4-13: Learning Goals

- Let's use percentages to describe how accurately we can measure.

4-13-1: Measuring to the Nearest

Your teacher will give you two rulers and three line segments labeled A, B, and C.

1. Use the centimeter ruler to measure each line segment to the nearest centimeter. Record these lengths in the first column of the table.

2. Use the millimeter ruler to measure each line segment to the nearest tenth of a centimeter. Record these lengths in the second column of the table.

line segment	length (cm) as measured with the first ruler	length (cm) as measured with the second ruler
A		
B		
C		

A —————————————————————

B —————————————————————

C —————————————————————
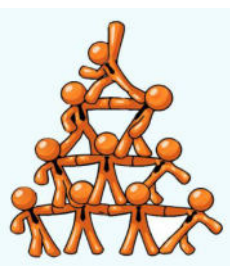
4-13-2: Measuring a Soccer Field

A soccer field is 120 yards long. Han measures the length of the field using a 30-foot-long tape measure and gets a measurement of 358 feet, 10 inches.

1. What is the amount of the error?

2. Express the error as a percentage of the actual length of the field.

4-13-3: Measuring Your Classroom

Your teacher will tell you which three items to measure. Keep using the paper rulers from the earlier activity.

1. Between you and your partner, decide who will use which ruler.

2. Measure the three items assigned by your teacher and record your measurements in the first column of the appropriate table.

Using the cm ruler:

item	measured length (cm)	actual length (cm)	difference	percentage

Using the mm ruler:

| item	measured length (cm)	actual length (cm)	difference	percentage

3. After you finish measuring the items, share your data with your partner. Next, ask your teacher for the actual lengths.

4. Calculate the difference between your measurements and the actual lengths in both tables.

5. For each difference, what percentage of the actual length is this amount? Record your answers in the last column of the tables.

4-13: **Lesson Synthesis**

- What is measurement error? What causes measurement error?

- How can we minimize the amount of error?

- What is the relationship between measurement error and percent error?
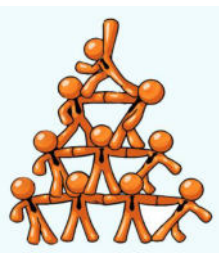
4-13: measurement error

Measurement error is the positive difference between a measurement of a quantity and the actual quantity. It is often expressed as a percentage of the actual value. For example, if we get 6 cm when we measure a line that is actually 6.2 cm long, then the measurement error is 0.2 cm and the percent error is 3.2%, because 0.2÷6.2=0.032.

4-13: **Learning Targets**

- I can represent measurement error as a percentage of the correct measurement.

- I understand that all measurements include some error.

4-13-4: **Shoes on Sale**

Clare estimates that her brother is 4 feet tall. When they get measured at the doctor's office, her brother's actual height is 4 feet, 2 inches.

1. Should Clare's or the doctor's measurement be considered the actual height? Explain your reasoning.

2. What was the error, expressed in inches?

3. What was the error, expressed as a percentage of the actual height?