

2. SIGNIFICANT DIGITS

CH30S

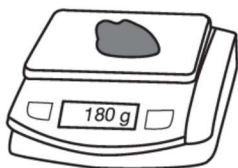
UNIT 1

WIEBE

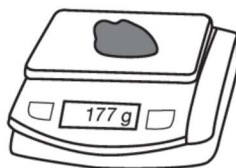
1

WHICH SCALE IS MOST RELIABLE?

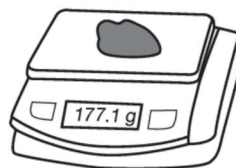
1.



Good Balance

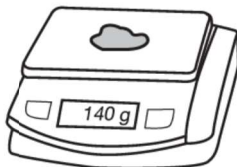


Balance Pro

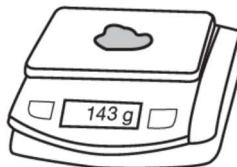


Exacto-Balance

2.



Good Balance



Balance Pro

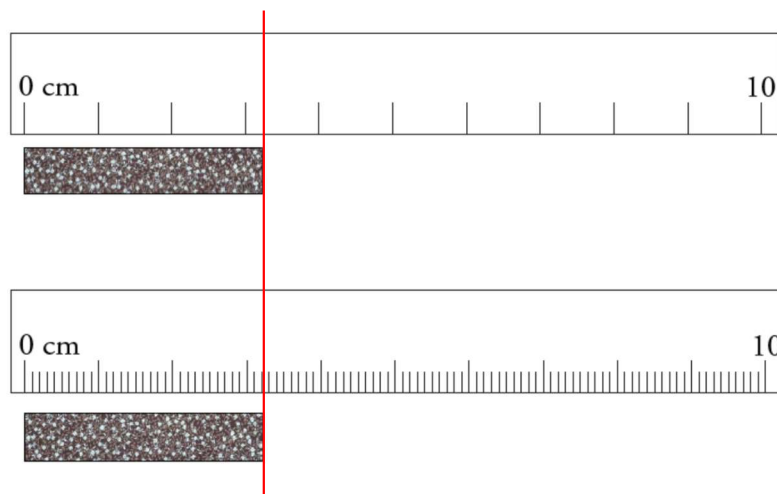


Exacto-Balance

2

COMMUNICATING RELIABILITY

When measuring with ANY device, write all the certain values PLUS ONE ESTIMATE!



3

WHAT ARE SIGNIFICANT DIGITS?

- A set of rules that communicate the reliability of a measurement.
- By following the rules, you ensure that your answer to a calculation that uses measurements is as reliable as it should be.
- In other words, they allow you to round your answer to a calculation correctly.

4

ANALOGY:

Attempting to Locate Your Friends in 2004 (before smartphones)

Me: Where are you guys?

Friend #1: Uh...we are on a road with buildings on it.

Friend #2: Yah...we're standing near a blue car.

Me: Oh cool. Sounds like you are on the southwest corner of Manitoba Avenue and Main Street. I'll be right there.

YOUR CONCLUSION FROM THIS INFORMATION IS TOO DETAILED AND THEREFOR UNRELIABLE. THE SAME IS TRUE OF MEAUREMENTS!

5

THE RULES

1. Leading Zeros are **NOT** significant.

0.00245 L

6

THE RULES

2. Trailing Zeros in a non-decimal number are **NOT** significant.

5500 g

7

THE RULES

3. ALL other zeros and numbers are significant.

10.25 g

3.00 mL

1.0×10^{-7}

8

THE RULES

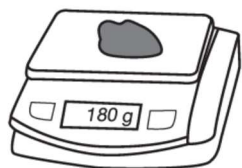
4. Round your answer to the number of sig digs in the least accurate measurement you started with.

$$\underline{3.0} \times 10^{-3} \text{ g}$$

$$1.50 \times 10^4 \text{ cm}^3$$

9

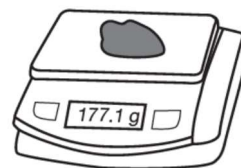
EXAMPLE:



Good Balance

Density of Rock Using Good Balance:

Volume of rock:
9.52 cm³



Exacto-Balance

Density of Rock Using Exacto-Balance:

10