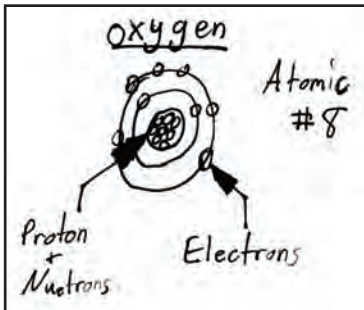


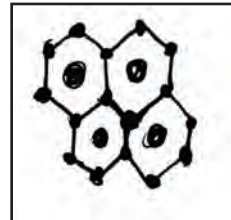
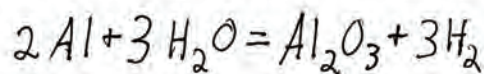
Science of Metals

Atomic Structure from Molecule to Crystal

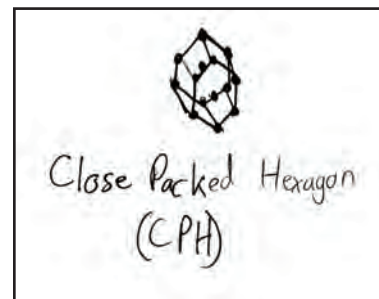
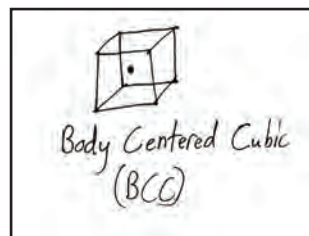
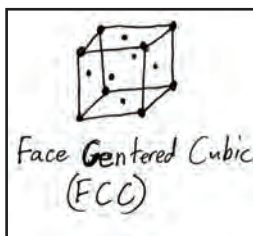
In order to work with metals and other materials while fabricating, you must know what the materials your using really are. All metals start with atoms. Atoms are made up of protons, neutrons, and electrons.



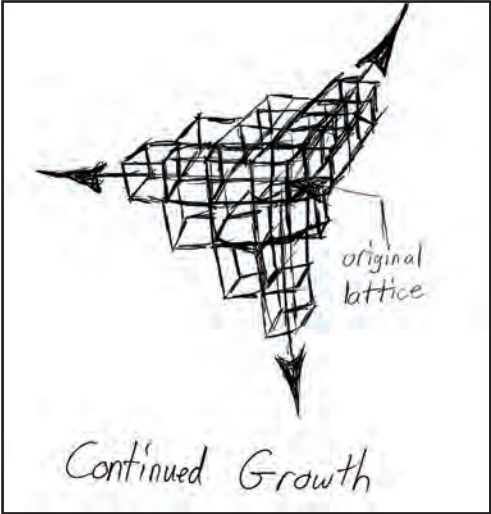
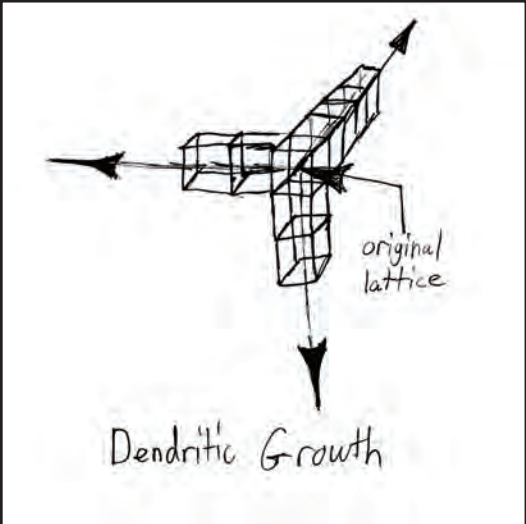
Atoms have an activation potential which allows them to bond together. Compounds are then formed when atoms share electrons to fill the outer electron valence rings, they then become stable. The smallest groupings of compounds are known as molecules.



There are three states of matter when dealing with materials. Gasses are defined as vibrations of atoms caused by heat. Liquids are atoms that are non-permanently grouped together. And Solids are cohesive attractive forces that overcome randomness to form geometric patterns called lattice patterns. Solids like metals are made of atoms placed in these patterns. There are seven possible lattice groupings with twenty-one variations within the seven types.



Liquids can form into solids after one lattice pattern nucleates which is called Dendritic Growth. Dendritic Growth is when spears shoot out from first organized lattice and begin to fill-in to create a solid made up of lattices known as grains or crystalline structures.



The organized rows of atoms in solids are known as slip planes. Metals are one thousand times weaker than what they theoretically should be. This is due to defects in metals. These slip planes have defects within that cause room to allow incremental movement.

