



1. How many electrons do metal atoms have in their outer ring?
 - (A) 1, 2, or 3
 - (B) 3, 4, or 5
 - (C) 4, 5, or 6
 - (D) 5, 6, or 7

2. Metal atoms bond together by _____.
 - (A) giving and taking electrons
 - (B) sharing electrons equally
 - (C) sharing electrons unequally
 - (D) dumping their electrons into a sea of electrons

3. Why does dumping their outer electrons into a sea of electrons cause metal atoms to pull together?
 - (A) When metal atoms dump their electrons, they become positive metal ions which are attracted to other positive metal ions.
 - (B) When metal atoms dump their electrons, they become positive metal ions which are attracted to the electrons still circling the nuclei of other metal atoms.
 - (C) When metal atoms dump their electrons, they become positive metal ions which are attracted to all the released electrons.
 - (D) When metal atoms dump their electrons, they become positive metal ions which are repelling each other and forcing each closer together.

4. How do metal ions arrange themselves?
 - (A) alternating rows of positive and negative metal ions.
 - (B) groups of positive metal ions clustered around a small cloud of electrons
 - (C) rows and columns of positive metal ions
 - (D) rows and columns of neutral metal atoms

5. Why do metals bend instead cracking when hammered?

- (A) Because rows of positive metal ions are still lying next to positive metal ions after they've been shifted over by the hammer.
- (B) Because the metallic bond holding positive metal ions together is extremely strong.
- (C) Because positive metal ions are able to repel the positive metal ions in the hammer.
- (D) Because metals are able to transfer mechanical force into the metal before the force can split the surface metal ions.

6. Why are metals such good conductors of electricity?

- (A) Because free-floating electrons in the sea of electrons are readily able to leap from positive metal ion to positive metal ion.
- (B) Because free-floating electrons in the sea of electrons are readily able to shoot down the aisles between rows and columns of metal ions.
- (C) Because electrical charges are able to avoid the center of the sea of electrons by speeding along the surface of the sea of electrons.
- (D) Because there are so many electrons in the sea of electrons to carry the electrical charges.

7. Why do metals feel cold?

- (A) Because the positive metal ions in a metal are being rigidly held and cannot jiggle in place.
- (B) Because positive metal ions do not conduct heat very well.
- (C) Because electrons prevent heat from begin transferred out of the metal bonds.
- (D) Because metals rapidly conduct heat away from the skin.

8. How is heat conduction different in a metal from most other substances?

- (A) Heat is conducted through the jiggling of positive metal atoms being held rigidly together.
- (B) Heat is conducted by electrons shooting down the aisles between positive metal ions.
- (C) Heat is conducted by the transfer of heat waves between rigidly held metal ions.
- (D) Heat is conducted by negative electrons rapidly leaping from one positive ion to the next.

9. What is an alloy?

- (A) An alloy is a mixture of two metals.
- (B) An alloy is rearrangement of metal ions into interlocking clusters.
- (C) An alloy is a metal made harder by hammering and heating it.
- (D) An alloy is a metal with interconnecting bonds between the rows and columns of positive metal ions.

10. Which of the following metals are not alloys?

- (A) bronze
- (B) iron
- (C) pewter
- (D) brass