

Name: _____

Types of Errors

Think of yourself doing an experiment and taking down a measurement.

Where can errors occur during this process? What kind of errors?

We can categorize these errors into 2 categories: _____ errors and _____ errors.

_____ errors come from flaws in the experimental design or in the equipment that cause your data set to deviate away from the true value(s). These errors cannot be reduced by simply repeating your experiments several times unless you change the design of your experiment.

Decreasing systematic errors help you improve _____.

Examples:

- Instrument calibration
- Energy lost due to friction
- Heat lost to the environment

Name: _____

_____ errors are random fluctuations of our data above and below a mean value similar to a normal distribution. These errors are caused by human imperfections, random instability of the environment, equipment, or your samples. Random error can be reduced by performing repeated experiments.

Decreasing random errors help you improve _____.

Examples:

- Your inability to stop the stopwatch exactly after 10 periods (pendulum lab) every single time
- Temperature fluctuations in the room during a thermal lab
- Electric mass balance fluctuations due to occasional drafts in the room
- A sample of 100000 E. coli bacterial cells may have 2-5 cells with the antibiotic resistance gene