors)

MAKE A FRACTIONAL INCH



Inches can be divided into fractional parts



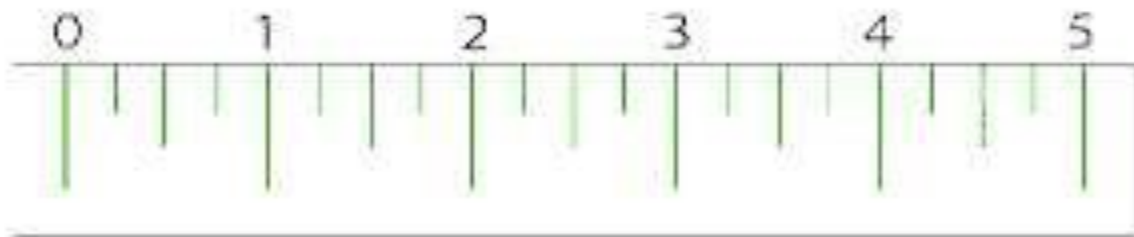
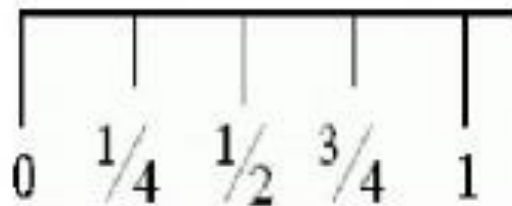
Teacher Demo Slide #1

1. Use the black marker and draw a number line and label the left end “0” and the right end “1”.
2. Use another color, cut the number line in half and label, $0/2$, $1/2$, and $2/2$



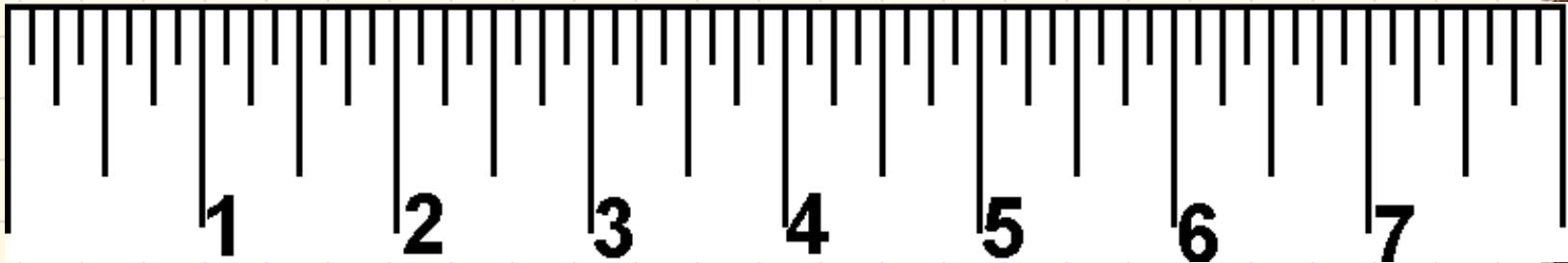
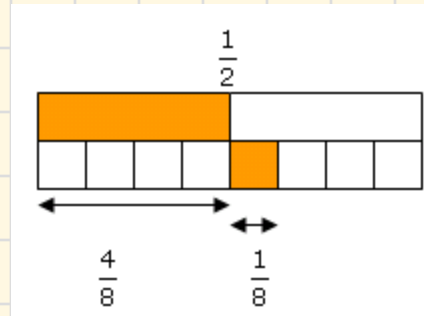
Teacher Demo Slide # 2

- Use another color, cut each section in half and label $0/4$, $1/4$, $2/4$, $3/4$, and $4/4$

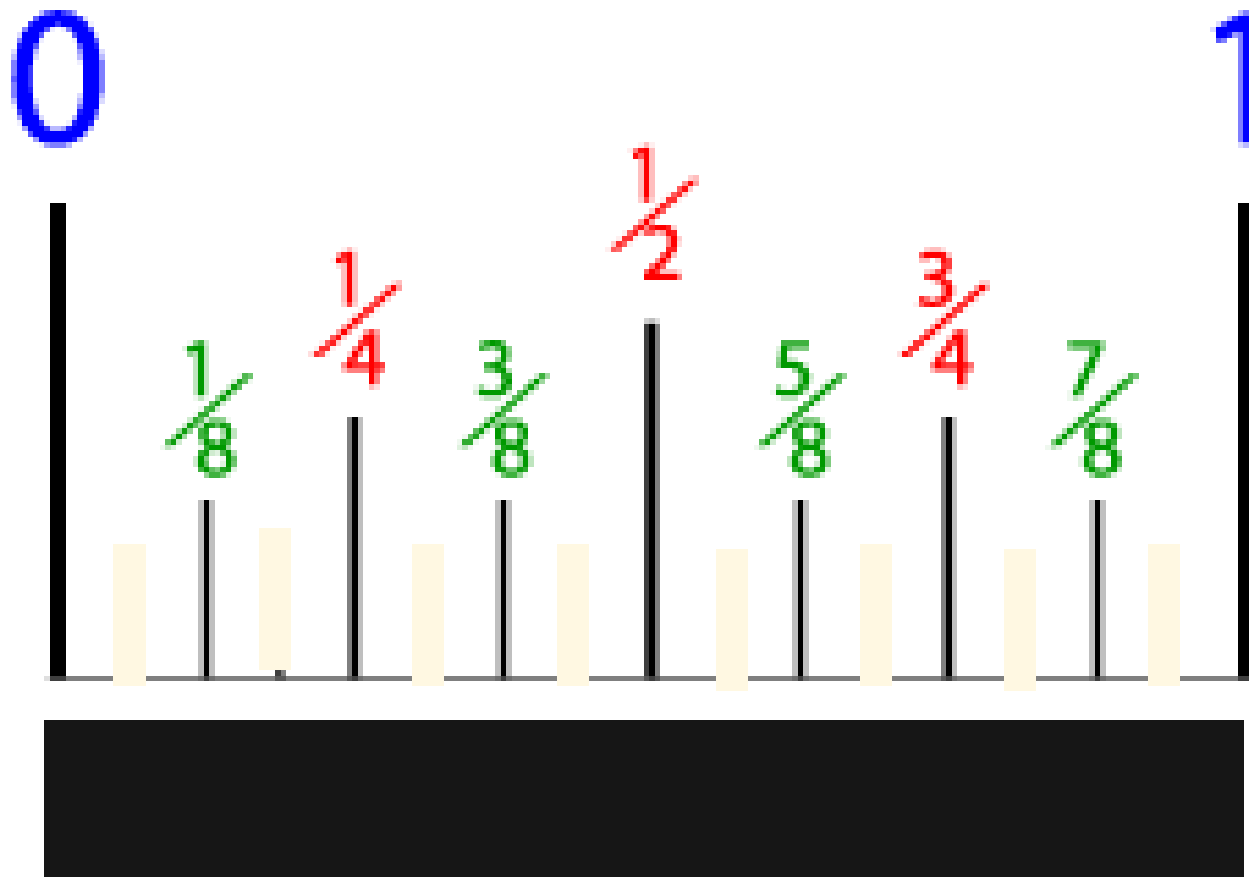


Teacher Demo Slide # 3

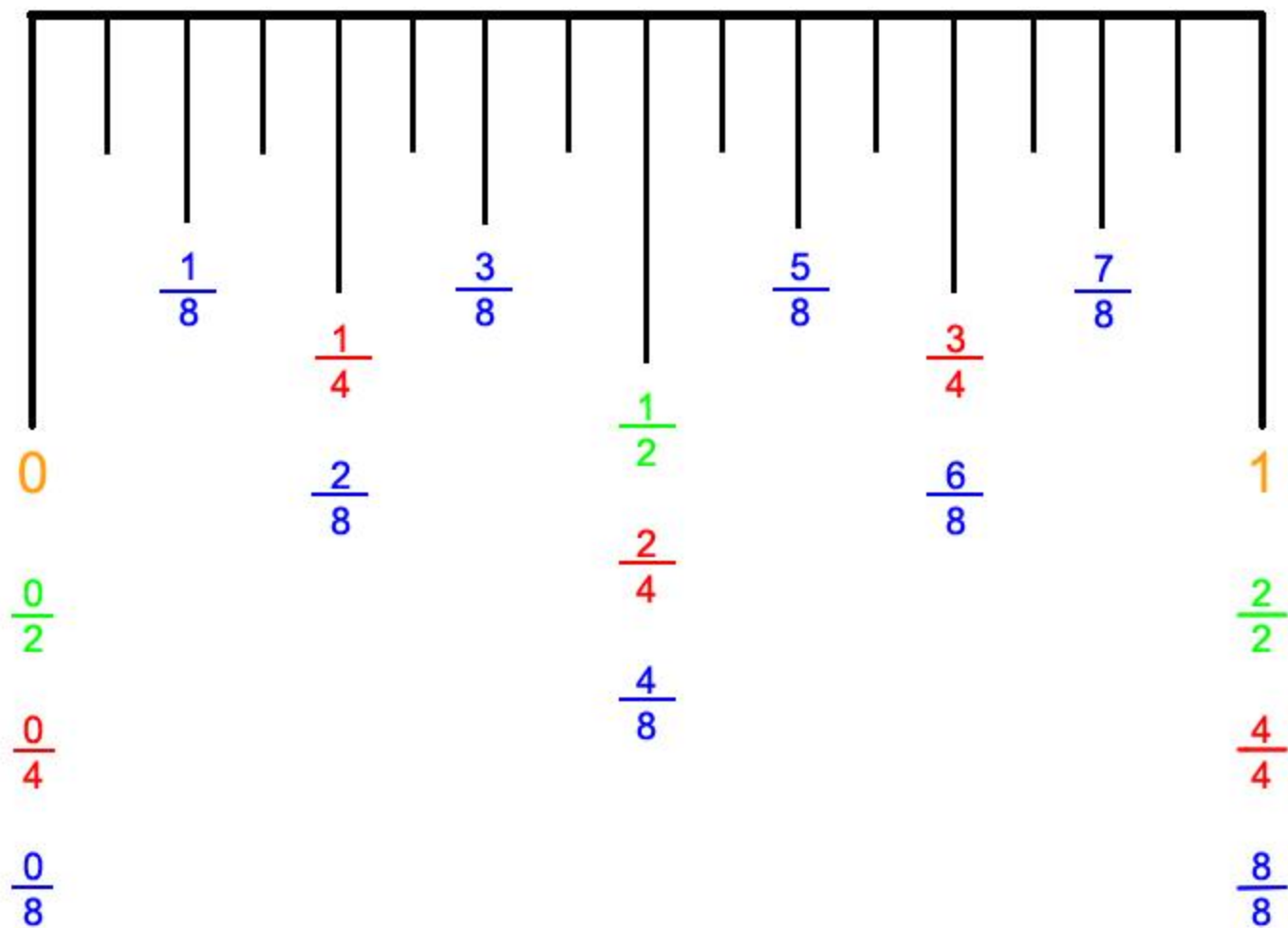
3. Use another color, cut each section in half and label $0/8$, $1/8$, $2/8$, $3/8$, $4/8$, $5/8$, $6/8$, $7/8$, and $8/8$.



Inch with Reduced Fractions

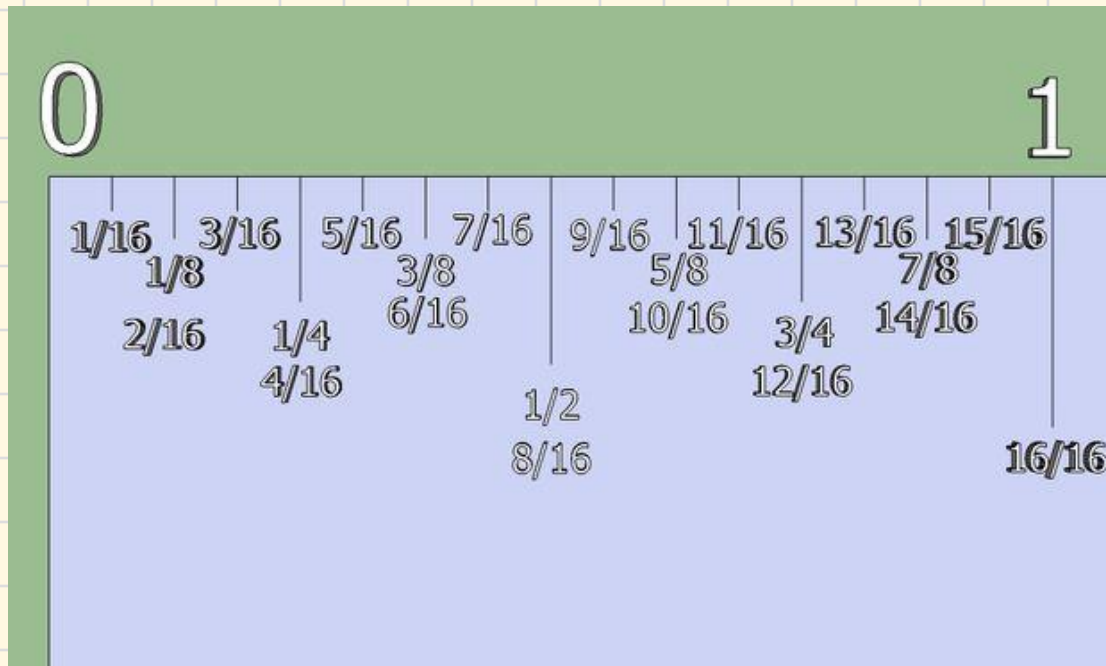


Reading a Ruler



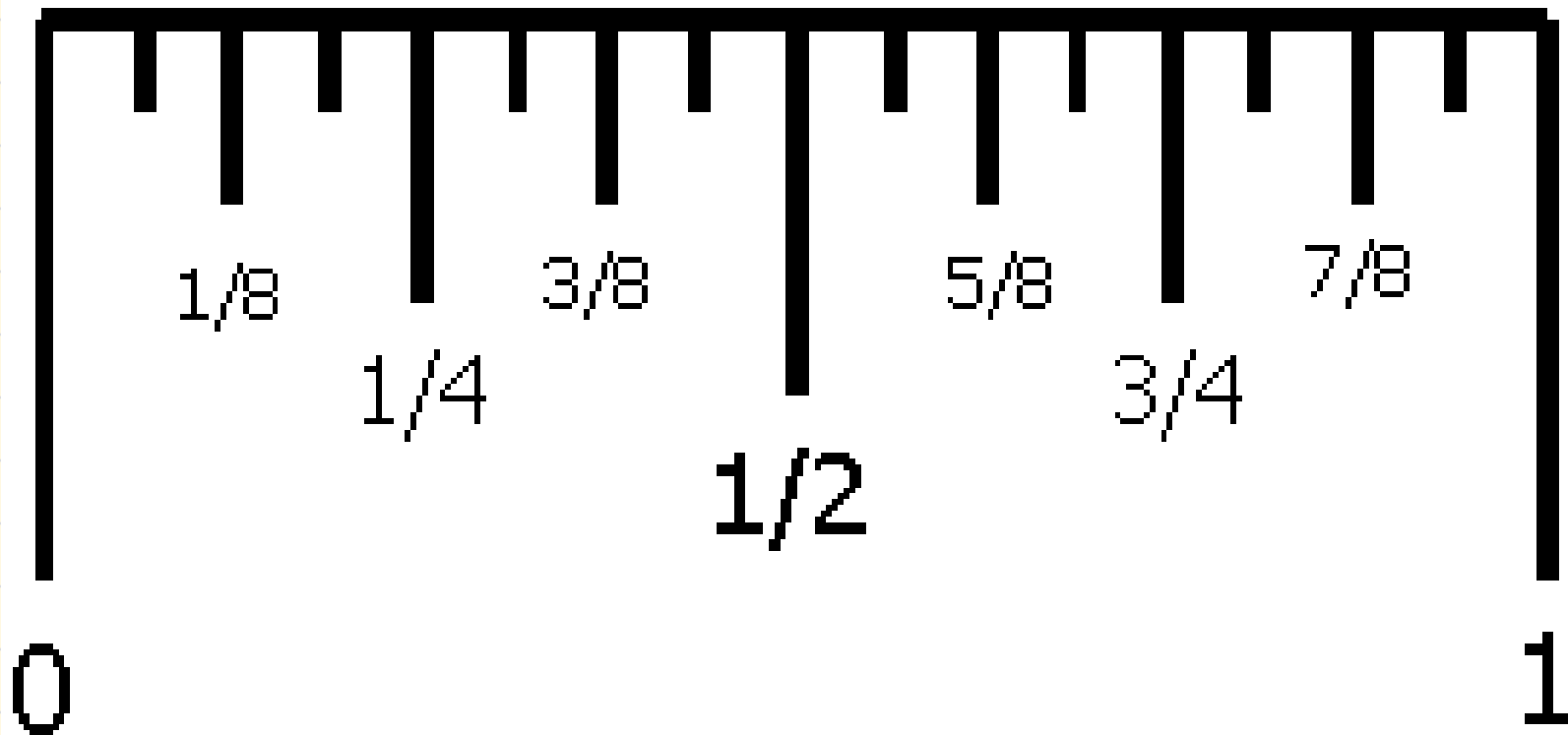
Teacher Demo Slide # 4

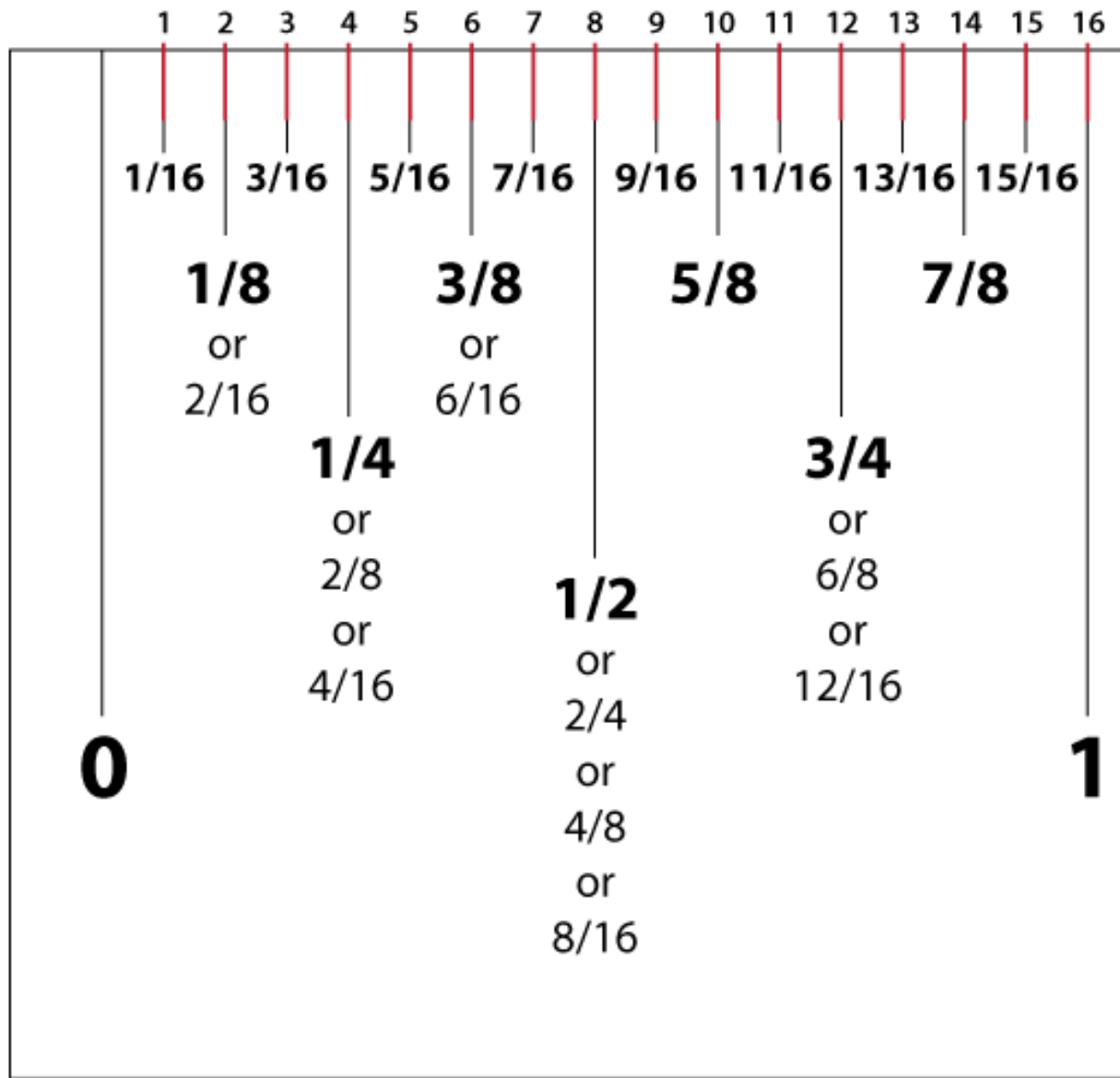
3. Use another color, cut each section in half and label $0/16$, $2/16$, $3/16$, $4/16$, $5/16$, $6/16$, $7/16$, $8/16$, $9/16$, $10/16$, $11/16$, $12/16$, $13/16$, $14/16$, $15/16$ and $16/16$.



Sixteenths

$1/16$ $3/16$ $5/16$ $7/16$ $9/16$ $11/16$ $13/16$ $15/16$





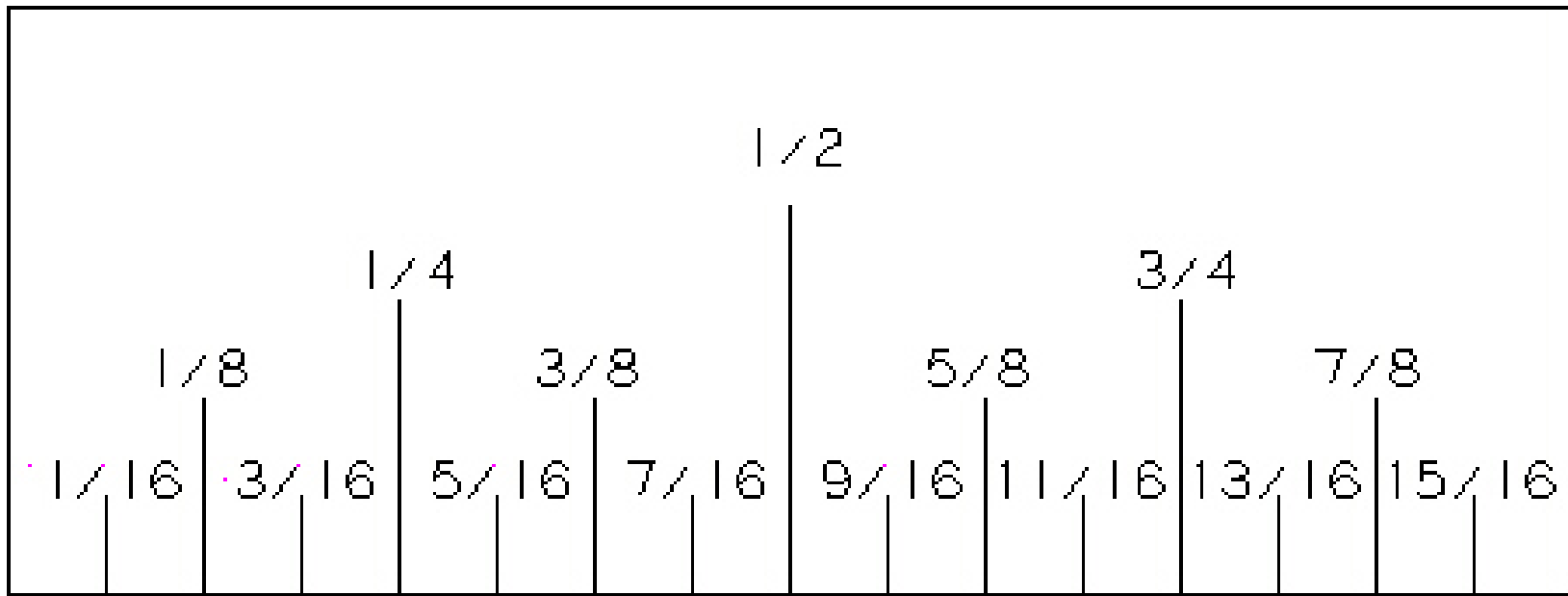
Finished Inch

Repeat the Demo!

- Repeat the demo and each student will make an oversized “Fractional Inch” of their own.
- Use a strip of card stock and four thin markers (black and 3 other colors)



The Fractional Inch!



Discussion Questions

1. What patterns do you see on the number line?
2. How did you use the pattern to know what fraction came next?
3. Is there a relationship between the denominator of the fraction and number of sections between 0 and 1?



Discussion Questions # 2

4. What information does the numerator of a fraction give us?

For example - $\frac{5}{8}$? $\frac{3}{4}$? $\frac{1}{2}$?

5. Do any of the fractions (such as $\frac{1}{2}$ and $\frac{2}{4}$) fall on the same place on the number line? Why?

6. Where would fractions like: $\frac{2}{2}$, $\frac{4}{4}$, $\frac{8}{8}$, $\frac{16}{16}$ fall on the line? How do we explain this? Do you know any other fractions that would be in the same spot?

Discussion Questions # 3

7. What other fractions could be in the $\frac{1}{2}$ spot?
8. What do you know about fractions that fall beyond 1 on the number line? How are they similar and different to the ones between 0 and 1
9. What do you know about the fractions between 2 and 3?
10. How many fractions are there on the number line?

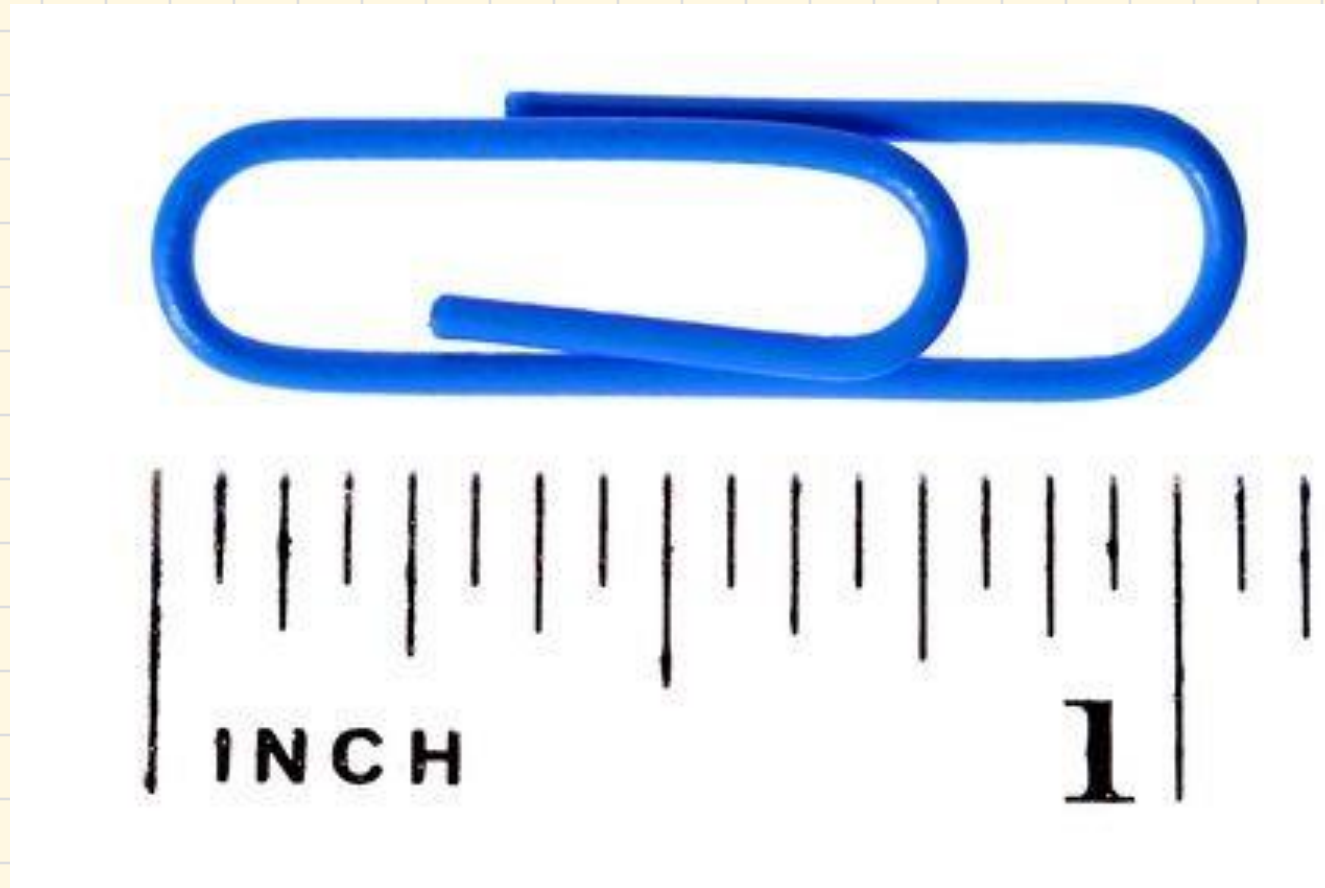




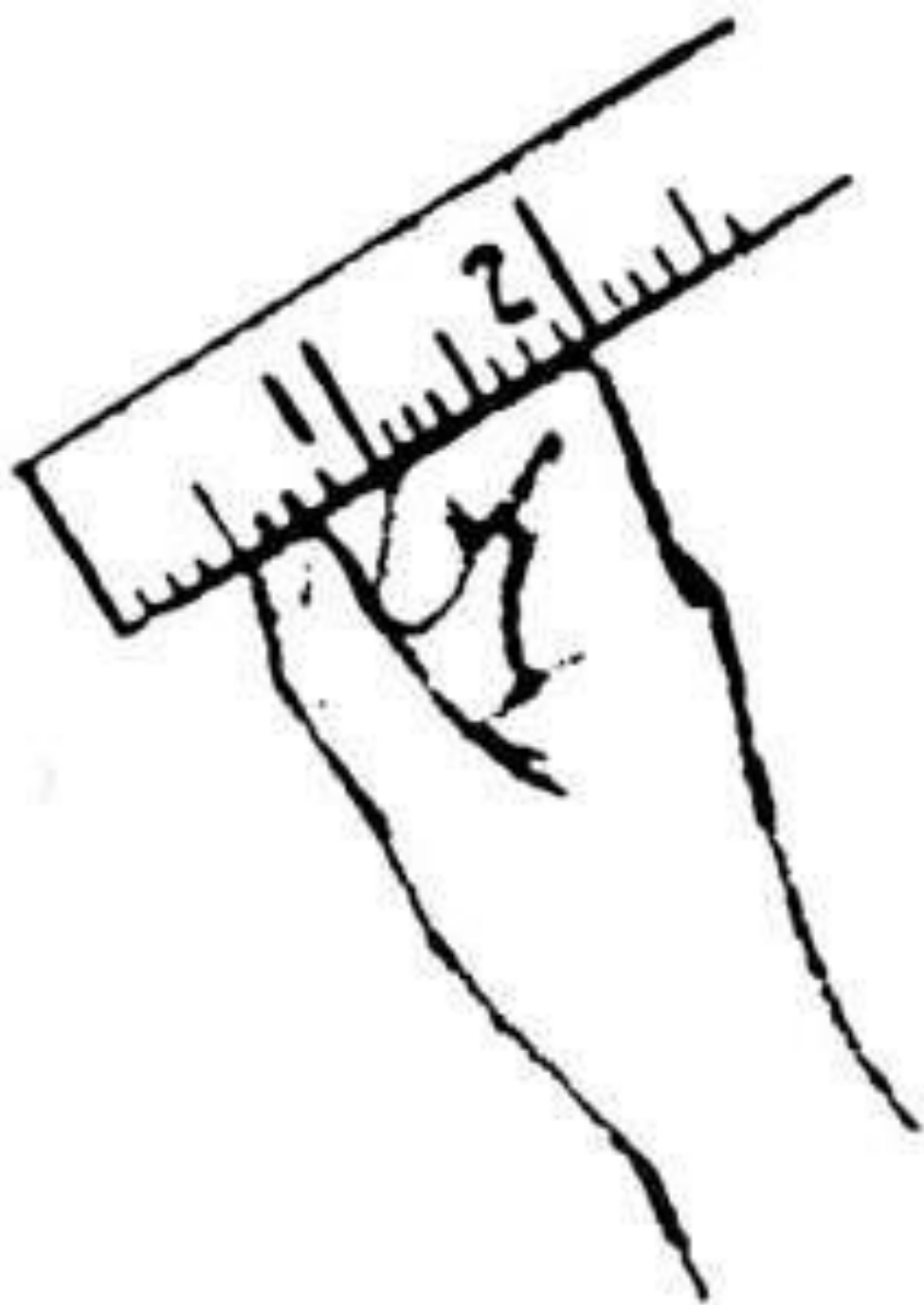
How do you estimate measurements?

ESTIMATING AN INCH

How much is an Inch?

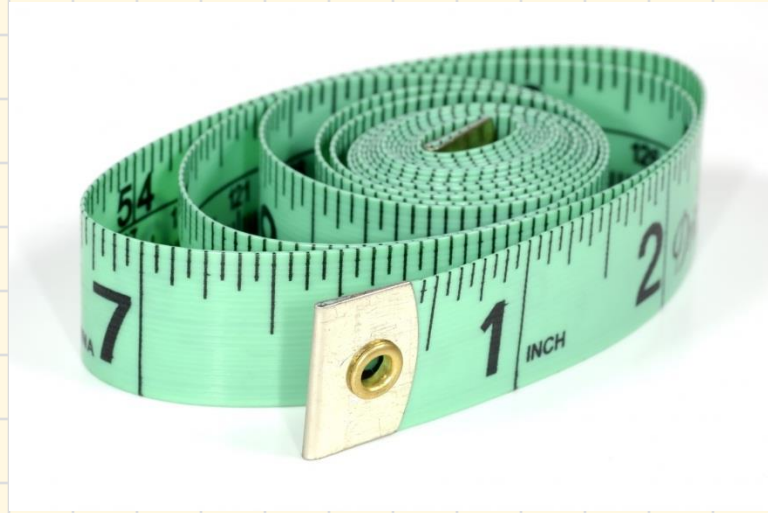


- A method to estimate the length of an inch
- How does your knuckle measure up?



1 inch = 2.54 cm





Using a ruler or tape measure

MEASURING INCHES AND FRACTIONS OF INCHES

How to Read a Ruler Video

http://www.youtube.com/watch?feature=player_embedded&v=f0t0WPHcHUg



Video Discussion Questions

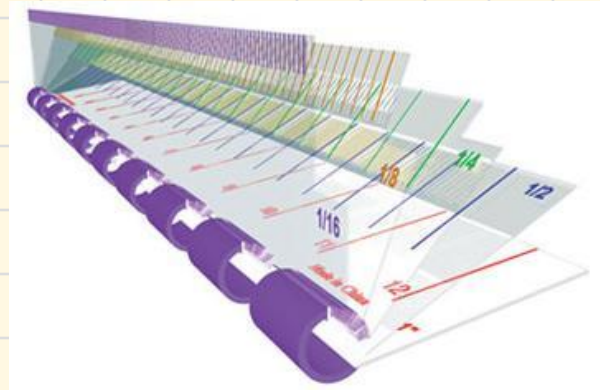
1. How did the video describe the “little lines” on the ruler?
2. Which is a correct measurement – $\frac{4}{8}$ inch or $\frac{1}{2}$ ” ? Explain your answer!
3. How is the ruler similar to the fractional number line that you made?



Practice Reading a Ruler

- Complete the handouts using a standard ruler or tape measure.
- Ruler Game – <http://www.rulergame.net/>
score goal 1000
- The Master Ruler

THE RULER GAME



Tape Measure Example –

What does the “24”
under the 2 F mean?



What is the measure?



This is $\frac{1}{8}$ inch
8 eighths = one inch

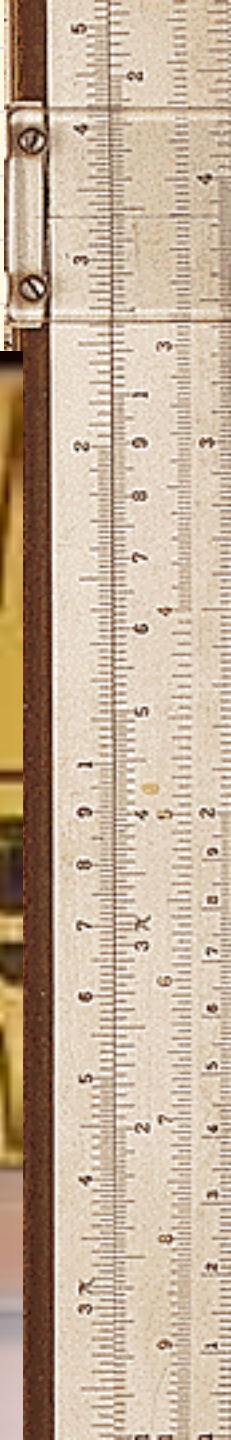


What is the measure?



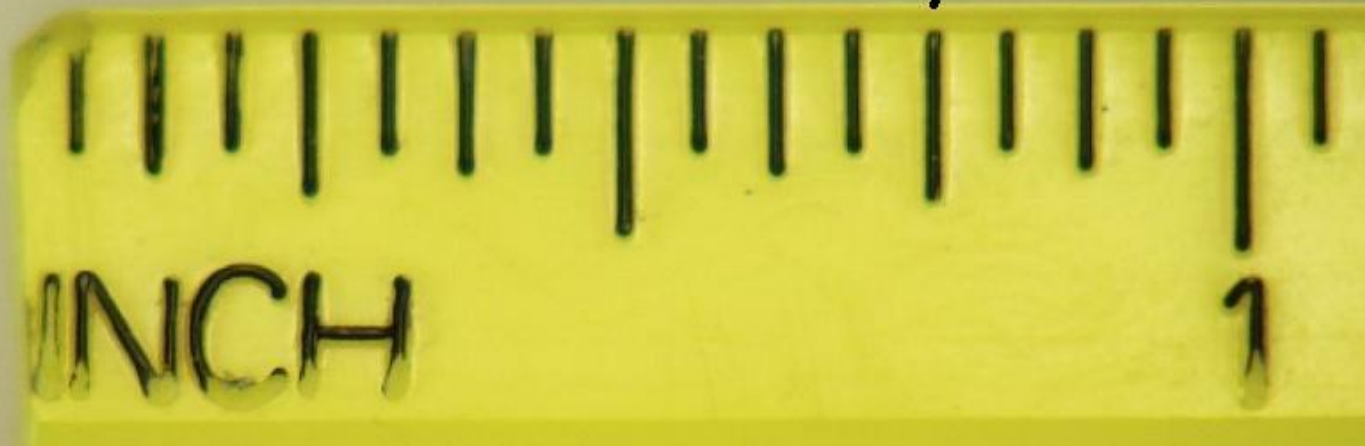
What is the measurement?

$5 \frac{1}{4}$



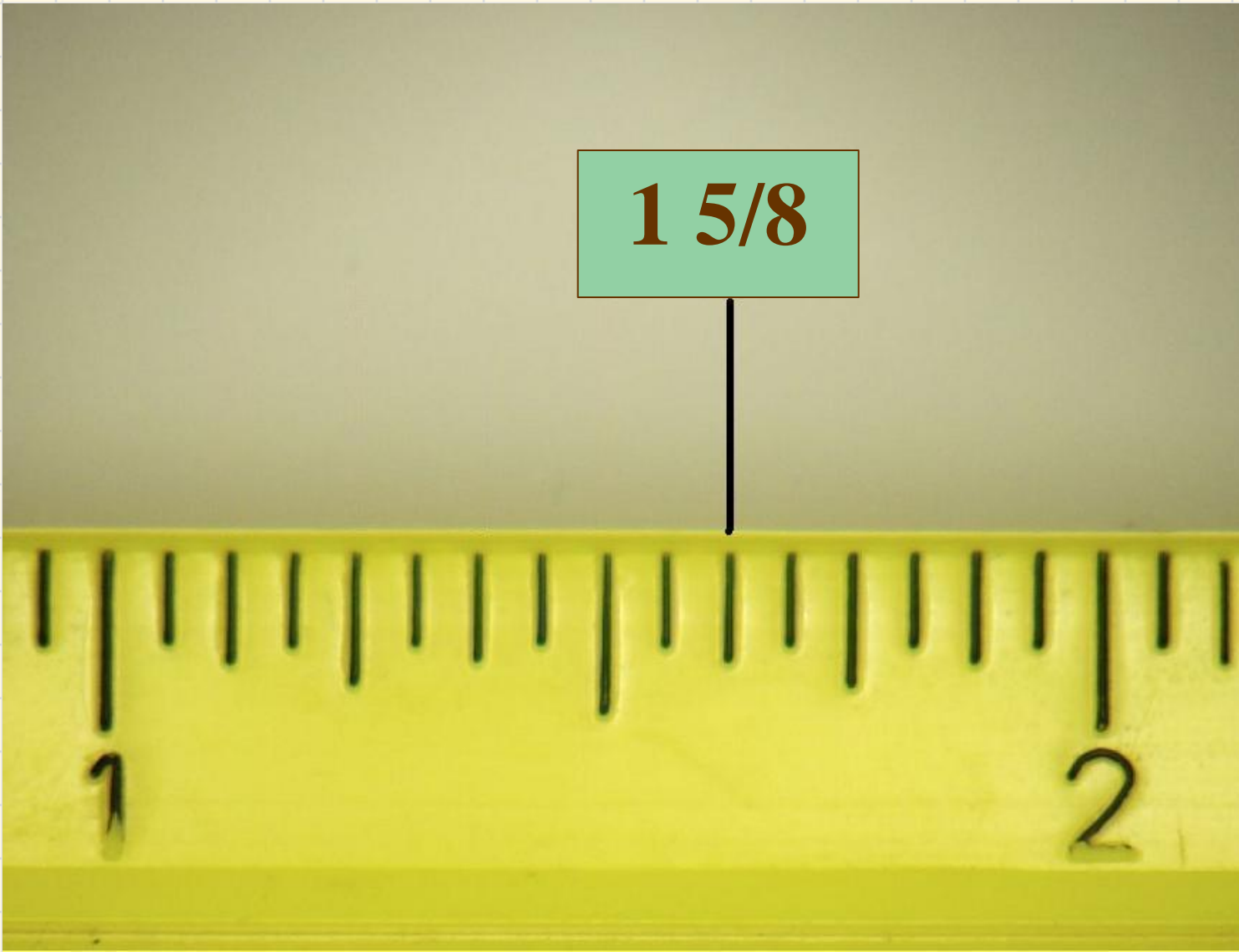
What is the measure?

$\frac{3}{4}$



What is the measure?

$1 \frac{5}{8}$



Class Debriefing

- Fractions that are part of the inch:
 - Sixteenths: $1/16$, $3/16$, $5/16$, $7/16$, $9/16$, $11/16$, $13/16$, $15/16$
 - Eighths: $1/8$, $3/8$, $5/8$, $7/8$, $9/8$
 - Quarters: $1/4$, $3/4$
 - Halves: $1/2$
- Reading a ruler using the fractions of an inch



Exit Ticket

- Choose a common measuring task from your program area. Describe how you will use the ruler to measure accurately.

