CONCEPT: ATOMIC MASS (CONCEPTUAL)

- **Atomic Masses** of elements can be found by simply looking at the Periodic Table.
  - □ The atomic mass of an element is an average of all its isotopes that uses the units of _____, _____ or _____.
  - □ Recall that 1 amu = _____ kg.

	1A (1)	2A (2)	3B (3)	4B (4)	5B (5)	6B (6)	7B (7)	8B (8)	8B (9)	8B (10)	1B (11)	2B (12)	3A (13)	4A (14)	5A (15)	6A (16)	7A (17)	8A (18)
1	1 H 1.008																	2 He 4.003
2	3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
3	11 Na 22.99	12 Mg 24.31											13 Al 26.982	14 Si 28.085	15 P 30.974	16 S 32.06	17 Cl 35.45	18 Ar 39.948
4	19 K 39.10	20 Ca 40.08	21 Sc 44.956	22 Ti 47.867	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.38	31 Ga 69.723	32 Ge 72.630	33 As 74.922	34 Se 78.971	35 Br 79.904	36 Kr 83.798
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.95	43 Tc 98	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
6	55 Cs 132.91	56 Ba 137.33	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)
7	87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (267)	105 Db (268)	106 Sg (269)	107 Bh (270)	108 Hs (270)	109 Mt (278)	110 Ds (281)	111 Rg (282)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (290)	116 Lv (293)	117 Ts (294)	118 Og (294)

58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.05	71 Lu 174.97
90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (266)

EXAMPLE: Which of the following represents an element from the first column with the greatest atomic mass?

a) Ba b) Al c) Cs d) Li e) Na

PRACTICE: Which of the following choices has the greatest atomic mass?

a) Element A (0.283 kg)

b) Element B (3.20×10^{24} amu)

c) Element C (0.350 kg)

d) Element D (4.14×10^{26} Da)

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Most Abundant Isotope

- Recall, the atomic mass of an element is an _____ of all its isotopes.
  - □ Most abundant isotope for an element is the one with a _____ number closest to the atomic mass of the element.

Atomic Masses

Element	Atomic Mass	Isotope Symbols	Most Abundant
Hydrogen	1.008 amu	$^{1}_{1}H$ $^{2}_{1}H$ $^{3}_{1}H$	_____
Boron	10.81 amu	$^{10}_{5}B$ $^{11}_{5}B$	_____
Sulfur	32.06 amu	$^{32}_{16}S$ $^{33}_{16}S$ $^{34}_{16}S$ $^{36}_{16}S$	_____

EXAMPLE: Oxygen consists of three isotopes, $^{16}_{8}O$, $^{17}_{8}O$, and $^{18}_{8}O$. If the atomic mass for oxygen on the periodic table is 15.999 amu, which isotope is the most abundant?

a) $^{16}_{8}O$ b) $^{17}_{8}O$ c) $^{18}_{8}O$ d) Cannot be determined.

PRACTICE: Vanadium consists of two isotopes, $^{50}_{23}V$ and $^{51}_{23}V$. If the atomic mass for vanadium on the periodic table is 50.942 amu, are there more atoms of $^{50}_{23}V$ and $^{51}_{23}V$ in a sample of vanadium?

a) $^{50}_{23}V$ b) $^{51}_{23}V$ c) They are equal. d) Cannot be determined.

PRACTICE: Potassium consists of three isotopes, $^{39}_{19}K$, $^{40}_{19}K$, and $^{41}_{19}K$. Based on its atomic mass, which isotope of potassium is the most abundant?

a) $^{39}_{19}K$ b) $^{40}_{19}K$ c) $^{41}_{19}K$ d) None of the following