

What is Physics?

And the Measure of Science

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What is Physics?

- The study of matter and energy and how they interact.
- Physics is the study of the physical world at its most fundamental level.
- Attempts to describe nature in an objective way through measurements.
- Physics is concerned with the two primary components of all things.

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Areas of Physics

- There are six major areas of physics.

Mechanics	Motion and its causes
Thermodynamics	Heat and Temperature
Waves	Types of repetitive motion
Electromagnetism	Electricity, Magnetism, Light
Relativity	High speed particles
Quantum Mechanics	Submicroscopic particles

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Scientific Method

- An organized system of determining answers to questions using observation, experimentation and analysis.
- There are many “methods” to solving a particular problem.

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Experiments

- Controlled Experiment
 - Only change one variable at a time
- System
 - The group of objects that are observed during the experiment

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Physics and Math

- Physics is the practical application of algebra.
- To succeed in physics you should already know how to:
 - Use significant digits correctly
 - Convert between metric units
 - Graph and analyze data
 - Manipulate algebraic equations

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Scientific Notation

- Used to eliminate repeated zeros
- The exponent is the number of spaces the decimal point is from the “ones” position.
- Remember: a positive exponent represents a number larger than 1, a negative exponent => less than 1

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Arithmetic with Scientific Notation

- Putting it in your calculator
 - Use the EE button on your calculator to replace the “x 10” in the number.

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SI Units

- Fundamental (Base) Units
 - seven basic units of measure
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- Derived Units
 - Unit containing any combination of fundamental units
 - Developed through the mathematic manipulation of base units (ex: m/s)

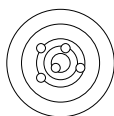
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Accuracy vs. Precision

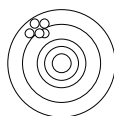
- Precision
 - How exact the number is
 - To what decimal place is the number measured to?
- Accuracy
 - How close to the accepted value the number is.

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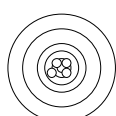
Accuracy vs. Precision



Accurate



Precise



Accurate
& Precise

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Significant Digits

- Valid digits are determined by the precision of the device.
- The last digit is always assumed to be estimated
- General Rules
 - Non-zero digits are always significant
 - All final zeros after the decimal are sig.
 - Zeros between 2 sig.digits are sig.
 - Zeros used only for spacing the decimal are not significant.

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