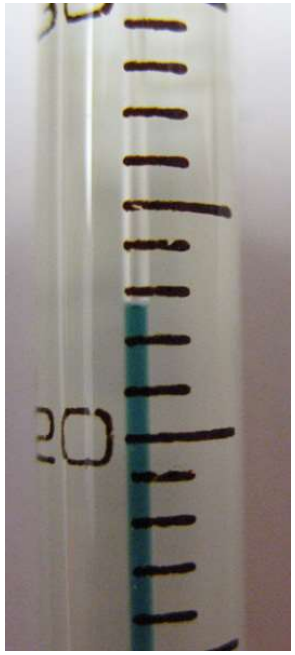
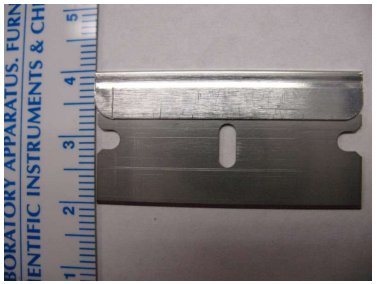
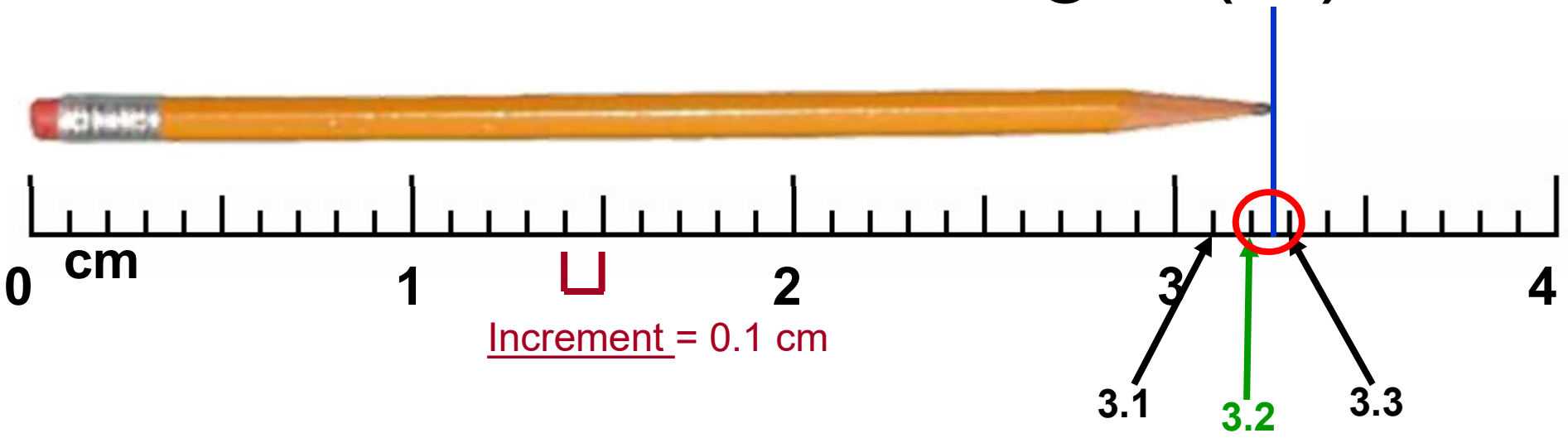





# Measurement




# Measurement: Length (m)



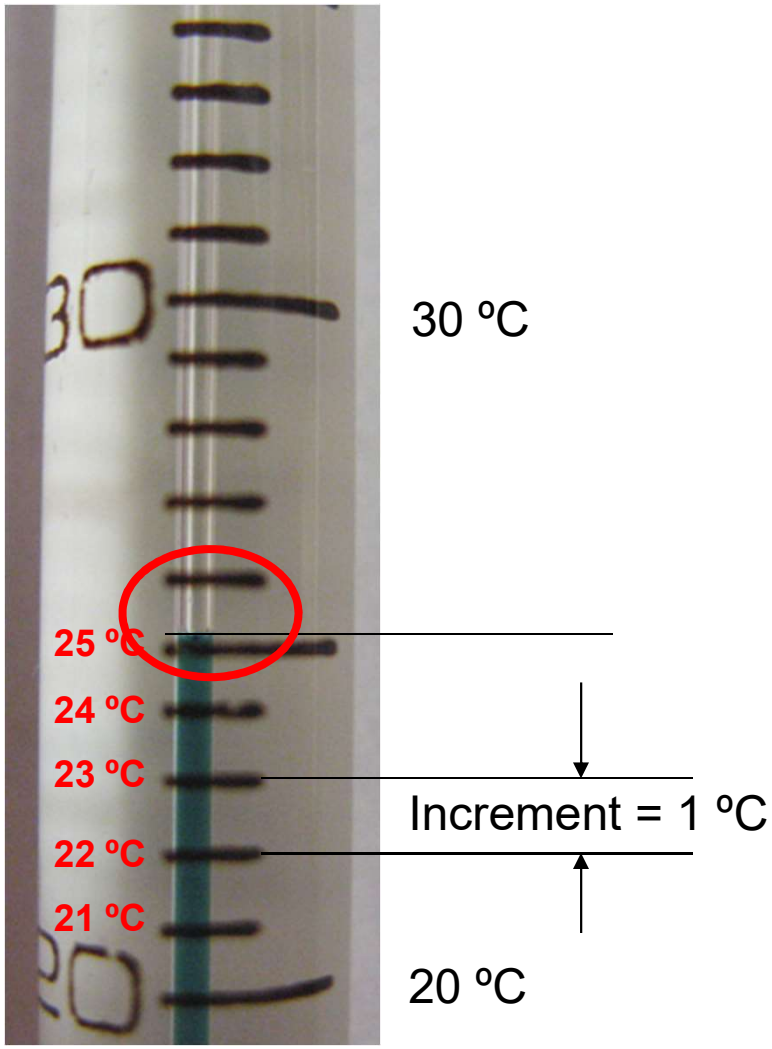

**Measurement: 3.2 6 cm**

**"certain" digits** **"uncertain" digit** *estimation required*

**Uncertainty: +/- 0.01**

**3.25 cm ... 3.26 cm... 3.27 cm**

# Measurement: Temperature (ºC)




## Measurement:

**25.2 ºC**

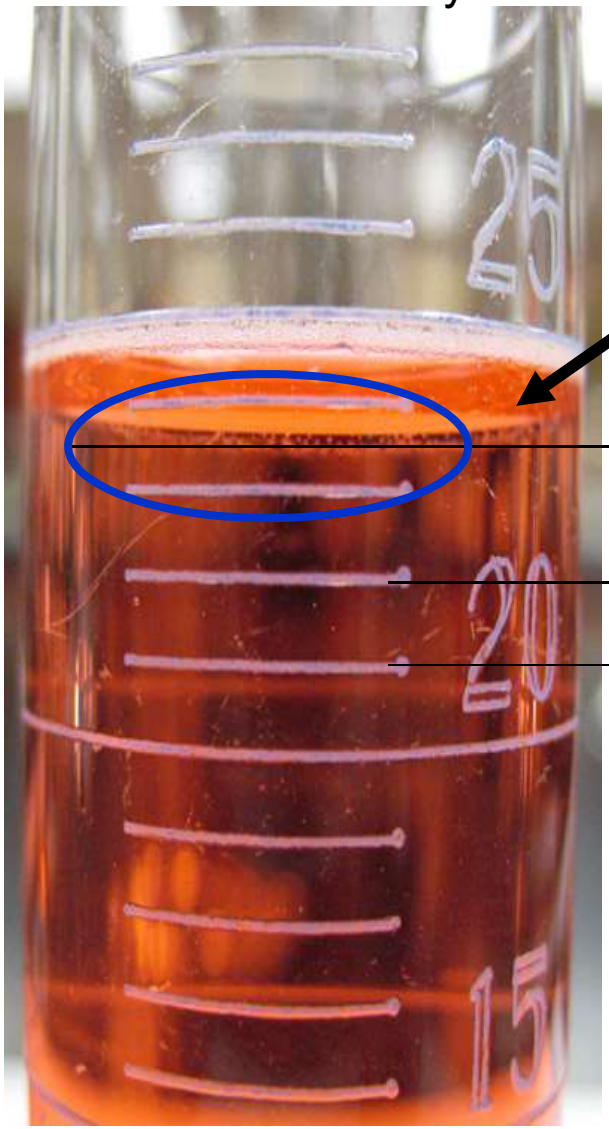
**"certain" digits** **"uncertain" digit**

**Uncertainty: +/- 0.1ºC**

**25.1 ºC ...25.2 ºC... 25.3 ºC**

# Measurement: Volume (L)

50 mL Graduated Cylinder




25 mL
24 mL
23 mL
22 mL
21 mL
20 mL

"Meniscus"

Increment = 1 mL

**Measurement:**

**23.5 mL**

**"certain" digits** **"uncertain" digit**

**Uncertainty: +/- 0.1 mL**

**23.4 mL ...23.5 mL... 23.6 mL**

# Measurement: Mass (g)

**Top Loading Balance**


Measurement:

35.48 g

Uncertainty: +/- 0.01 g

35.47 g ...35.48 g... 35.49 g

Analytical Balance


Measurement:

28.8301 g

Uncertainty: +/- 0.0001 g

28.8300 g ...28.8301 g... 28.8302 g

# Significant Figures (Sig. Figs.)

What are the digits in a measurement that *really matter*?


35.48 g

**4 Sig. Figs.**

Yes,
even the uncertain digit counts as a sig. fig.!


28.8301 g

**6 Sig. Figs.**

# Significant Figures: Other Examples

**Measurement**

**12.5430 grams**

**6 Sig. Figs.**

***When a decimal point is displayed, all trailing zeros count as sig. figs.***

**15.60036 grams**

**7 Sig. Figs.**

***Captured zeros always count as significant figures***

**0.000145 grams**

**3 Sig. Figs.**

***Leading zeros do NOT count as significant figures***

# Significant Figures: Other Examples

**Measurement**

**0.01100 grams**

**4 Sig. Figs.**

***When a decimal point is displayed, all trailing zeros count as sig. figs.***

***Leading zeros do NOT count as significant figures***

**1,200 grams**

**2 Sig. Figs.**

***No Decimal Point Displayed!***

**1,200. grams**

**4 Sig. Figs.**

***Decimal Point IS Displayed!***

# Significant Figures: Scientific Notation

**Measurement**

**1200 grams**

**How would we write this with 3 significant figures?**

**1200 grams**

**2 Sig. Figs.**

**1200. grams**

**4 Sig. Figs.**

**Scientific Notation**

**$1.20 \times 10^3$ grams**

**3 Sig. Figs.**