1. What is a regular, repeating three-dimensional arrangement of atoms called?

2. Do the separate electrons belong exclusively to a single atom? What word is used to describe such electrons?

3. Why are the central atoms shown as positively charged?

4. How does the number of separate electrons shown for the group 1A metal atoms compare to the number of atoms? Explain why in terms of valence electrons.

5. How does the number of separate electrons shown for the group 2A metal atoms compare to the number of atoms?

6. What holds the metal atoms together in such an arrangement?

7. What term is used to describe this model of metallic bonding?

8. How well do metals conduct electricity? How does the model of metallic bonding account for that property?

9. Are metals brittle, or are they malleable and ductile? How does the model of metallic bonding account for that property?

10. Why are the electrons in a metallic solid described as delocalized?

11. Which electrons from the metal make up the delocalized electrons?

12. Are the metal atoms that are shown cations or anions?

13. How do metallic ions differ from the ions that exist in ionic solids?

14. Explain what holds the metal atoms together in the solid.
1. What is a regular, repeating three-dimensional arrangement of atoms called?
   a crystal lattice

2. Do the separate electrons belong exclusively to a single atom? What word is used to describe such electrons?
   no; delocalized

3. Why are the central atoms shown as positively charged?
   The delocalized negative electrons came from neutral atoms, thus leaving the atoms with a positive charge.

4. How does the number of separate electrons shown for the group 1A metal atoms compare to the number of atoms? Explain why in terms of valence electrons.
   They are equal. Group 1A atoms have only one valence electron and thus only one electron that can become delocalized.

5. How does the number of separate electrons shown for the group 2A metal atoms compare to the number of atoms?
   There are twice as many electrons as group 2A atoms.

6. What holds the metal atoms together in such an arrangement?
   The delocalized electrons are simultaneously attracted to more than one metal cation.

7. What term is used to describe this model of metallic bonding? Electron sea model

8. How well do metals conduct electricity? How does the model of metallic bonding account for that property?
Metals tend to conduct electricity well. The model’s delocalized electrons are not held strongly by individual atoms and are thus able to move easily throughout the metal.

9. Are metals brittle, or are they malleable and ductile? How does the model of metallic bonding account for that property?

Metals are malleable and ductile. The model’s delocalized electrons are able to move around the positive metal core atoms and keep the crystal from breaking during hammering or drawing into wire.

10. Why are the electrons in a metallic solid described as delocalized? They are free to move from one atom to another.

11. Which electrons from the metal make up the delocalized electrons? the valence electrons

12. Are the metal atoms that are shown cations or anions? How can you tell? Cations; they are positively charged.

13. How do the metallic ions differ from the ions that exist in ionic solids?

The electrons are not completely lost by the metal atoms, as they are in an ionic solid.

14. Explain what holds the metal atoms together in the solid.

They are bonded by the oppositely charged electron sea that surrounds them.