name:	date:	#:

Meter Stick Building

Estimate:

1) Object being estimated: _____ Your fraction estimate: _____

2) Why was it difficult to compare your estimate with your classmates? Why would it be difficult to find who had the closest estimate?

_____

_____

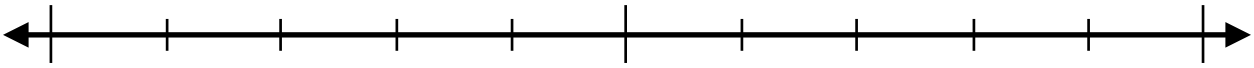
_____

_____

3) With your meter paper marked, estimate the length of the object to the nearest tenth. Write this as both a fraction and a decimal.

4) Estimate in fraction form: _____ Estimate in decimal form: _____

5) Color parts of the diagram below to represent your estimate:



6) How many parts did you color? _____ What is the length of each part? _____

7) Write these two numbers next to each other using multiplication: _____
This is a third equivalent way to write your estimate.

8) After measuring, what is the length of the object to the nearest tenth? _____

9) How many tenths was your estimate away from the measured length? (Answer in a complete sentence.)

_____

name:	date:	#:

10) How many parts does your meter strip have now? _____

11) What are the two ways to write the name of these little parts? _____ _____

12) Estimate the length of the object to the nearest hundredth. Write this as both a fraction and a decimal.

13) Estimate in fraction form: _____ Estimate in decimal form: _____

14) Put a pencil mark on your paper strip at your estimate.

15) Count from the 0 end of the strip. How many complete tenths are there before you get to your estimate? _____ How many extra hundredths? _____

16) Write the number of tenths x $\frac{1}{10}$ plus the number of extra hundredths x $\frac{1}{100}$:

_____

This is a third equivalent way to write your new estimate.

17) After measuring, how long is the object to the nearest hundredth? _____

18) How many hundredths off was your estimate? (Answer in a complete sentence.)

_____

_____

19) Compare your paper strip to a meter stick. What does the meter stick have that your paper strip does not?

_____

_____

20) How many parts are there on the meter stick? _____

21) What are each of these parts called? _____

name:	date:	#:

22) Estimate the length of the object to the nearest thousandth. Write this as a decimal and a fraction. Label each place value in the decimal.

0 . ____ ____ ____ ____

23) Write in words how we would read the fraction above:

_____

This is the same way that we read the decimal above.

24) What do you notice about which place value we say when we are reading a decimal?

_____

_____

_____

25) After measuring, how long is the object to the nearest thousandth? Write the length here and label each of the place values.

0 . ____ ____ ____

26) How many thousandths off was your estimate? (Answer in a complete sentence.)

_____

_____

Teacher Directions: Meter Stick Building

Materials:

- Meter-long Strips of Paper, about 3-4 cm wide. (These can be cut from butcher paper.)
- Index Cards, cut to 10 cm long & unmarked (at least 1 per pair of students)
- Index Cards, cut to 10 cm long with 1 cm marks (at least 1 per pair of students)
- A carefully selected object to be measured that is in between 0.6 and 1 m. It is best if the object has a well defined length (not flexible/changeable). It is better if the object is clearly closer to a tenth measurement (not 0.65 m, for example).
- Meter Sticks (at least 1 per group, preferably 1 per pair)

Objective:

Students will develop an understanding of the first three decimal place values through the building of a meter stick and the estimation and measurement of an object to the tenths, hundredths, and finally thousandths.

Directions:

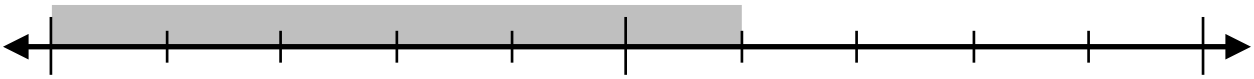
Give each student a meter strip of paper, telling them that this length is what we will call "one" today. Hold up the object that you have chosen to measure today and ask them how it compares to the length of 1 that they are holding. Hopefully they will respond that the object is less than 1 long, maybe more than ½. Ask students to use a fraction to estimate how long the object is. Give them a moment to think in silence, then discuss their estimate with students near them. Select students to say their fractions until you have several with different denominators. Ask how we could find out the length of the object and see who is closest. Lead the class to the realization that if we are each using different denominators it will be difficult to measure and compare how close we are.

Pass out the activity pages and have them record their fraction and some ideas from the class discussion about the difficulty of using different denominators.

Tell the class that we will all use tenths to estimate the object and to make it easier to visualize, you are giving them cards that are one tenth long. Ask them to use the cards to mark off all of the tenths on their long strip. Have them label the tenths using both decimal and fraction names.

Have students complete #3-#7 of the activity page.

Sample answer for 5) and 6):



How many parts did you color? ___6___ What is the length of each part? ___$^{1}/_{10}$___

In #7 we are looking for an expression similar to $7 \times \frac{1}{10}$.

As a class, possibly with many students coming up to the object to measure for themselves, come to an agreement about what is the nearest tenth for everyone to write in #8.

Before beginning the second page, ask the class if it was EXACTLY that many tenths. Since it was not, tell the class we want to be even more accurate. Ask for some suggestions about how to do this. Hopefully, you can get a response of dividing our "one" into more parts. To do this, give everyone a "tenth" card with 10 markings. Ask them to put these marks between each of their tenths on their strip. Ask them how many equal parts the whole is now divided into (ans: 100), and then have them label a few of the hundredths using both fraction and decimal names.

Repeat the process of what was done on page 1 with tenths, but now on page 2 with hundredths. Again, as a class, come to an agreement about what is the nearest hundredth for the length of the object.

Starting with problem 19, rather than put more marks on the strip of paper, hand each team or pair a meter stick for them to compare with their paper strips.

As we already know how long the object is to the nearest hundredth, the question would be to find its length to the nearest thousandth. The students will write their guess and label the place values in #22. They will also write this decimal as a fraction. The next questions are to point out how we read a decimal.

20) 1000
21) thousandths

SAMPLE ANSWERS for 22-26:
22) 0.635; 6 tenths, 3 hundredths, 5 thousandths; $^{635}/_{1000}$
23) six hundred thirty-five thousandths
24) We read the number, then the place value at which the digits end.

25) 0.629; 6 tenths, 2 hundredths, 9 thousandths
26) My estimate was 0.635 m, which was 6 thousandths more than the exact measurement of 0.629 m.

If there is time at the end of the class you could have students practice reading the length indicated by a spot on a meter stick that one of their teammates points to.