## Atomic Structure Answers

1. The Atomic Number of an element shows the number of: Protons
2. The Atomic Mass of an atom shows the number of: Protons + Neutrons
3. The number of Neutrons can be calculated by taking the Atomic Mass and subtracting the Atomic Number.
4. Protons have a positive charge and electrons have a negative charge.
5. Atoms are usually neutral (they have an equal number of positive and negative charges). Therefore, the number of protons is equal to the number of electrons in an atom.

| Element Name | Element Symbol | Atomic <br> Number | Atomic Mass | Number of Electrons | Number of Protons | Number of Neutrons |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Oxygen | O | 8 | 16 | 8 | 8 | 8 |
| Carbon | C | 6 | 12 | 6 | 6 | 6 |
| Hydrogen | H | 1 | 1 | 1 | 1 | $\underline{0}$ |
| Nitrogen | N | 7 | 14 | 7 | 7 | 7 |
| Calcium | Ca | 20 | 40 | 20 | 20 | 20 |
| Phosphorus | P | 15 | 31 | 15 | 15 | 16 |
| Chlorine | Cl | 17 | 35 | 17 | 17 | 18 |
| Magnesium | Mg | 12 | 24 | 12 | 12 | 12 |
| Silicon | Si | 14 | 28 | 14 | 14 | 14 |
| Potassium | K | 19 | 39 | 19 | 19 | 20 |
| Strontium | Sr | 38 | 88 | 38 | 38 | 50 |
| Francium | Fr | 87 | 223 | 87 | 87 | 136 |
| Xenon | Xe | 54 | 131 | 54 | 54 | 77 |

Find answers with the Periodic Table on the 2nd page or here: http://www.ptable.com/

| $\begin{gathered} \text { hydrogen } \\ 1 \\ \text { H } \\ 1 \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{gathered} \text { helium } \\ 2 \\ \text { He } \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1.0079 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 4.0026 |
| $\begin{gathered} \text { lithium } \\ 3 \end{gathered}$ | $\begin{gathered} \text { beryllium } \\ 4 \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  | $\begin{gathered} \hline \text { boron } \\ 5 \end{gathered}$ | $\begin{gathered} \text { carbon } \\ 6 \end{gathered}$ | $\begin{aligned} & \text { nitrogen } \\ & 7 \end{aligned}$ | $\begin{gathered} \text { oxygen } \\ 8 \end{gathered}$ | $\begin{aligned} & \text { fluorine } \\ & 9 \end{aligned}$ | $\begin{aligned} & \text { nean } \\ & 10 \end{aligned}$ |
| - |  |  |  |  |  |  |  |  |  |  |  |  | B | C | N | $0$ | $F$ | Ne |
| 6.941 | 9.0122 |  |  |  |  |  |  |  |  |  |  |  | 10.811 | 12.011 | 14.007 | 15.999 | 18.998 | 20.180 |
| $\begin{gathered} \text { sodium } \\ 11 \end{gathered}$ | $\begin{gathered} \hline \text { magnesium } \\ 12 \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  | aluminium 13 | $\begin{gathered} \text { silicon } \\ \hline \end{gathered}$ | phosphorus 15 | $\begin{gathered} \text { sulfur } \\ 16 \end{gathered}$ | chlorine 17 | $\begin{aligned} & \text { argon } \\ & 18 \end{aligned}$ |
| $\mathrm{Na}$ | $\mathrm{Mg}$ |  |  |  |  |  |  |  |  |  |  |  | $\mathbf{A}$ | Si | P | $S$ | $\mathrm{Cl}$ | Ar |
| 22.990 | 24.305 |  |  |  |  |  |  |  |  |  |  |  | 26.982 | 28.086 | 30.974 | 32.065 | 35.453 | 39.948 |
| $\begin{gathered} \hline \text { potassium } \\ 19 \end{gathered}$ | $\begin{gathered} \hline \text { calcium } \\ 20 \end{gathered}$ |  | $\begin{gathered} \hline \text { scandium } \\ 21 \end{gathered}$ | $\begin{aligned} & \text { titanium } \\ & 22 \end{aligned}$ | vanadium 23 | chromium 24 | $\begin{array}{c\|} \hline \text { manganese } \\ 25 \end{array}$ | $\begin{gathered} \text { iron } \\ 26 \end{gathered}$ | $\begin{aligned} & \text { cobalt } \\ & 27 \end{aligned}$ | $\begin{gathered} \text { nickel } \\ 28 \end{gathered}$ | $\begin{aligned} & \text { copper } \\ & 29 \end{aligned}$ | $\begin{aligned} & \text { zinc } \\ & 30 \end{aligned}$ | $\begin{aligned} & \text { gallium } \\ & 31 \end{aligned}$ | $\begin{aligned} & \text { germanium } \\ & 32 \end{aligned}$ | $\begin{aligned} & \text { arsenic } \\ & 33 \end{aligned}$ | $\begin{gathered} \text { selenium } \\ 34 \end{gathered}$ | $\begin{gathered} \hline \text { bromine } \\ 35 \end{gathered}$ | krypton 36 |
| $K$ | Ca |  | SC | TI |  | Cr | $\mathrm{M} \cap$ | Fe | CO | $\mathbf{N i}$ | Cu | $Z n$ | Ga | Ge | AS | Se |  |  |
| 39.098 | 40.078 |  | 44.956 | 47.867 | 50.942 | 51.996 | 54.938 | 55.845 | 58.933 | 58.693 | 63.546 | 65.39 | 69.723 | 72.61 | 74.922 | 78.96 | 79.904 | 83.80 |
| $\begin{aligned} & \text { rubidium } \\ & 37 \end{aligned}$ | $\begin{gathered} \text { strontium } \\ 38 \end{gathered}$ |  | $\begin{gathered} \text { yttrium } \\ 39 \end{gathered}$ | $\begin{gathered} \text { zirconium } \\ 40 \end{gathered}$ | $\begin{gathered} \text { niobium } \\ 41 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { molybdenum } \\ 42 \\ \hline \end{array}$ | $\begin{aligned} & \hline \text { technetium } \\ & 43 \end{aligned}$ | $\begin{array}{c\|} \hline \text { ruthenium } \\ 44 \end{array}$ | $\begin{gathered} \text { rhodium } \\ 45 \end{gathered}$ | $\begin{gathered} \text { palladium } \\ 46 \end{gathered}$ | $\begin{gathered} \text { silver } \\ 47 \end{gathered}$ | cadmium 48 | $\begin{gathered} \text { indium } \\ 49 \end{gathered}$ | $\begin{aligned} & \text { tin } \\ & 50 \end{aligned}$ | $\begin{aligned} & \text { antimony } \\ & 51 \end{aligned}$ | $\begin{aligned} & \text { tellurium } \\ & 52 \end{aligned}$ | $\begin{gathered} \text { iodine } \\ 53 \end{gathered}$ | $\begin{gathered} \text { xenon } \\ 54 \end{gathered}$ |
| Ro | Sr |  | Y | $\mathrm{Zr}$ | Nb | MO | TC | RU | $R h$ | Pd | $A g$ | Cd | $1 \cap$ | $S n$ | Sb |  | $\\|$ | $\mathbf{X e}$ |
| 85.468 | 87.62 |  | 88.906 | 91.224 | 92.906 | 95.94 | [98] | 101.07 | 102.91 | 106.42 | 107.87 | 112.41 | 114.82 | 118.71 | 121.76 | 127.60 | 126.90 | 131.29 |
| $\begin{gathered} \text { caesium } \\ 55 \end{gathered}$ | $\begin{gathered} \text { barium } \\ 56 \end{gathered}$ | 57-70 | $\begin{aligned} & \text { lutetium } \\ & 71 \end{aligned}$ | $\begin{gathered} \text { hafnium } \\ 72 \end{gathered}$ | $\begin{array}{c\|} \hline \text { tantalum } \\ 73 \end{array}$ | tungsten 74 | $\begin{aligned} & \text { rhenium } \\ & 75 \end{aligned}$ | osmium 76 | $\begin{aligned} & \text { iridium } \\ & 77 \end{aligned}$ | $\begin{aligned} & \text { platinum } \\ & 78 \end{aligned}$ | $\begin{aligned} & \text { gold } \\ & 79 \end{aligned}$ | $\begin{aligned} & \text { mercury } \\ & 80 \end{aligned}$ | $\begin{gathered} \text { thallium } \\ 81 \end{gathered}$ | $\begin{aligned} & \text { leed } \\ & 82 \end{aligned}$ | $\begin{aligned} & \text { bismuth } \\ & 83 \end{aligned}$ | $\begin{array}{c\|} \hline \text { polonium } \\ 84 \end{array}$ | $\begin{gathered} \hline \text { astatine } \\ 85 \end{gathered}$ | $\begin{gathered} \text { radon } \\ 86 \end{gathered}$ |
| $\mathrm{CS}$ | $8 a$ | * | LU | Hf | Ta | $\mathbf{M}$ | Re | Os | Ir | $P t$ | $\mathrm{AU}$ | $\mathrm{Hg}$ | $T \\|$ | Pb | $B i$ | $P_{0}$ | $A t$ | Rn |
| 132.91 | 137.33 |  | 174.97 | 178.49 | 180.95 | 183.84 | 186.21 | 190.23 | 192.22 | 195.08 | 196.97 | 200.59 | 204.38 | 207.2 | 208.98 | [209] | [210] | [222] |
| $\begin{aligned} & \text { francium } \\ & 87 \end{aligned}$ | $\begin{gathered} \hline \text { radium } \\ 88 \end{gathered}$ | 89-102 | $\begin{gathered} \hline \text { lawrencium } \\ 103 \end{gathered}$ | rutherfordium 104 | $\begin{gathered} \hline \text { dubnium } \\ 105 \end{gathered}$ | $\begin{array}{c\|} \hline \text { seaborgium } \\ 106 \end{array}$ | $\begin{gathered} \text { bohrium } \\ 107 \end{gathered}$ | $\begin{aligned} & \text { hassium } \\ & 108 \end{aligned}$ | $\begin{gathered} \hline \text { meitnerium } \\ 109 \end{gathered}$ | $\begin{gathered} \hline \text { ununnilium } \\ 110 \end{gathered}$ | $\begin{gathered} \hline \text { unununium } \\ 111 \end{gathered}$ | $\begin{array}{c\|} \hline \text { ununbium } \\ 112 \end{array}$ |  | $\begin{array}{\|c\|} \hline \text { ununquadium } \\ 114 \\ \hline \end{array}$ |  |  |  |  |
| Er | $P a$ | * * | $L r$ | Rf | Db | Sg | $3 h$ | HS | $\mathrm{Mt}$ | Uun | UuU | Uub |  | Uuq |  |  |  |  |
| [223] | [226] |  | [262] | [261] | [262] | [266] | [264] | [269] | [268] | [271] | [272] | [277] |  | [289] |  |  |  |  |


| *Lanthanide series | lanthanum | ${ }^{\text {cerium }}$ | praseodymium | neodymium | promethium | samarium | europium | gadolinium | terbium | dysprosium | holmium | erbium | thulium | ytterbium |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
|  | La | Ce | Pr | Nd | PMn | Sm | EU | Gd | Tb | Dy | 1 HO | Er | TM | Yb |
| **Actinide series | 138.91 | 140.12 | 140.91 | 144.24 | [145] | 150.36 | 151.96 | 157.25 | 158.93 | 162.50 | 164.93 | 167.26 | 168.93 | 173.04 |
|  | $\begin{gathered} \text { actinium } \\ 89 \end{gathered}$ | $\begin{gathered} \text { thorium } \\ 90 \end{gathered}$ | $\begin{array}{c\|} \hline \text { protactinium } \\ 91 \end{array}$ | $\begin{gathered} \text { uranium } \\ 92 \end{gathered}$ | $\begin{array}{c\|} \hline \text { neptunium } \\ 93 \end{array}$ | plutonium 94 | $\begin{aligned} & \hline \text { americium } \\ & 95 \end{aligned}$ | $\begin{gathered} \text { curium } \\ 96 \end{gathered}$ | $\begin{aligned} & \hline \text { berkelium } \\ & 97 \end{aligned}$ | $\begin{aligned} & \text { californium } \\ & 98 \end{aligned}$ | $\begin{gathered} \hline \text { einsteinium } \\ 99 \end{gathered}$ | $\begin{gathered} \text { fermium } \\ 100 \end{gathered}$ | $\begin{array}{\|c\|} \hline \text { mendelevium } \\ 101 \end{array}$ | $\begin{gathered} \hline \text { nobelium } \\ 102 \end{gathered}$ |
|  | $A C$ |  |  |  | NO | PU | AMn | Cm | BK | Cf | ES | FMn | Mc | NO |
|  | [227] | 232.04 | 231.04 | 238.03 | [237] | [244] | [243] | [247] | [247] | [251] | [252] | [257] | [258] | [259] |

