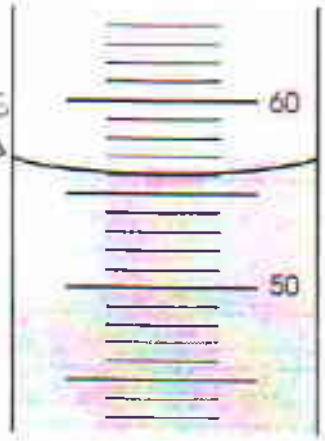
Name KEY Date ____/____/____ Period _____

Activity 1.2 Basic Lab Techniques Background

Measuring Liquid Volume Identify the volume indicated on each graduated cylinder. The unit of volume is milliliters (mL). The last digit or lowest place value should always be estimated.

MENISCUS

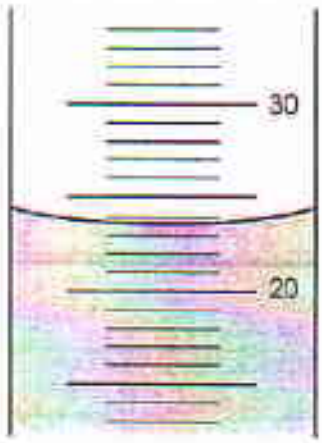


50
6

1. 56.0 mL (estimated)

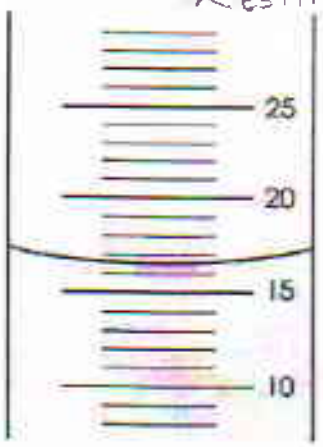
4
.3

4. 4.38 mL



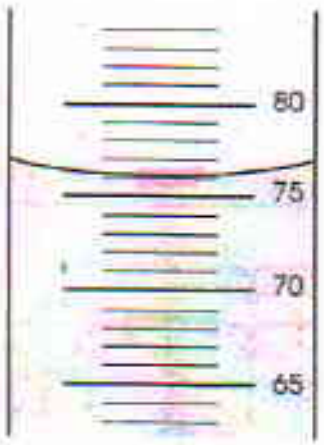
20
3

7. 23.8 mL



10
6

2. 16.7 mL (estimated)

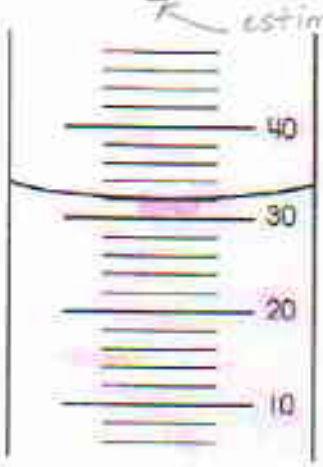


70
6

5. 76.1 mL

5
.3

8. 5.30 mL

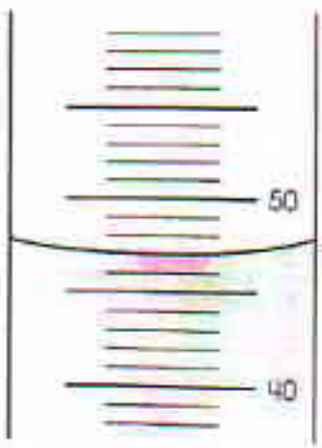


30
2

3. 32.0 mL

3
.5

6. 3.50 mL

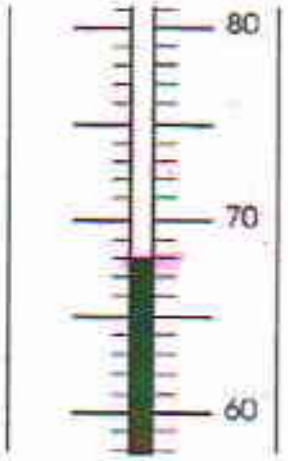


40
7

9. 47.0 mL

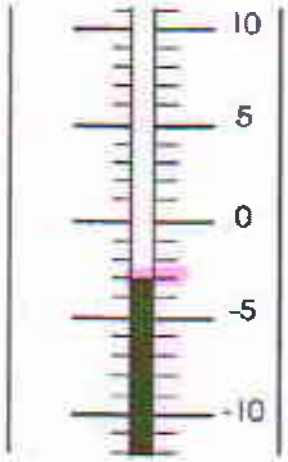
Reading Thermometers Identify the temperature indicated on each thermometer. Assume the units are in celsius (°C). The last digit or lowest place value should always be estimated.

60
8



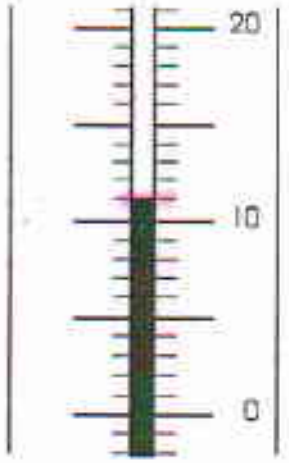
1. 68.0 °C

00
- 3



4. - 3.0 °C

10
1

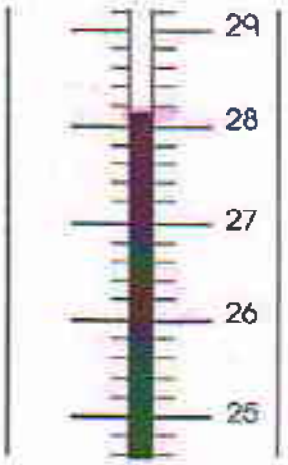


7. 11.0 °C

00
- 1

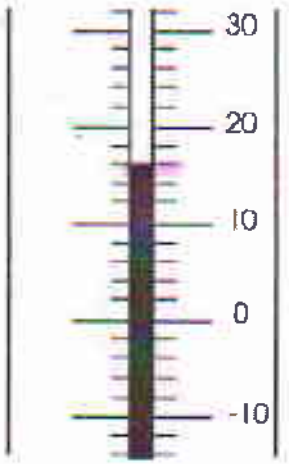
2. - 1.1 °C

20
8
.1



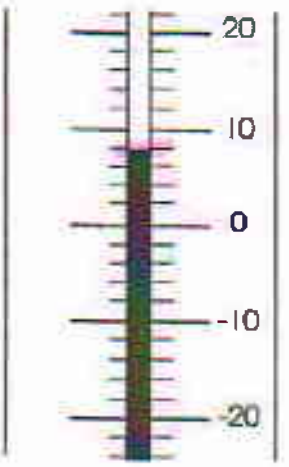
5. 28.10 °C

10
5



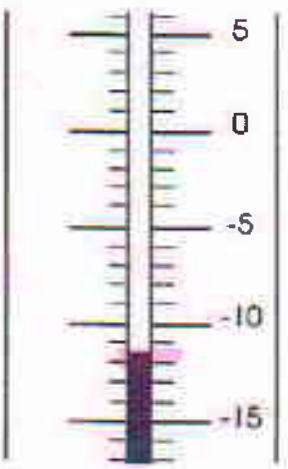
8. 15.9 °C

00
7



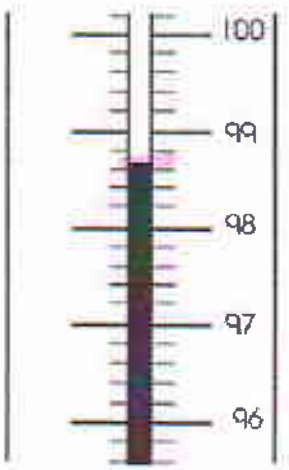
3. 7.9 °C

-10
- 1



6. - 11.5 °C

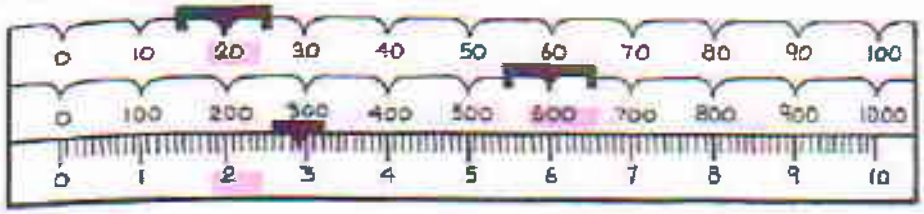
90
8
.6



9. 98.65 °C

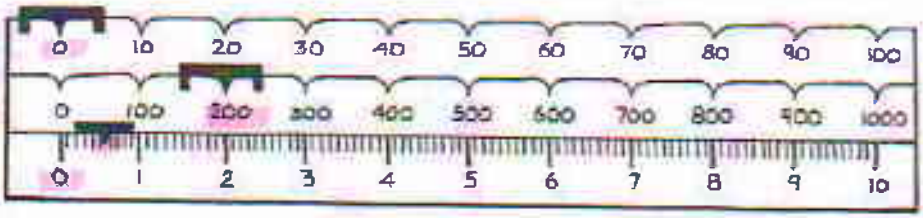
Reading a beam balance Identify the mass on each balance. Assume the units are in grams (g). The last digit or lowest place value should always be estimated.

Triple Beam Balance



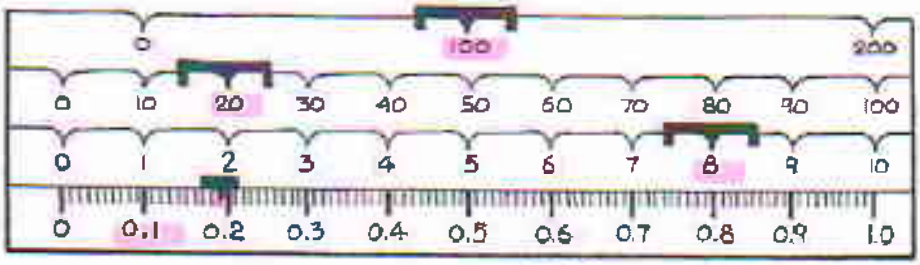
600
20
2
.8
628.89 g

100
50
3
.7
153.70 g

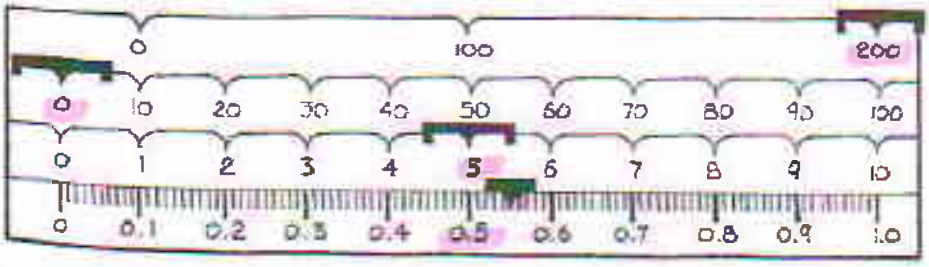


200
00
.5
200.55 g

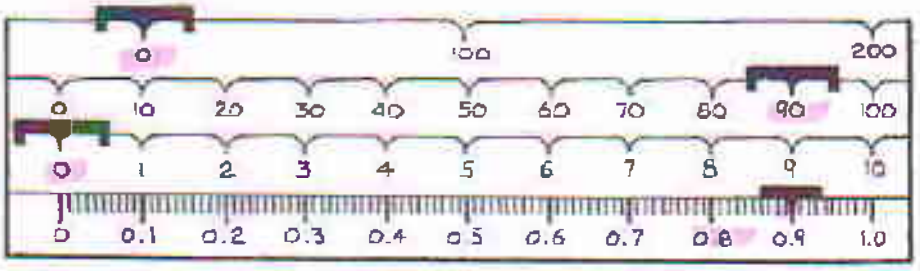
Four Beam Balance



100
20
8
.1
.09
128.191



200
00
5
.5
.05
205.550 g



000
90
0
.8
.0
.08
90.8089g

Pre-Lab 1.2 Recording Measurements with Accuracy

Objective

To relate the accuracy of the measurement being made to the instrument being used

Procedures

1. Measure the length (cm) of wooden cube using ruler 1

   Remember the last digit or lower place value should be estimated
2. Record the measurement in Data Table 1
3. Repeat Steps 1 and 2 with ruler 2 and ruler 3

Data Table 1

Equipment	**Ruler 1**	**Ruler 2**	**Ruler 3**
Length (cm)	2	1.8	1.90
Volume (cm^3)	8	5.832	6.859

Q1 Calculate the volumes of the wooden cube for each ruler.

Volume of cube = length x length x length = $(\text{length})^3$

$V = l^3 = l \times l \times l = 2 \times 2 \times 2 = 8$

When you are done, begin reading Activity 1.2 Basic Lab Techniques. The teacher will discuss the calculations below.

actual (also known as theoretical) volume of cube = 6.913 cm^3

$$\text{percent error} = \frac{\text{actual volume (mL)} - \text{experimental volume (mL)}}{\text{actual volume (mL)}} \times 100$$

Ruler 1 **Percent Error** $\frac{(6.913 - 8)}{6.913} \times 100 = -15.72\%$

Ruler 2 **Percent Error** $\frac{(6.913 - 5.832)}{6.913} \times 100 = 15.64\%$

Ruler 3 **Percent Error** $\frac{(6.913 - 6.859)}{6.913} \times 100 = 0.78\%$