







Science 10

Databook

Mr. Standing

10	11	12	13	14	15	16	17	18
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Legend for Elements

	Metallic solids		Gases
	Non-metallic solids		Liquids

Note: The legend denotes the physical state of the elements at exactly 101.325 kPa and 298.15 K.

Key

Atomic number	26	55.85
		3+, 2+
Electronegativity	1.8	
Symbol	Fe	
Name	iron	

Atomic molar mass (g/mol)*
Most stable ion charges

* Based on $^{12}_6\text{C}$
() Indicates mass of the most stable isotope

								2	4.00								
								He	helium								
5		10.81	6	12.01	7	14.01	8	16.00	9	19.00	10	20.18					
2.0			2.6		3.0		3.4		4.0								
B			C		N		O		F		Ne						
boron			carbon		nitrogen		oxygen		fluorine		neon						
13		26.98	14	28.09	15	30.97	16	32.07	17	35.45	18	39.95					
1.6			1.9		2.2		2.6		3.2								
Al			Si		P		S		Cl		Ar						
aluminium			silicon		phosphorus		sulfur		chlorine		argon						
28	58.69	29	63.55	30	65.41	31	69.72	32	72.64	33	74.92	34	78.96	35	79.90	36	83.80
1.9		1.9		1.7		1.8		2.0		2.2		2.6		3.0			
Ni		Cu		Zn		Ga		Ge		As		Se		Br		Kr	
nickel		copper		zinc		gallium		germanium		arsenic		selenium		bromine		krypton	
46	106.42	47	107.87	48	112.41	49	114.82	50	118.71	51	121.76	52	127.60	53	126.90	54	131.29
2.2		1.9		1.7		1.8		2.0		2.1		2.1		2.7		2.6	
Pd		Ag		Cd		In		Sn		Sb		Te		I		Xe	
palladium		silver		cadmium		indium		tin		antimony		tellurium		iodine		xenon	
78	195.08	79	196.97	80	200.59	81	204.38	82	207.2*	83	208.98	84	(209)	85	(210)	86	(222)
2.2		2.4		1.9		1.8		1.8		1.9		2.0		2.2			
Pt		Au		Hg		Tl		Pb		Bi		Po		At		Rn	
platinum		gold		mercury		thallium		lead		bismuth		polonium		astatine		radon	
110 (271)	111 (272)																
Ds	Rg																
darmstadtium	roentgenium																

* The isotopic mix of naturally occurring lead is more variable than other elements, preventing precision to greater than tenths of a gram per mole.

63	151.96	64	157.25	65	158.93	66	162.50	67	164.93	68	167.26	69	168.93	70	173.04	71	174.97
	3+, 2+		3+		3+		3+		3+		3+		3+		3+, 2+		3+
—		1.2		—		1.2		1.2		1.2		1.3		—		1.0	
Eu		Gd		Tb		Dy		Ho		Er		Tm		Yb		Lu	
europium		gadolinium		terbium		dysprosium		holmium		erbium		thulium		ytterbium		lutetium	
95	(243)	96	(247)	97	(247)	98	(251)	99	(252)	100	(257)	101	(258)	102	(259)	103	(262)
	3+, 4+		3+		3+, 4+		3+		3+		3+		2+, 3+		2+, 3+		3+
—		—		—		—		—		—		—		—		—	
Am		Cm		Bk		Cf		Es		Fm		Md		No		Lr	
americium		curium		berkelium		californium		einsteinium		fermium		mendelevium		nobelium		lawrencium	

ALPHABETICAL LISTING OF THE ELEMENTS

Element	Symbol	Atomic Number	Element	Symbol	Atomic Number
Actinium	Ac	89	Mendelevium	Md	101
Aluminium	Al	13	Mercury	Hg	80
Americium	Am	95	Molybdenum	Mo	42
Antimony	Sb	51	Neodymium	Nd	60
Argon	Ar	18	Neon	Ne	10
Arsenic	As	33	Neptunium	Np	93
Astatine	At	85	Nickel	Ni	28
Barium	Ba	56	Niobium	Nb	41
Berkelium	Bk	97	Nitrogen	N	7
Beryllium	Be	4	Nobelium	No	102
Bismuth	Bi	83	Osmium	Os	76
Bohrium	Bh	107	Oxygen	O	8
Boron	B	5	Palladium	Pd	46
Bromine	Br	35	Phosphorus	P	15
Cadmium	Cd	48	Platinum	Pt	78
Calcium	Ca	20	Plutonium	Pu	94
Californium	Cf	98	Polonium	Po	84
Carbon	C	6	Potassium	K	19
Cerium	Ce	58	Praseodymium	Pr	59
Cesium	Cs	55	Promethium	Pm	61
Chlorine	Cl	17	Protactinium	Pa	91
Chromium	Cr	24	Radium	Ra	88
Cobalt	Co	27	Radon	Rn	86
Copper	Cu	29	Rhenium	Re	75
Curium	Cm	96	Rhodium	Rh	45
Darmstadtium	Ds	110	Roentgenium	Rg	111
Dubnium	Db	105	Rubidium	Rb	37
Dysprosium	Dy	66	Ruthenium	Ru	44
Einsteinium	Es	99	Rutherfordium	Rf	104
Erbium	Er	68	Samarium	Sm	62
Europium	Eu	63	Scandium	Sc	21
Fermium	Fm	100	Seaborgium	Sg	106
Fluorine	F	9	Selenium	Se	34
Francium	Fr	87	Silicon	Si	14
Gadolinium	Gd	64	Silver	Ag	47
Gallium	Ga	31	Sodium	Na	11
Germanium	Ge	32	Strontium	Sr	38
Gold	Au	79	Sulfur	S	16
Hafnium	Hf	72	Tantalum	Ta	73
Hassium	Hs	108	Technetium	Tc	43
Helium	He	2	Tellurium	Te	52
Holmium	Ho	67	Terbium	Tb	65
Hydrogen	H	1	Thallium	Tl	81
Indium	In	49	Thorium	Th	90
Iodine	I	53	Thulium	Tm	69
Iridium	Ir	77	Tin	Sn	50
Iron	Fe	26	Titanium	Ti	22
Krypton	Kr	36	Tungsten	W	74
Lanthanum	La	57	Uranium	U	92
Lawrencium	Lr	103	Vanadium	V	23
Lead	Pb	82	Xenon	Xe	54
Lithium	Li	3	Ytterbium	Yb	70
Lutetium	Lu	71	Yttrium	Y	39
Magnesium	Mg	12	Zinc	Zn	30
Manganese	Mn	25	Zirconium	Zr100	40
Meitnerium	Mt	109			

NAMES, FORMULAE AND CHARGES OF SOME POLYATOMIC IONS

Positive Ions	Negative Ions
NH_4^+ Ammonium	CH_3COO^- Acetate
	CO_3^{2-} Carbonate
	ClO_3^- Chlorate
	ClO_2^- Chlorite
	CrO_4^{2-} Chromate
	CN^- Cyanide
	$\text{Cr}_2\text{O}_7^{2-}$ Dichromate
	HCO_3^- Hydrogen carbonate, bicarbonate
	HSO_4^- Hydrogen sulfate, bisulfate
	HS^- Hydrogen sulfide, bisulfide
	HSO_3^- Hydrogen sulfite, bisulfite
	OH^- Hydroxide
	ClO^- Hypochlorite
	NO_3^- Nitrate
	NO_2^- Nitrite
	ClO_4^- Perchlorate
	MnO_4^- Permanganate
	PO_4^{3-} Phosphate
	PO_3^{3-} Phosphite
	SO_4^{2-} Sulfate
	SO_3^{2-} Sulfite

NAMES AND FORMULAE OF COMMON ACIDS

Hydrochloric acid	HCl
Sulfuric acid	H_2SO_4
Nitric acid	HNO_3
Acetic acid	HCH_3COO

PREFIXES

1	mono
2	di
3	tri
4	tetra
5	penta
6	hexa
7	hepta
8	octa
9	nona
10	deca

SI (international scientific) units

Prefix	Symbol for Prefix		Scientific Notation
exa	E	1 000 000 000 000 000 000	10^{18}
peta	P	1 000 000 000 000 000	10^{15}
tera	T	1 000 000 000 000	10^{12}
giga	G	1 000 000 000	10^9
mega	M	1 000 000	10^6
kilo	k	1 000	10^3
hecto	h	100	10^2
deka	da	10	10^1
----	--	1	10^0
deci	d	0.1	10^{-1}
centi	c	0.01	10^{-2}
milli	m	0.001	10^{-3}
micro	μ	0.000 001	10^{-6}
nano	n	0.000 000 001	10^{-9}
pico	p	0.000 000 000 001	10^{-12}
femto	f	0.000 000 000 000 001	10^{-15}
atto	a	0.000 000 000 000 000 001	10^{-18}

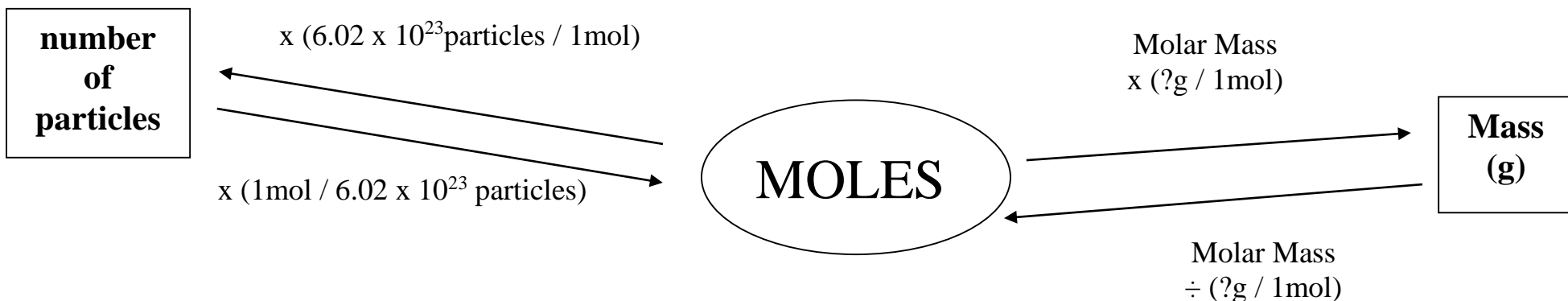
Measurement	Unit	Symbol
Mass (not weight)	kilogram	kg
Length	meter	m
Temperature	kelvin	K
Time	second	s

EQUATIONS OF MOTION

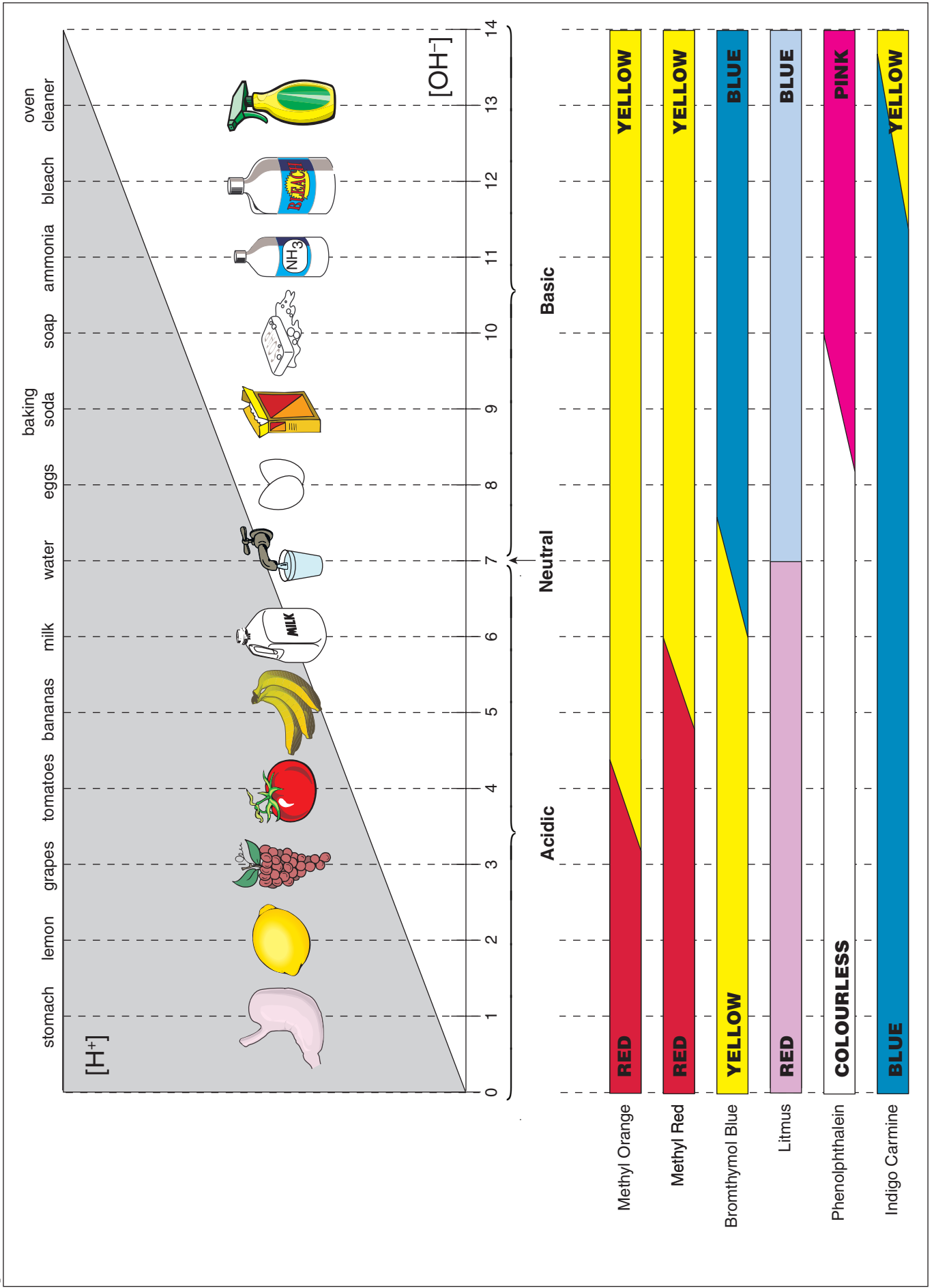
$v_{av} = \frac{\Delta d}{\Delta t}$ $\Delta d = v_{av} \Delta t$ $\Delta t = \frac{\Delta d}{v_{av}}$	$a = \frac{\Delta v}{\Delta t}$ $\Delta v = a \Delta t$ $\Delta t = \frac{\Delta v}{a}$	$\Delta v = v_f - v_i$ $v_i = v_f - \Delta v$ $v_f = v_i + \Delta v$
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- $g = 9.81 \text{ m/s}^2$
 - the acceleration due to gravity
- $\Delta E = W = F \times d$
- $F = m \times a$
- $E_k = \frac{1}{2} \times m \times v^2$
- $E_p = m \times g \times h$
- $E_m = E_k + E_p$

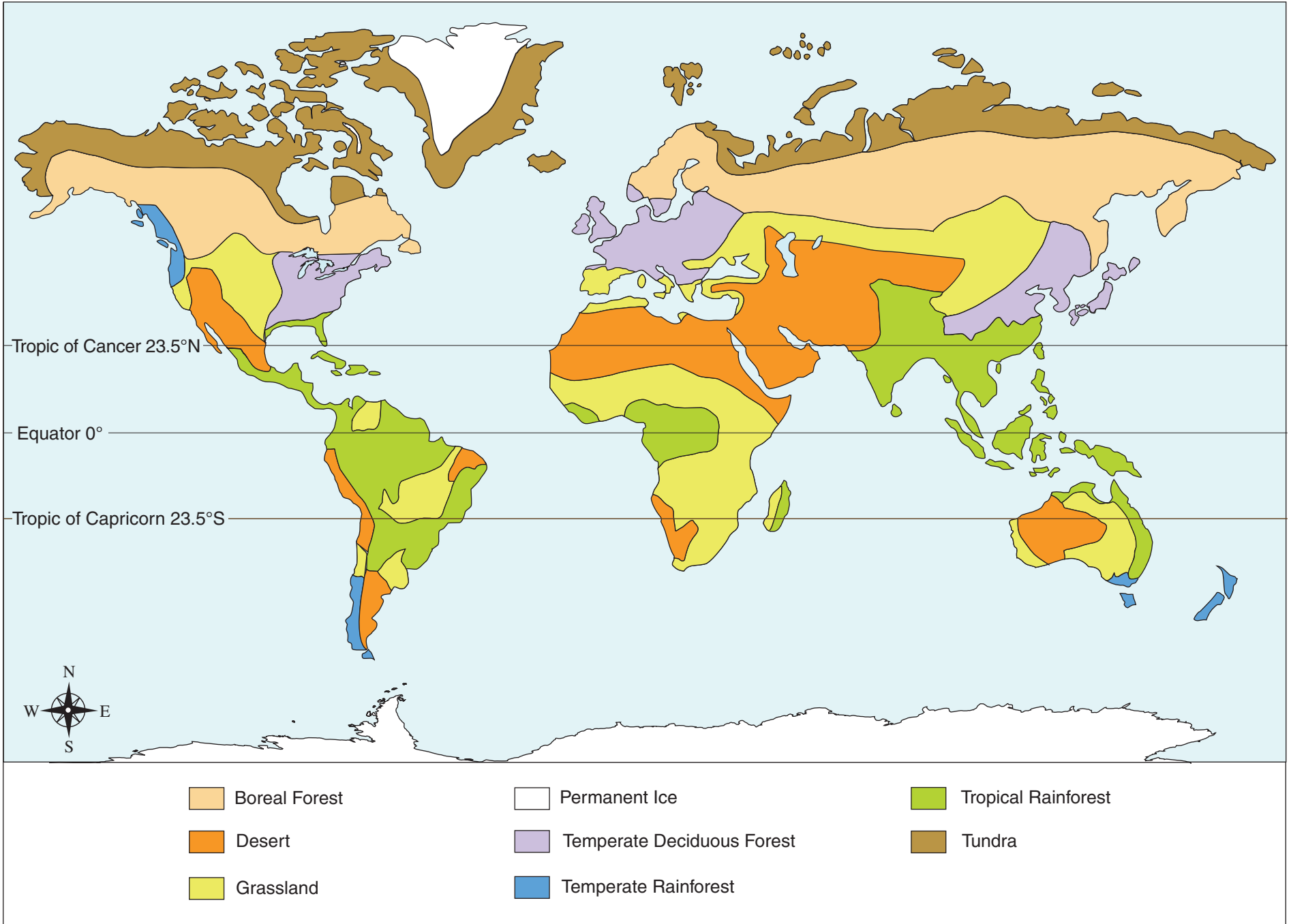
Mole Conversion Picture



pH SCALE



BIOMES OF THE WORLD



Different sources will provide varying information.