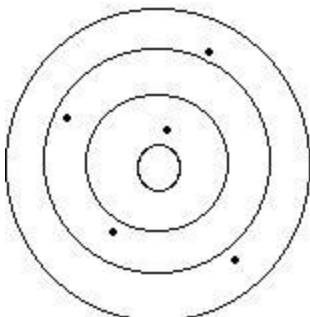# Introduction to Measurement

Schweitzer

Measurement basics

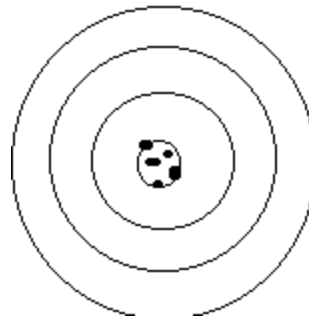- A measurement is only as good as the tool used to measure it.
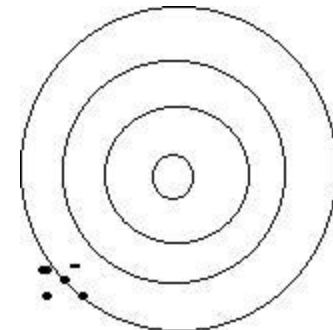
Accurate vs. Precise

- What is the difference between Accurate and precise?

  – Accurate is how close the measured value is to the actual value.

  – Precise is how close in proximity or value of several trials
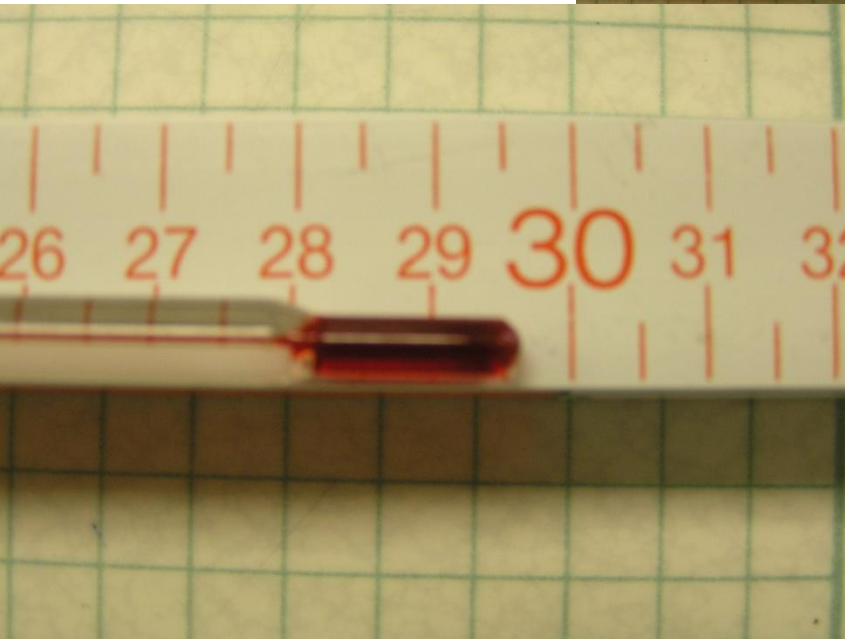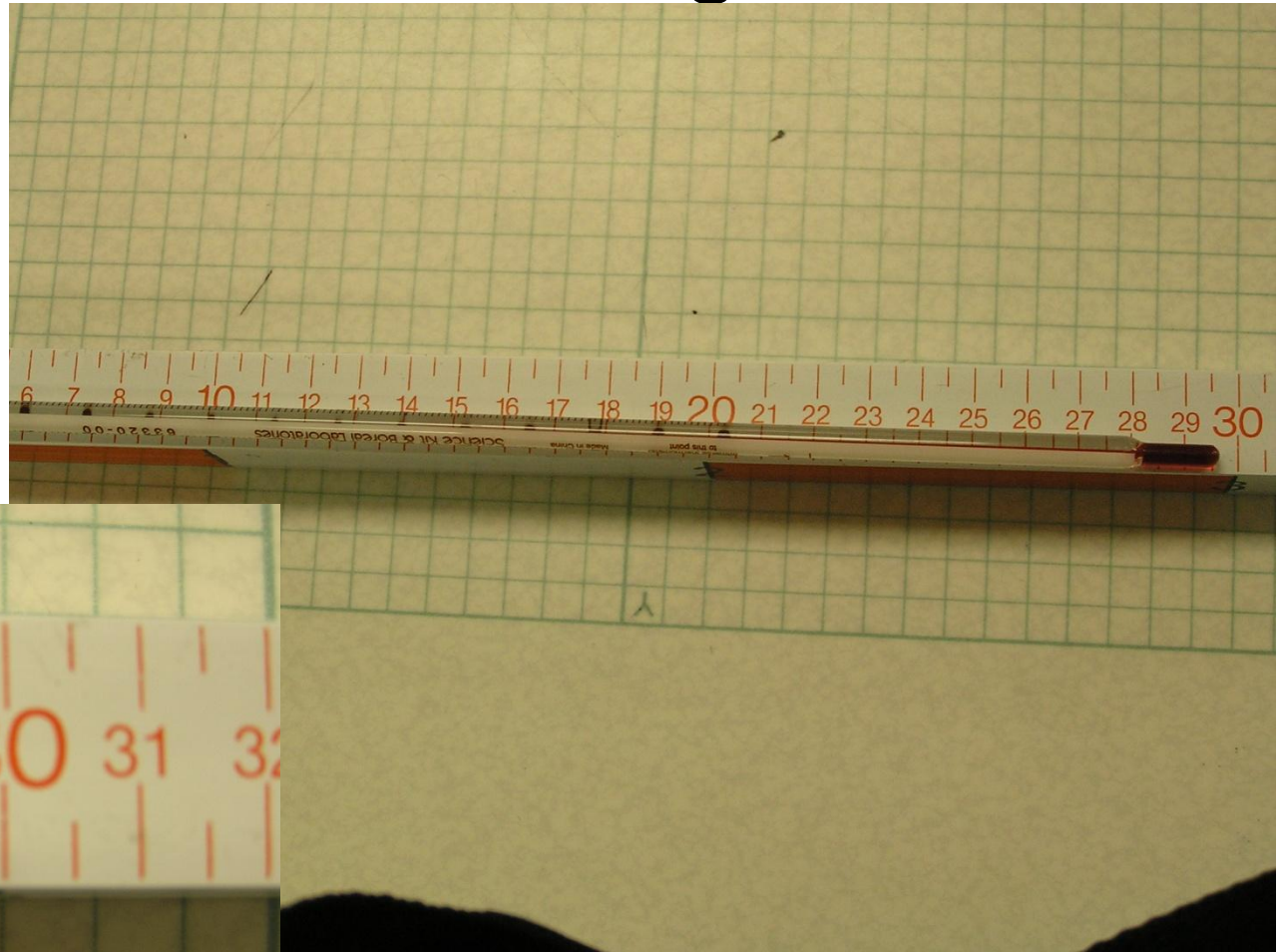
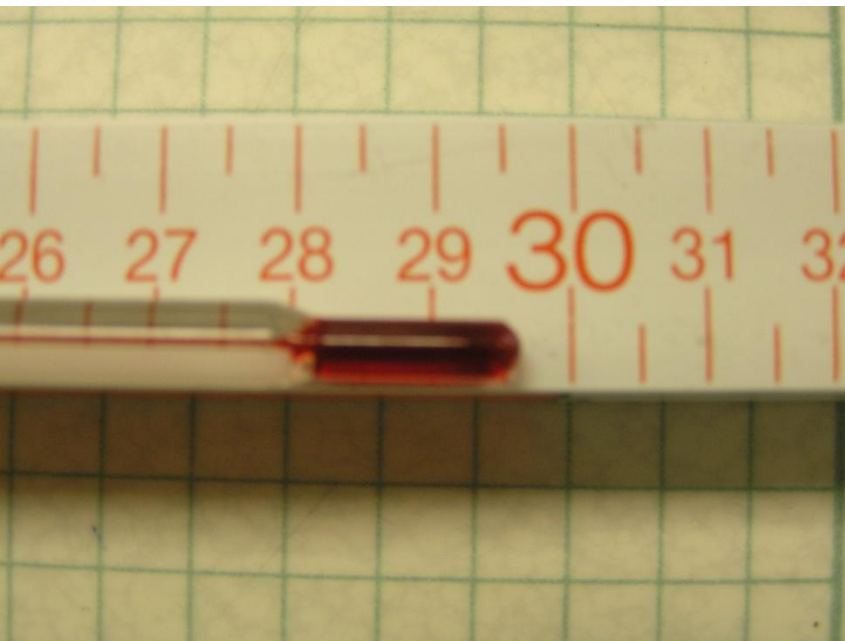Neither Precise nor Accurate   Precise and accurate   Precise but not accurate

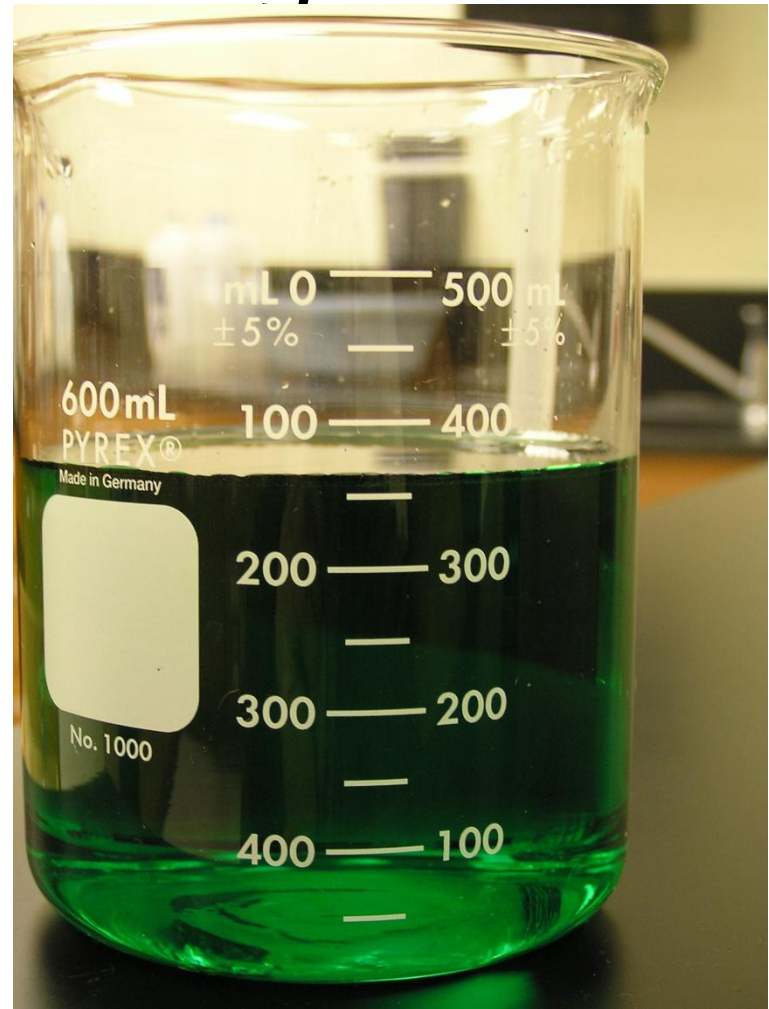# Measure what you know then estimate one digit.

Measure what you know then estimate one digit.

- We know 29 for sure. So the digit after the decimal will be estimated. I say 29.<u>5</u>.
- Note: Since there is only 1 line for all the tenths digit that line is used to aid in estimation
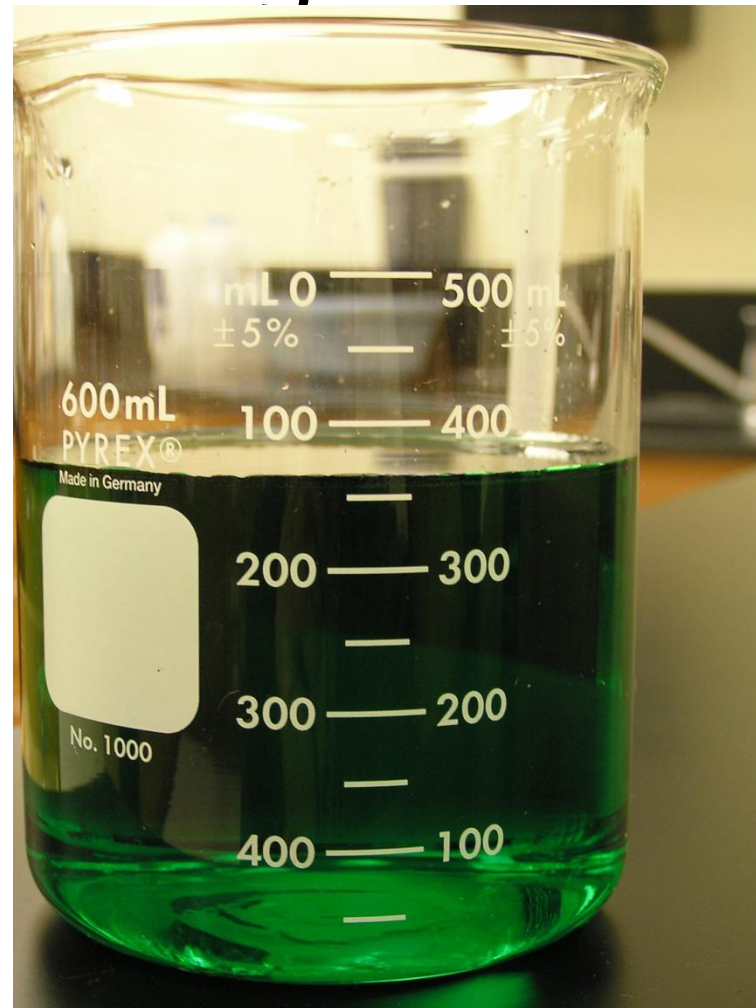
Measure what you know then estimate one digit.

- What do you know? There is a mark for the hundreds spot. We know we have at least 300. The "3" is known. The tens spot will have to be estimated.
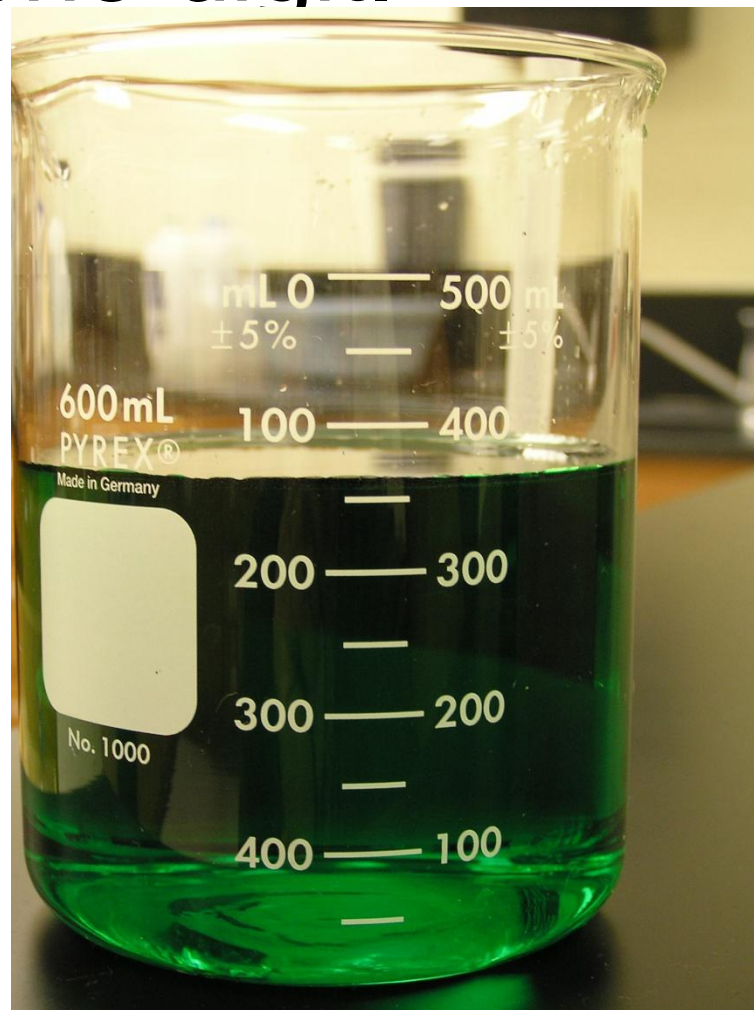
Measure what you know then estimate one digit.

- **3<u>6</u>0**

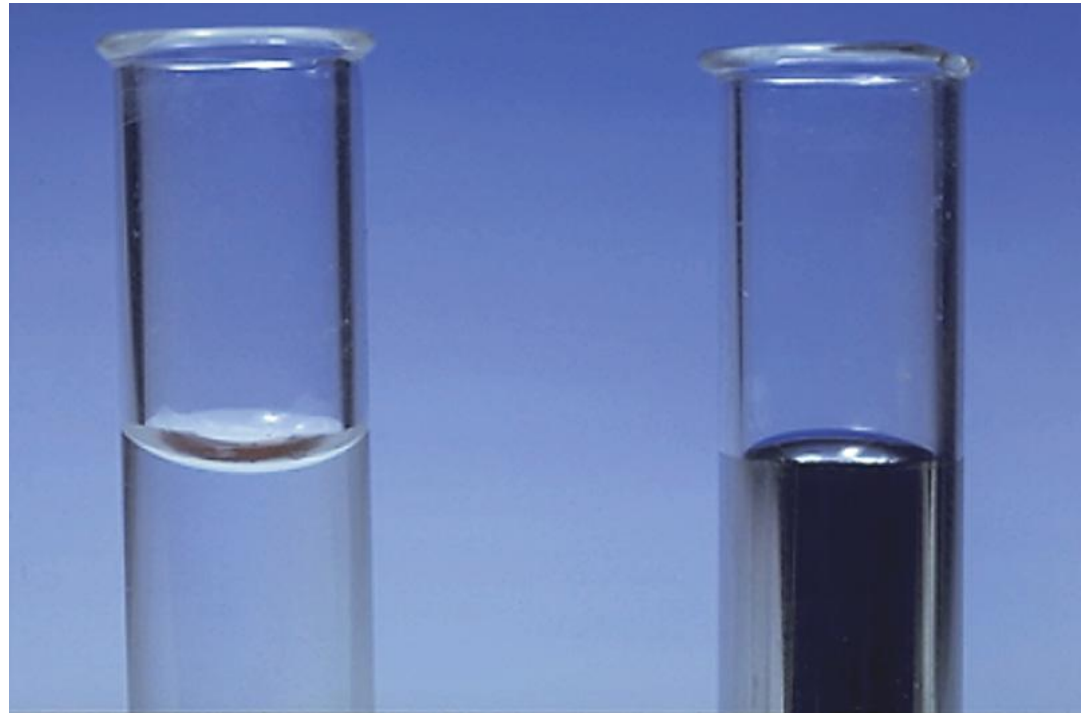- **Someone else might say 350. This is perfectly good. The estimated digit can vary.**

Measure what you know then estimate one digit.

- **3<u>6</u>0**

- **What is the role of this zero. Does it actually mean zero?**

How to read liquids.

- Liquids will adhere to the sides of the container forming a meniscus. Either read the top or the bottom of the arch.

Measure what you know then estimate 1 digit.

- Look at the scale. There is a mark for every milliliter and a half way mark that will aid in estimation.

- What do you think?

Measure what you know then estimate 1 digit.
Practice 1

- We know the 15 for sure. I will then estimate the next digit at 1.

- 15.1mL

Practice 2

What do you think?

Practice 2

There is a mark for every 10s spot so that is know and the ones spot must be estimated

I am going with 53.

What do you think?

Practice 3

It is a little hard to see but there is a line for each mL and 10 lines between for the tenths spot. Therefore we must estimate the to the hundreds spot.
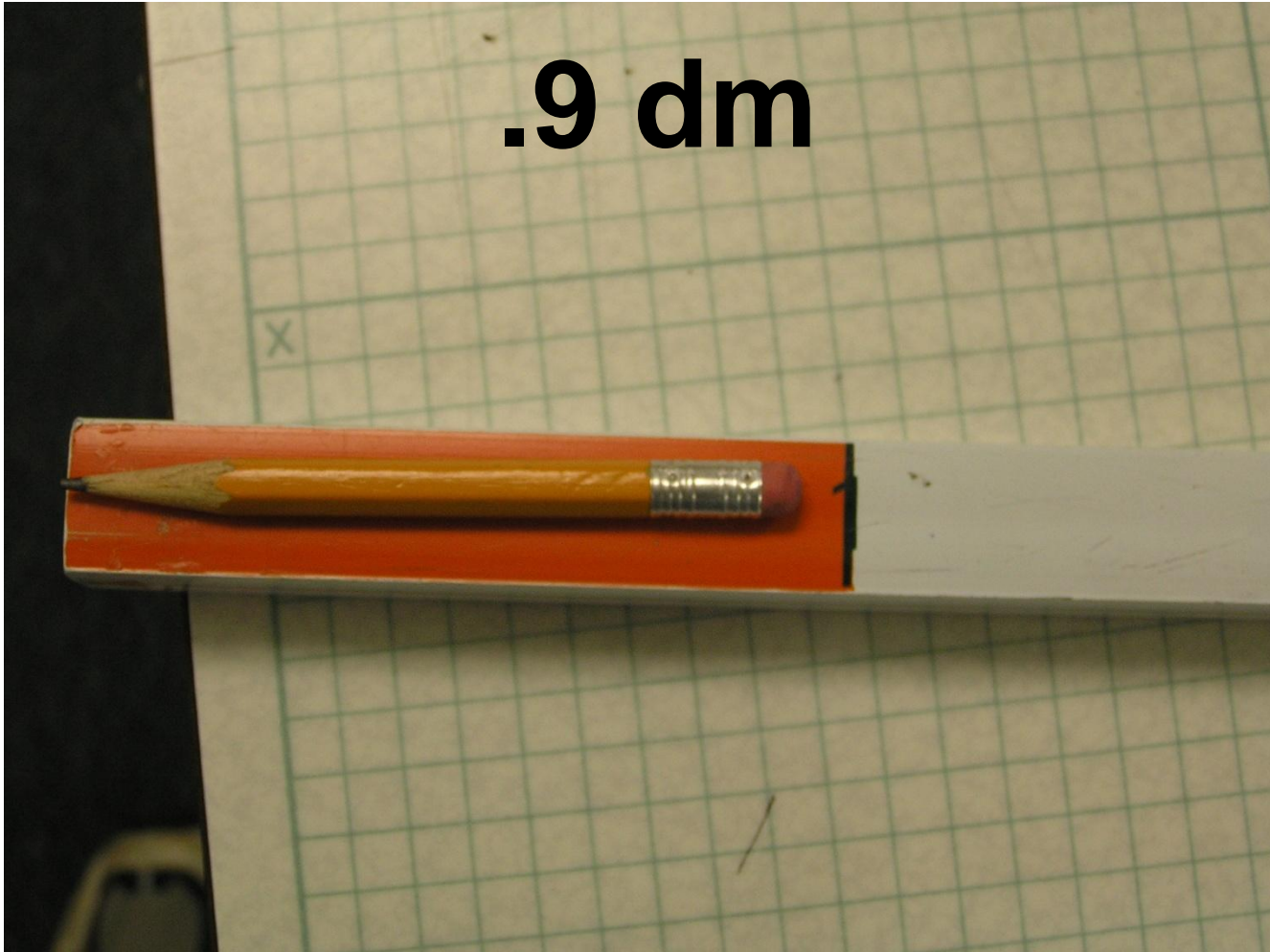
6.30

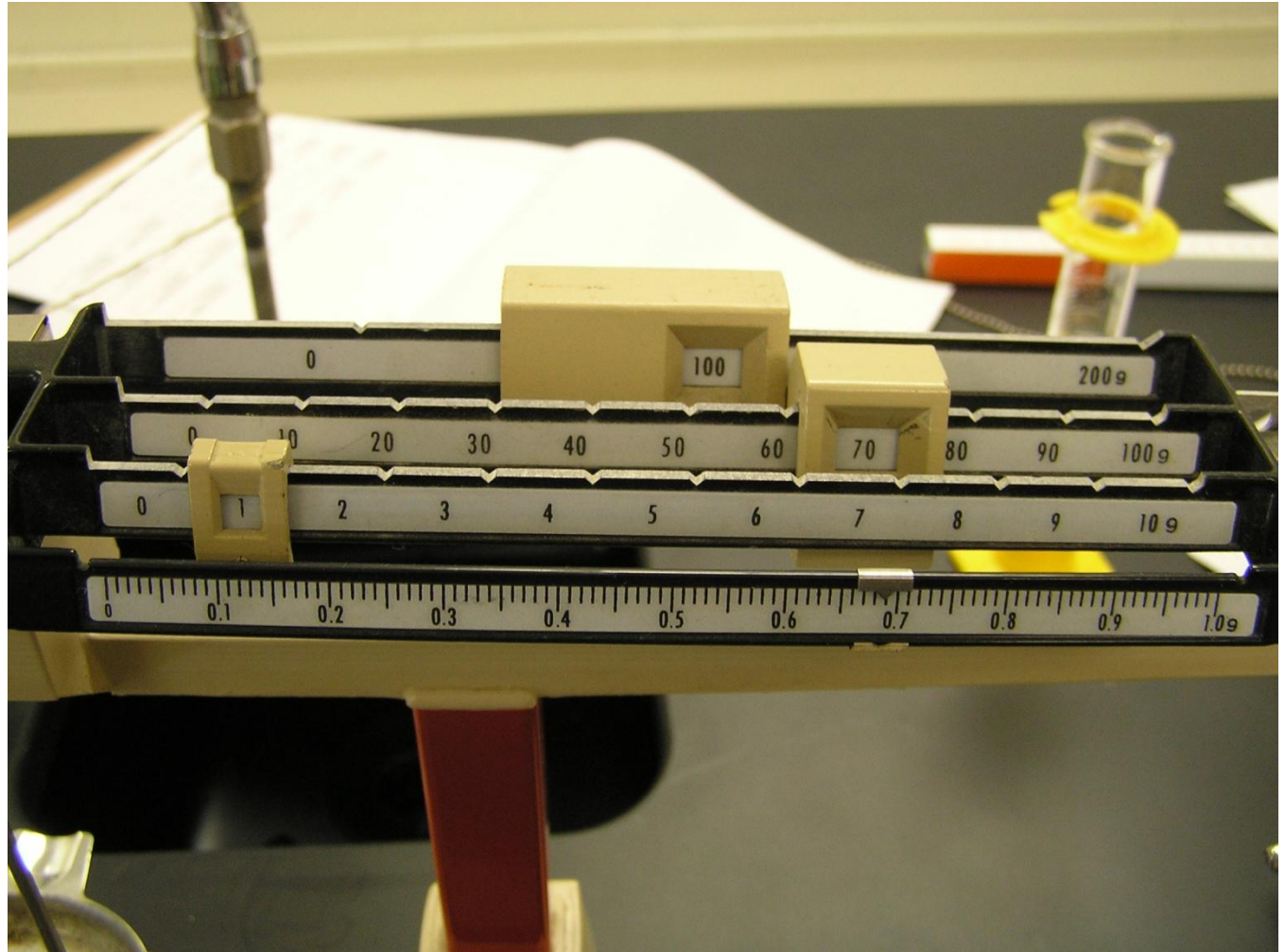# Practice 4

Practice 4
We don't know anything so we must estimate the first digit.
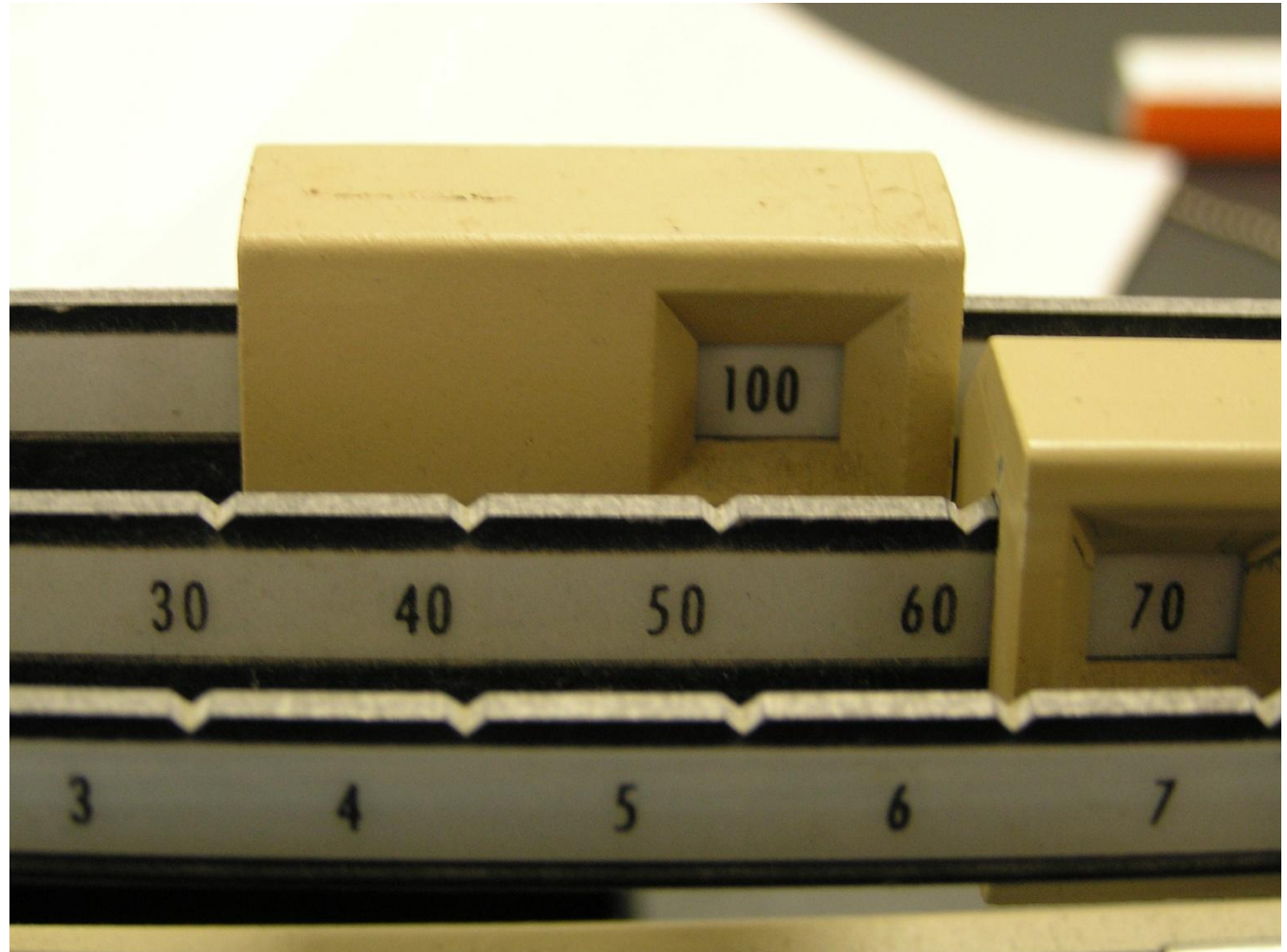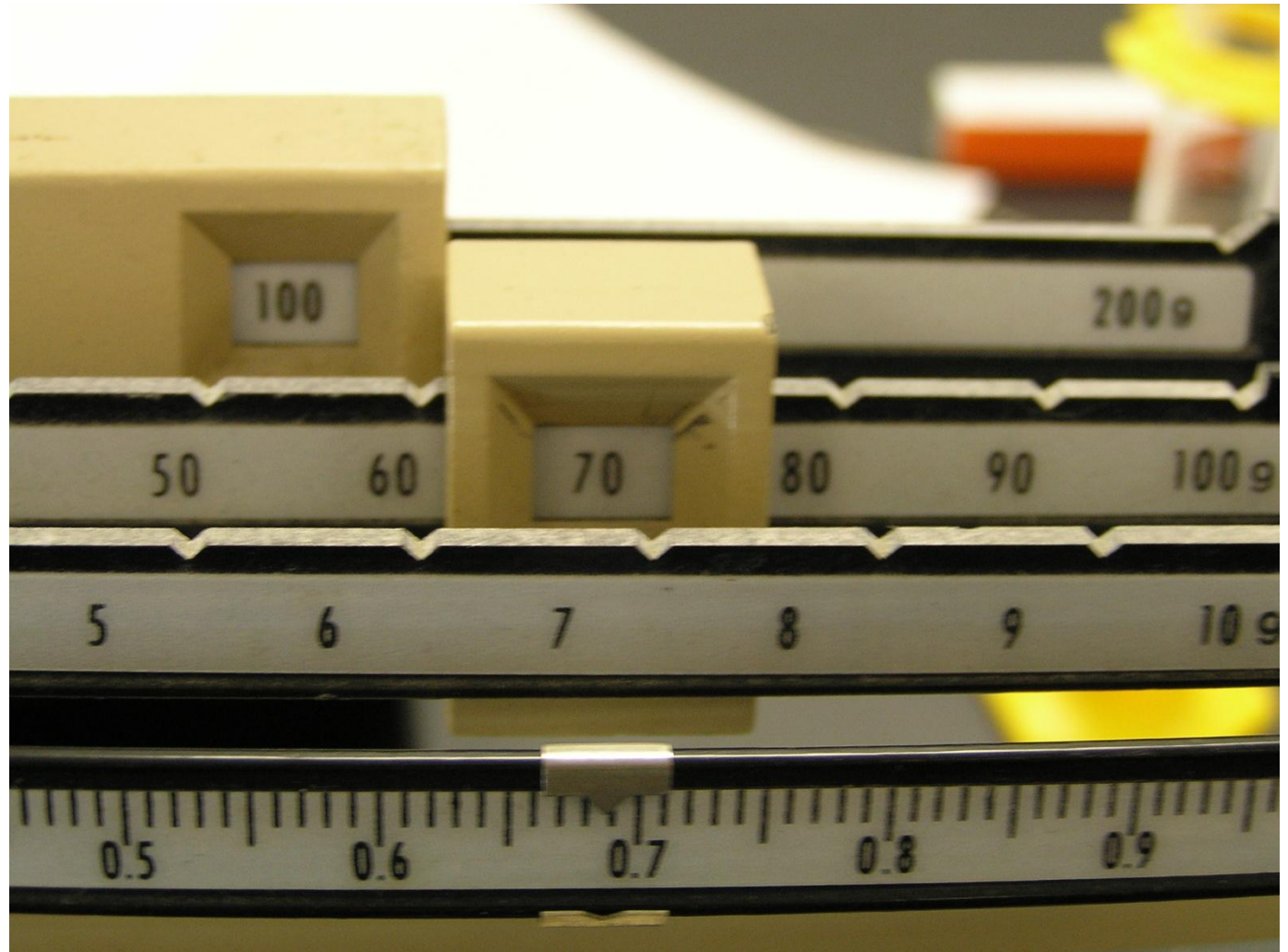

.9 dm

Practice 5

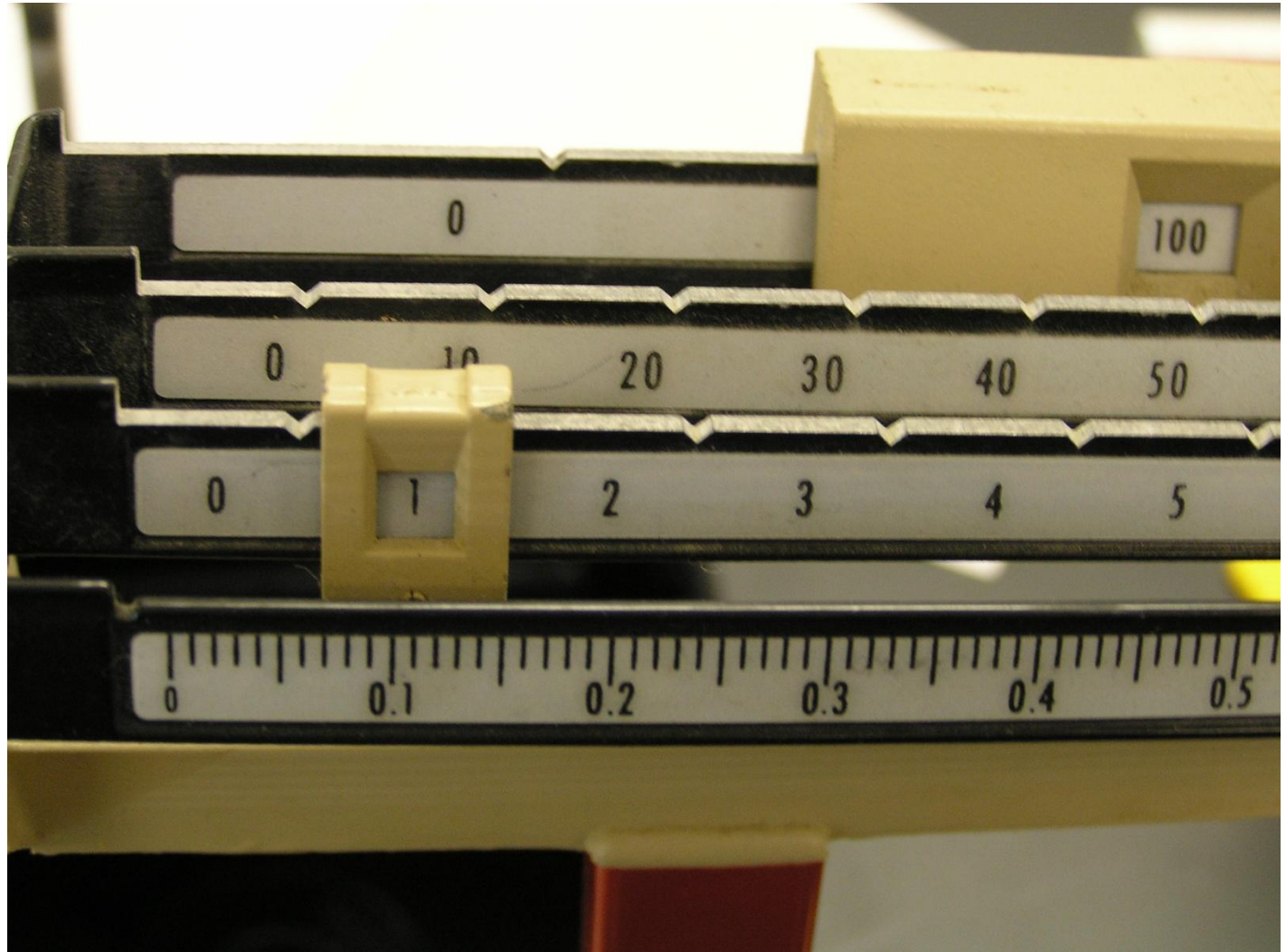- Triple beam balance

Largest weight

- 100g

Tens digit weight
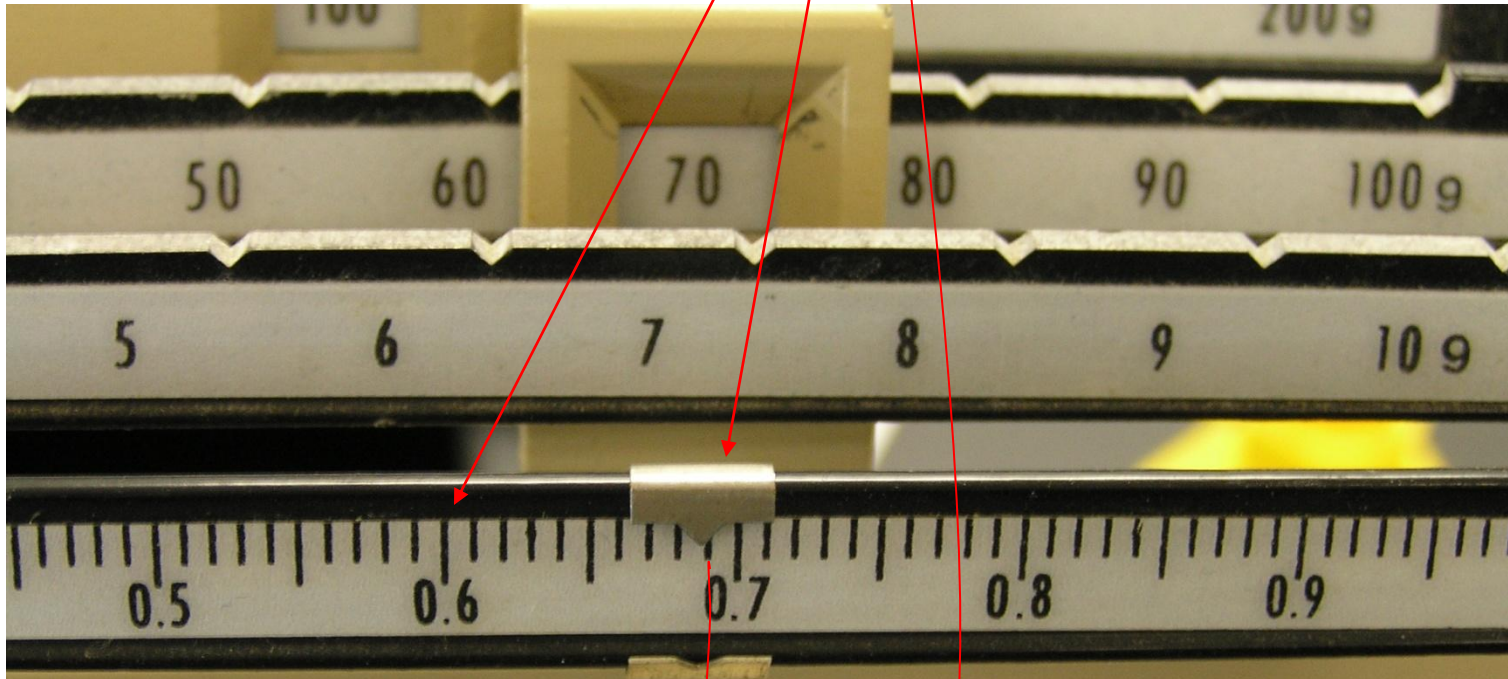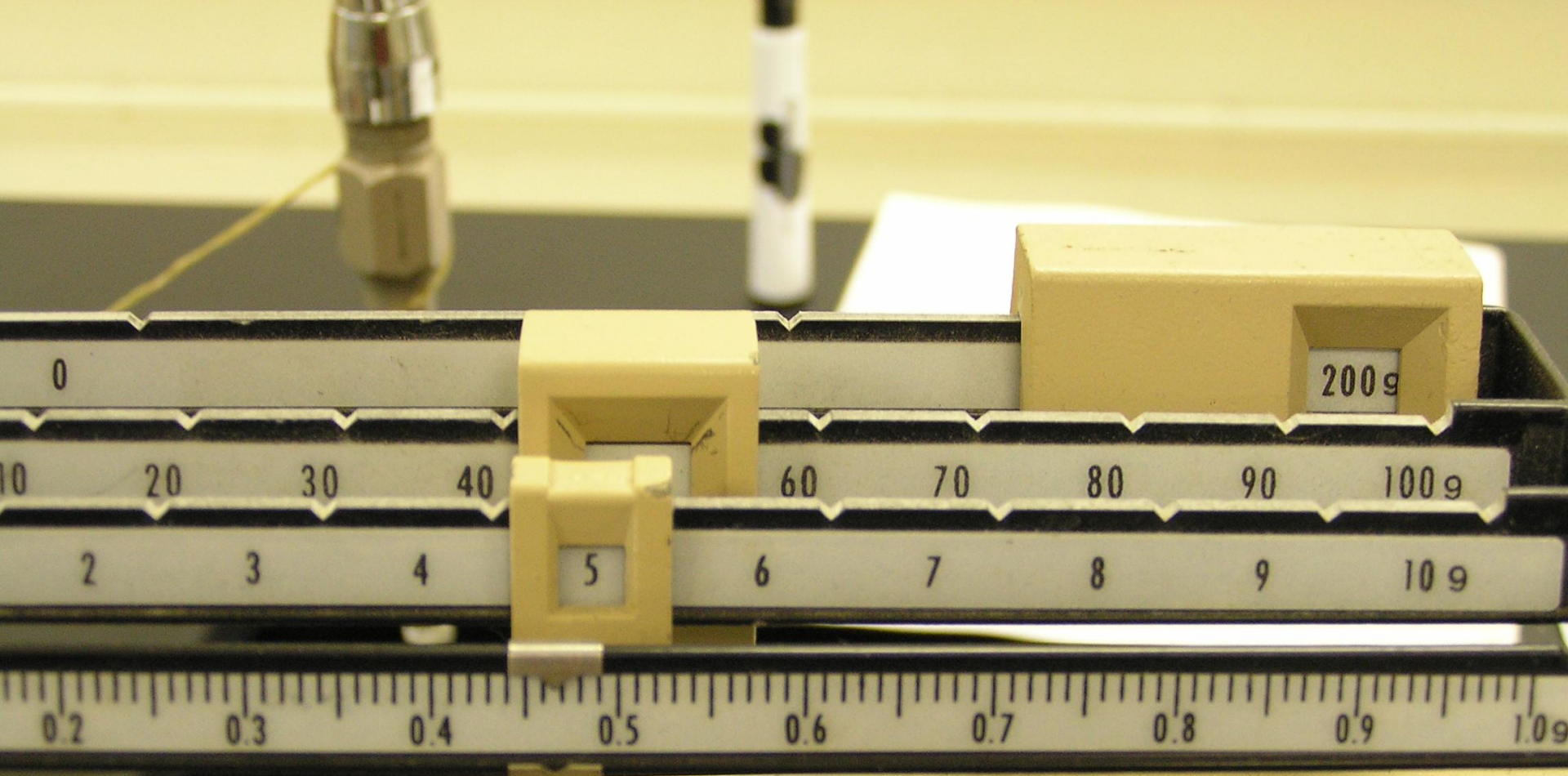
- 1<u>7</u>0

Ones digit

- 171.

Tenths, hundredths and thousands
171.689g

Estimate between lines.
Appears to be right on the 9th line

0

10   20   30   40   5   60   70   80   90   100 g

2   3   4   5   6   7   8   9   10 g

0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1.0 g

200 g

Give it a try?

0

10 20 30 40 50 60 70 80 90 100 g

2 3 4 5 6 7 8 9 10 g

200 g

0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0 g
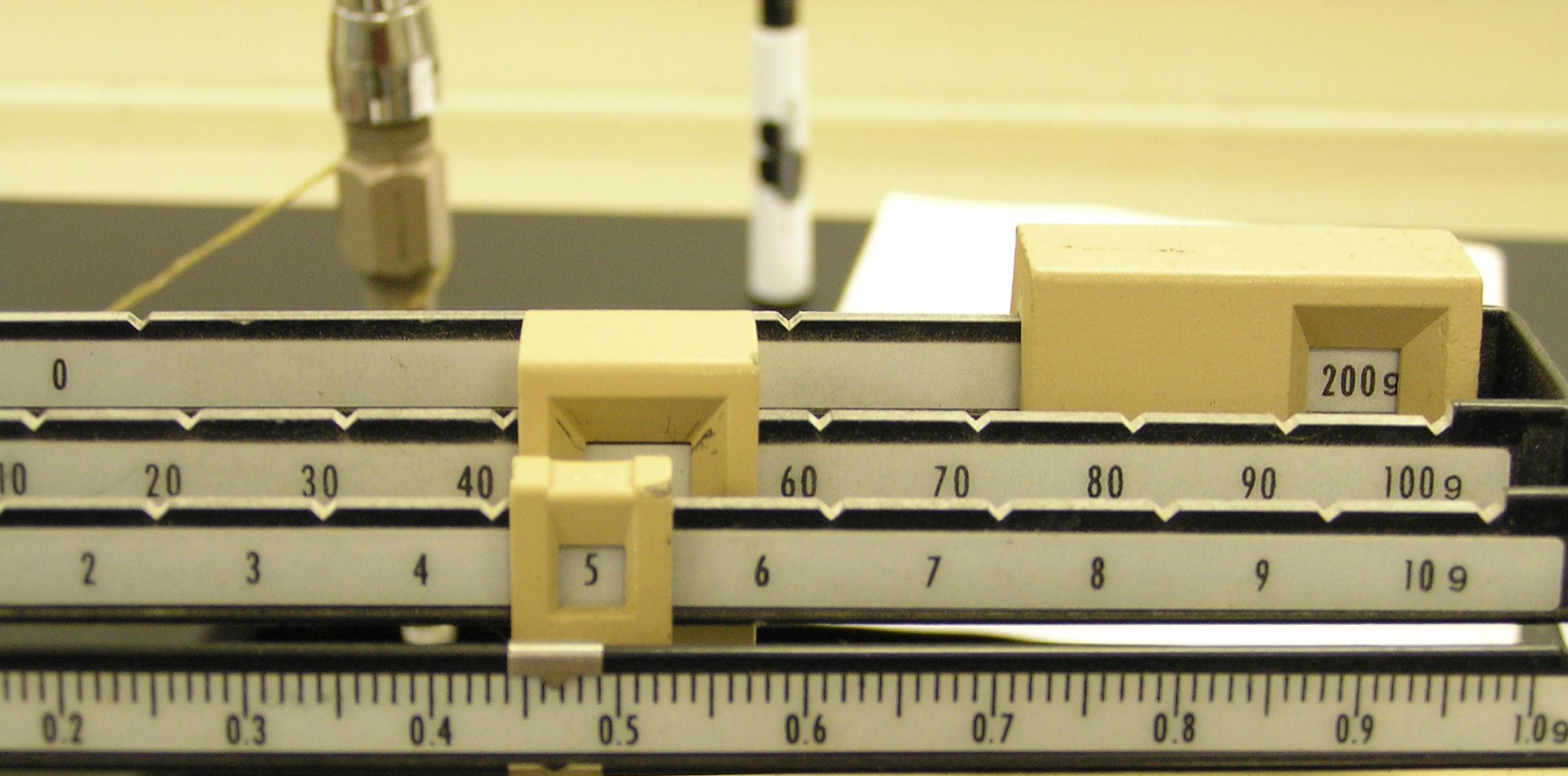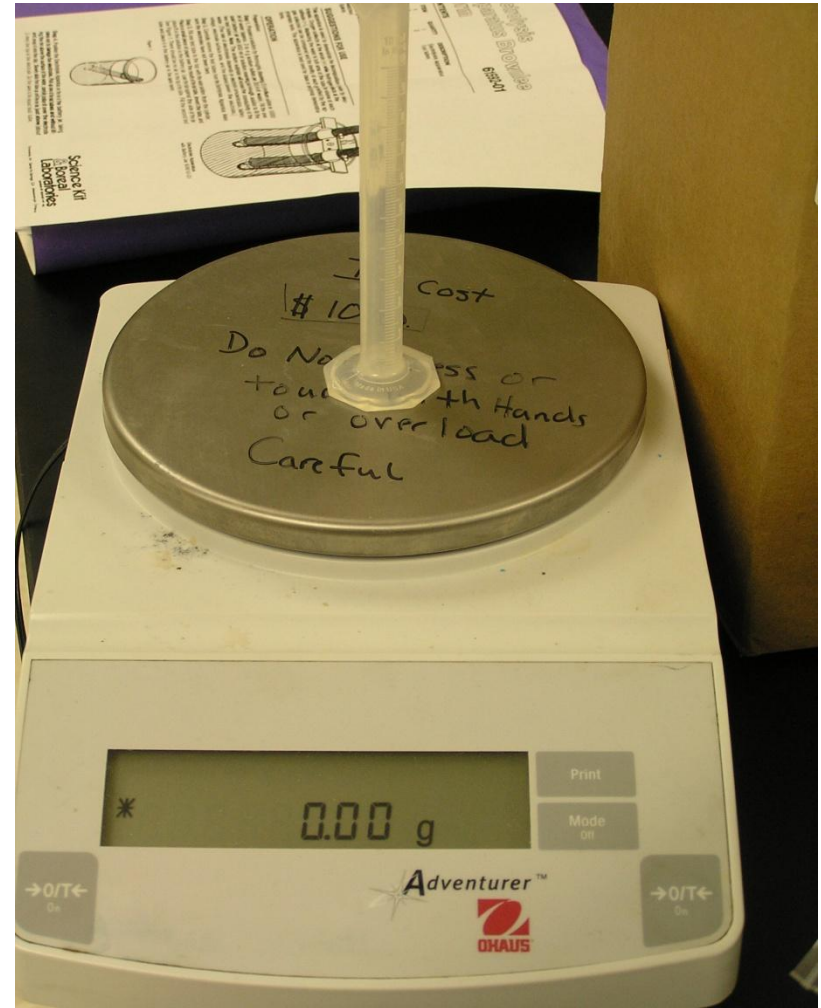
255.469g

Electronic balance

- Caution: These are very expensive. Do not press or overload.

- Cost: nearly $1000.

Electronic balance

- An electronic balance allows you to subtract the weight of a container by pushing the tare button.

1. Place container on scale

2. Press tare button.

3. Fill container.

4. Re-weigh

Digital

- – Very easy just read it!!

- But always ask yourself. Does this make sense?