1. (a) Larger nuclear charge (Z) = larger effective nuclear charge (Z_e) ⟶ that means higher ionization energy
   (b) More loops = larger n ⟶ so ionization energy decreases
   (c) This would shield the electron. Shielding causes the electron wave to increase in energy, and so the ionization energy decreases
   (d) Electron-electron repulsion tends to decrease the ionization energy.

2. Ionization energy: $I = \Delta E = E_f - E_i = E_\infty - E_n = 0 + \frac{(2.18\text{ aJ})Z_e^2}{n^2} = \frac{(2.18\text{ aJ})Z_e^2}{n^2}$

Atom	Z	Electron configuration	Trend in ionization energy compared to previous atom, and explanation
H	1	$1s^1$	–
He	2	$1s^2$	*IE* of He is higher than H, because He has a larger nuclear charge, but the electron being ionized is still $n = 1$ (increased effective nuclear charge)
Li	3	$1s^2 2s^1$	*IE* of Li is lower than He, because the electron ionized from He is 1s and the electron ionized from Li is 2s (new shell)
Be	4	$1s^2 2s^2$	*IE* of Be > *IE* of Li, because of the increased effective nuclear charge.
B	5	$1s^2 2s^2 2p_x^1$	*IE* of B < *IE* of Be, because 2p is more shielded than 2s. So the 2p orbital energy is higher ⟶ so the *IE* of a 2p electron is lower (more shielding)
C	6	$1s^2 2s^2 2p_x^1 2p_y^1$	*IE* of C > *IE* of B, because of the increased effective nuclear charge
N	7	$1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$	*IE* of N > *IE* of C, because of the increased effective nuclear charge
O	8	$1s^2 2s^2 2p_x^1 2p_y^2 2p_z^1$	*IE* of O < *IE* of N, because pairing a 2p electron causes a large increase in electron/electron repulsion (increased electron/electron repulsion)
F	9	$1s^2 2s^2 2p_x^2 2p_y^2 2p_z^1$	*IE* of F > *IE* of O, because of the increased effective nuclear charge
Ne	10	$1s^2 2s^2 2p^6$	*IE* of Ne > *IE* of F, because of the increased effective nuclear charge
Na	11	$1s^2 2s^2 2p^6 3s^1$	*IE* of Na < *IE* of Ne, because the Na valence electron is part of a new shell.
Mg	12	$1s^2 2s^2 2p^6 3s^2$	*IE* of Mg > *IE* of Na, because of the increased effective nuclear charge.
Al	13	$1s^2 2s^2 2p^6 3s^2 3p_y^1$	*IE* of Al < *IE* of Mg, because of more shielding
Si	14	$1s^2 2s^2 2p^6 3s^2 3p_y^1 3p_z^1$	*IE* of Si > *IE* of Al, because of the increased effective nuclear charge
P	15	…	…