

# “PERIODIC TABLE PUZZLE”

## ANSWER KEY

1. **C** (Cannot be “I” because “I” is Hydrogen, which is a gas, not a metal.)
2. **F** (Group 2 is the Alkaline Earth Metal Family)
3. **A** (“Inactive” means *not reactive*, also known as “inert.” The Noble Gases in Group 18 are inert because they do not easily react with other elements.)
4. **H** (“Active,” meaning “reactive.” Group 17, the Halogens, are the most reactive nonmetals. Letter “H” occupies the space of the element Fluorine, which is the most active nonmetal on the Periodic Table.)
5. **B** (“Semi-metal” is the same as a “metalloid,” referring to elements that have some of the physical and chemical properties typical of metals, but other properties that are not characteristic of metals. )
6. **D** (“E” is technically a Transition Metal, not an “Inner” Transition Metal)
7. **G** (Oxidation state, or oxidation number, refers to the charge an atom would have if it became an ion. Elements in Group 16, such as “G,” all have 6 valence electrons, meaning they would need 2 more electrons to complete their valence shell. Since electrons have negative charges, gaining 2 more would give the ion a charge of -2.)
8. **E** (Transition Metals like “E” do not follow the standard rules. For instance, many have more than one oxidation number. Also, answer can’t be “B” because B is a semimetal/metalloid, not a metal.)
9. **J** (“B” is in Group 13, meaning it has 3 valence electrons. It would be easier for it donate 3 negative electrons, leaving it with a charge of +3, than it would for it to gain 5, for a charge of -5.)
10. **I** (“I” is in the place of Hydrogen, which could gain 1 electron to fill the first electron shell, or lose 1 electron to become the common positive ion H<sup>+</sup>.)

# “PERIODIC TABLE WORKSHEET”

## ANSWER KEY

1. **Group 1 – Alkali Metals**, especially bottom-left. (Reactivity increases as you move down the Group.) **Francium** is the most reactive metal.
2. **Group 17 – Halogens** (“Salt Makers”), especially top-right (before Noble Gasses); Fluorine is the most reactive nonmetal.
3. **Decreases**; Atomic size (also known as atomic radius) decreases left-to-right because additional protons are being added, and the increased positive charge pulls the electron shells closer towards the nucleus.
4. **Increases**; Atomic size/radius gets larger as you move down a group because each additional period means another electron shell is required.
5. **Larger**; A negative ion (“anion”) is larger because additional electrons are being added to the cloud. Electrons repel each other. The attractive force of the protons is more spread out.
6. **Smaller**; A positive ion (“cation”) is smaller because an electron has left. The attractive force of the protons is concentrated on fewer electrons, pulling them closer to the nucleus.
7. **Increases**; Ionization energy is the amount of energy required to pull away an electron. As you move right, getting closer and closer to having a full electron shells like a Noble Gas, it takes more and more energy to steal away an electron. But near the left, when atoms have only 1 or 2 electrons in their valence shell, they are more likely to donate their electrons.

8. **Decreases;** Again, ionization energy is how “hard” it is to remove an electron. In periods 1 and 2, the electrons are very close to the nucleus, and are strongly attracted. In period 7, they are further away, and so it requires less energy to break the attractive force.
9. **F (Fluorine)** – Top, Right-hand side
10. **Fr (Francium)** – Bottom, Left-hand side
11. **Alkali Metals**
12. **Alkaline Earth Metals**
13. **Transition Metals**
14. **Metals, Nonmetals**
15. **Halogens (“Salt Makers”)**
16. **F (Fluorine)**
17. **Noble Gasses**
18. [DISREGARD] – “d” subshell
19. **Valence Electrons**
20. **Electrons Shells**
21. [DISREGARD] – Transition Metal
22. **More**
23. **Metals**
24. **Atomic Number** (Protons)
25. **Metalloid** (or “semimetal”)