

Physics 231

Outline for Day 1

Attendance and a list of units

Discuss syllabus

Units & Measurements

P231 Week 1: measurements

Goals of Week 1:

- Learn about base and derived units
- Learn dimensions and dimensional analysis
- Understand the need for errors and significant figures
- Learn how to propagate errors in $+$, $-$, \times , and \div
- Understand how μ , σ , and σ_μ are related to measurements and errors
- Learn definitions of average velocity, speed, instantaneous velocity, etc.

P231 Week 1: measurements

Units



Base Units

Derived Units

Mechanical

Quantity	MKS unit	CGS unit	Derived Units
mass	kg (kilogram)	g	miles/hour
length	m (meter)	cm	km/s
time	s (second)	s	mol/liter
			kg m/s ²
			etc.
			etc.
			etc.

Other

Unit systems

System	L	M	T
SI, or MKS	m	kg	s
cgs	cm	g	s
US Customary	ft (foot)	slug	s

Making convenient units with prefixes

TABLE 1.2 Multiples and Prefixes for Metric Units*

<i>Multiple[†]</i>	<i>Prefix (and Abbreviation)</i>	<i>Pronunciation</i>	<i>Multiple[†]</i>	<i>Prefix (and Abbreviation)</i>	<i>Pronunciation</i>
10 ²⁴	yotta- (Y)	yot'ta (a as in about)	10 ⁻¹	deci- (d)	des'i (as in decimal)
10 ²¹	zetta- (Z)	zet'ta (a as in about)	10 ⁻²	centi- (c)	sen'ti (as in sentimental)
10 ¹⁸	exa- (E)	ex'a (a as in about)	10 ⁻³	milli- (m)	mil'li (as in military)
10 ¹⁵	peta- (P)	pet'a (as in petal)	10 ⁻⁶	micro- (μ)	mi'kro (as in microphone)
10 ¹²	tera- (T)	ter'a (as in terrace)	10 ⁻⁹	nano- (n)	nan'oh (an as in annual)
10 ⁹	giga- (G)	ji'ga (ji as in jiggle, a as in about)	10 ⁻¹²	pico- (p)	pe'ko (peek-oh)
10 ⁶	mega- (M)	meg'a (as in megaphone)	10 ⁻¹⁵	femto- (f)	fem'toe (fem as in feminine)
10 ³	kilo- (k)	kil'o (as in kilowatt)	10 ⁻¹⁸	atto- (a)	at'toe (as in anatomy)
10 ²	hecto- (h)	hek'to (heck-toe)	10 ⁻²¹	zepto- (z)	zep'toe (as in zeppelin)
10	deka- (da)	dek'a (deck plus a as in about)	10 ⁻²⁴	yocto- (y)	yock'toe (as in sock)

*For example, 1 gram (g) multiplied by 1000 (10³) is 1 kilogram (kg); 1 gram multiplied by 1/1000 (10⁻³) is 1 milligram (mg).

[†]The most commonly used prefixes are printed in color. Note that the abbreviations for the multiples 10⁶ and greater are capitalized, whereas the abbreviations for the smaller multiples are lowercased.

