

ATOM BUILDING WORKSHEET

Let us consider the elements Magnesium (Mg), Uranium (U), Iron (Fe), and Beryllium (Be). These elements represent different methods of nucleus building.

1. Match the five elements above with the mechanism that created them.
 - a) end of the Big Bang
 - b) red giant
 - c) supergiant
 - d) supernovae

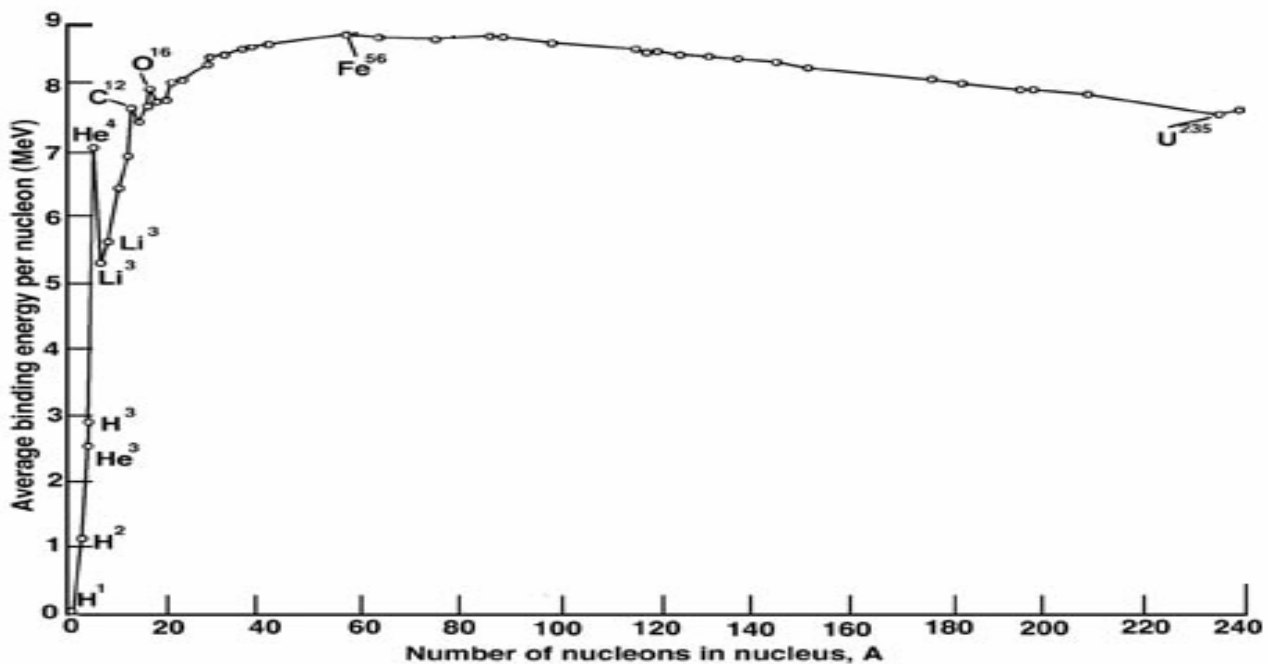
2. Using the periodic table, determine each element's:
 - a) atomic number
 - b) atomic mass number (rounded to the nearest whole number)
 - c) average number of neutrons

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1 H 1.008	IIa																IIb	IVa	Va	VIa	VIIa	2 He 4.00
3 Li 6.94	4 Be 9.01	12 Mg 24.31														<- Atomic number <- Chemical symbol <- Atomic weight	5 B 10.81	6 C 12.01	7 N 14.00	8 O 15.99	9 F 18.99	10 Ne 20.18
11 Na 22.99	12 Mg 24.31	IIb	IVb	Vb	VIb	VIII					IB	IIb	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95				
19 K 39.10	20 Ca 40.08	21 Sc 44.6	22 Ti 47.90	23 V 50.94	24 Cr 51.99	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.91	36 Kr 83.80					
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc 99	44 Ru 101.97	45 Rh 102.91	46 Pd 106.4	47 Ag 107.87	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.90	54 Xe 131.30					
55 Cs 132.91	56 Ba 137.34	57-71 see below	72 Hf 178.49	73 Ta 180.95	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.97	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.98	84 Po 210	85 At 210	86 Rn 222					
87 Fr 223	88 Ra 226	89-103 see below	104 Rf 261	105 Ha 260	106 Sg 263																	

57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 147	62 Sm 150.35	63 Eu 151.96	64 Gd 157.24	65 Tb 158.92	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
89 Ac 227	90 Th 232.04	91 Pa 231	92 U 238.03	93 Np 237	94 Pu 242	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 254	100 Fm 253	101 Md 256	102 No 254	103 Lw 257

3. Use the following graph to determine the binding energy per nucleon or each of the five elements.



4. Which element has the greatest binding energy per nucleon?

5. Determine the total binding energy for each nucleus. This is equal to the binding energy per nucleon multiplied by the mass number. This is the total energy needed to bind each nucleus.

6. What is the maximum energy available for nuclear binding in the following scenarios?
 - a) end of the big bang
 - b) red giants
 - c) supergiants
 - e) supernovae