Name: _____Hour: _____Date: _____
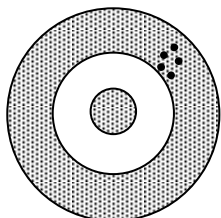
Accuracy and Precision

Definitions:

accuracy – how close a measurement is to _____

precision – how close a measurement is to _____
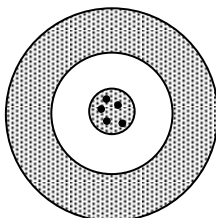
Precision versus Accuracy:

Look at each target below and decide whether the situation is accurate, precise, both, or neither:

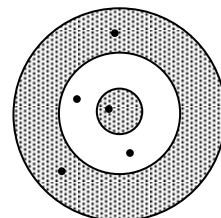(Note: it is "accepted" that the bull's eye is the place everyone aims for.)

Accurate?: Yes / No   Accurate?: Yes / No   Accurate?: Yes / No

Precise?:   Yes / No   Precise?:   Yes / No   Precise?:   Yes / No

Precision Problems:

Several lab groups measure the density of aluminum. Here is their data:

Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7
2.65 g/cm^3	2.75 g/cm^3	2.80 g/cm^3	2.77 g/cm^3	2.60 g/cm^3	2.65 g/cm^3	2.68 g/cm^3

What is the average density? _____g/cm^3

Here is more data. Is this more precise, less precise, or the same precision as the above data?

Team 1	Team 2	Team 3	Team 4	Team 5	Team 6	Team 7
2.60 g/cm^3	2.70 g/cm^3	2.80 g/cm^3	2.75 g/cm^3	2.65 g/cm^3	2.62 g/cm^3	2.78 g/cm^3

Accuracy Problems:

$$\% \text{ error } = \frac{\text{actual value} - \text{measured value}}{\text{actual value}} \times 100$$

1. Working in the laboratory, a student find the density of a piece of pure aluminum to be 2.85 g/cm^3. The accepted value for the density of aluminum is 2.699 g/cm^3. What is the student's percent error?

2. A student experimentally determines the specific heat of water to be 4.29 J/g x C^o. He then looks up the specific heat of water on a reference table and finds that is is 4.18 J/g x C^o. What is his percent error?

3. A student takes an object with an accepted mass of 200.00 grams and masses it on his own balance. He records the mass of the object as 196.5 g. What is his percent error?

4. Often, with accuracy we are concentrating on one measurement. However, we can also look at a collection of measurements and simply take the average. Does this target represent someone who is accurate? _____ Precise? _____