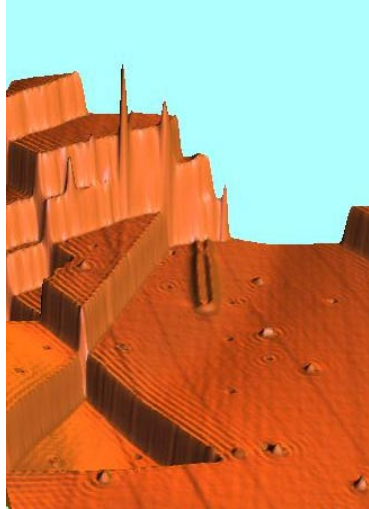


GSCI 101: Chemistry, Physics and the Human Experience



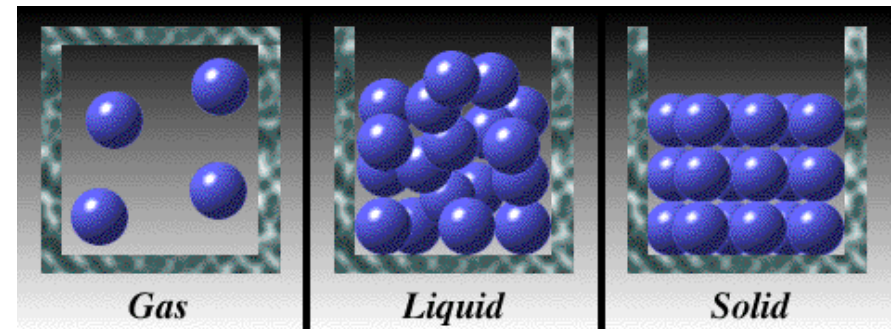
February 19, 2001

- Three States of Matter
- Bonding in Solids
 - Ionic Bonds
 - Covalent Bonds
 - Metallic Bonds

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Three States of Matter



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Properties of Each Phase

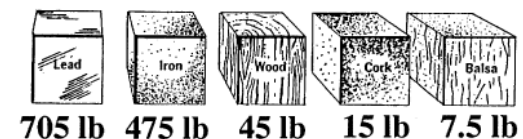
- Gases
 - Compressible
 - Low density (mass / volume)
 - Volume fills container
 - Molecules always in motion
 - Molecules bounce off of the side of their containers and off of each other
 - Solids
 - Definite volume
 - Assume the shape of their container
 - Molecules held rigidly in position
 - Little freedom of motion
 - Long or short range order
 - Almost incompressible
 - High Density
- Condensed Matter** (Liquid and Solids):
- Liquids
 - Close Together
 - More difficult to compress than a gas
 - More dense than a gas

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Density

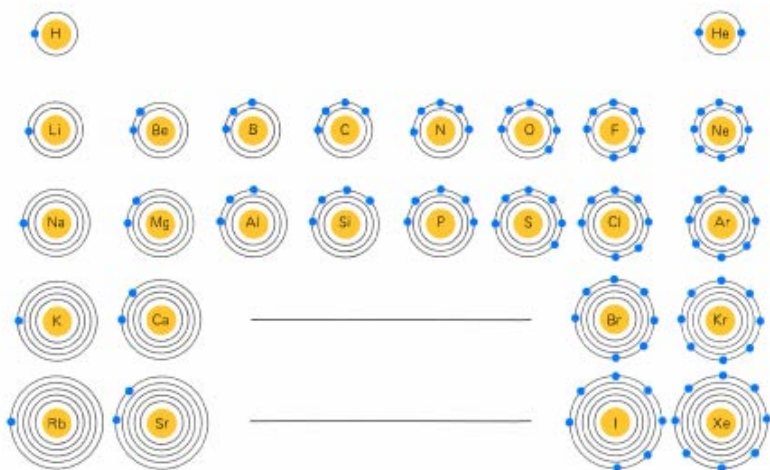
**RELATIVE DENSITIES:
One Cubic Foot of the
Following would Weigh;**



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Recall the Deeper Structure

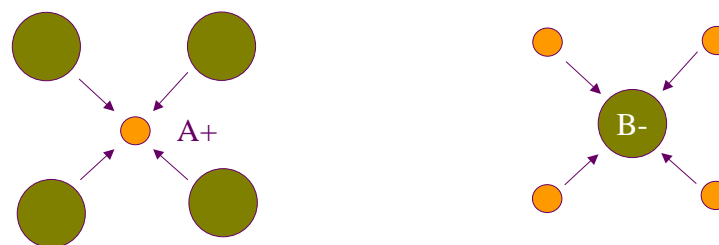


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Ionic Bonding and Crystal Structure

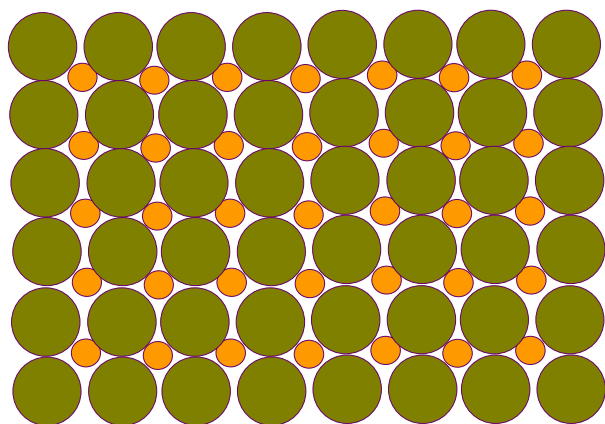
Ionic bonding is **non-directional** and the closeness of the ions is only restricted by the need to separate like charges (recall these repel one another), and to maintain electrical neutrality.



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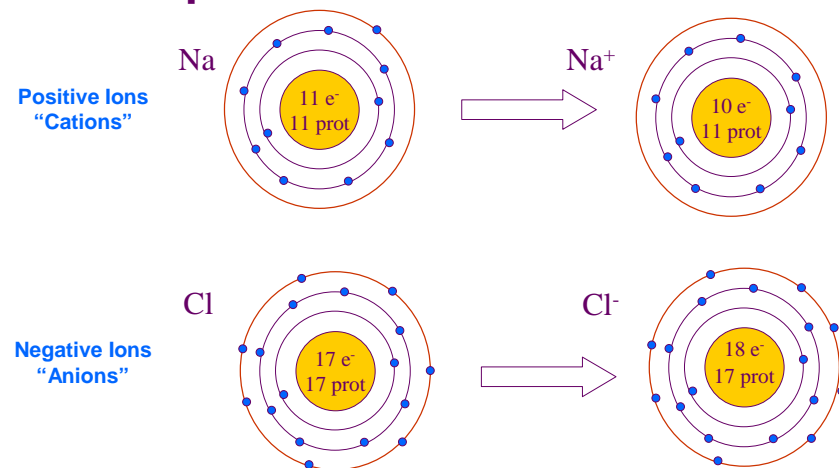
Two-Dimensional Bonding AB Crystal



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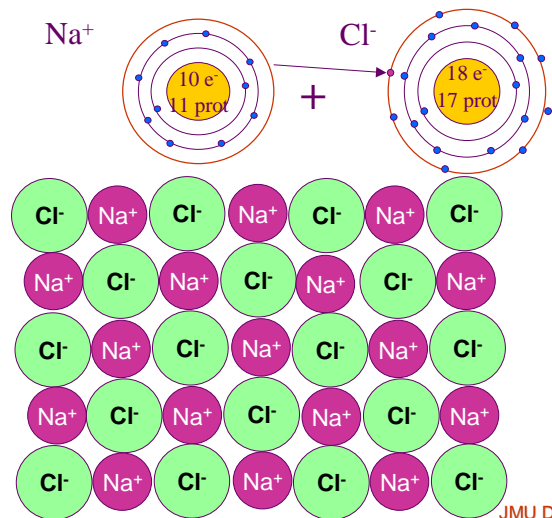
Recall the formation of an ionic compound



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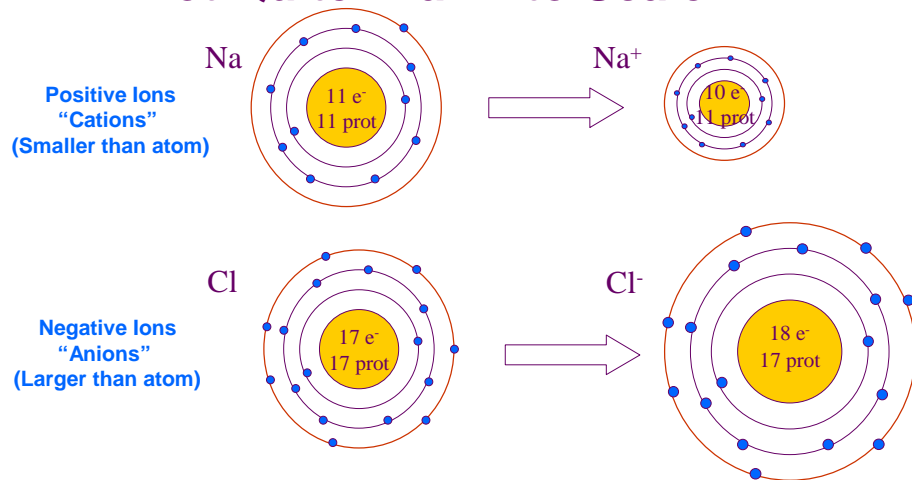
Octet Rule is satisfied for Na⁺ and Cl⁻



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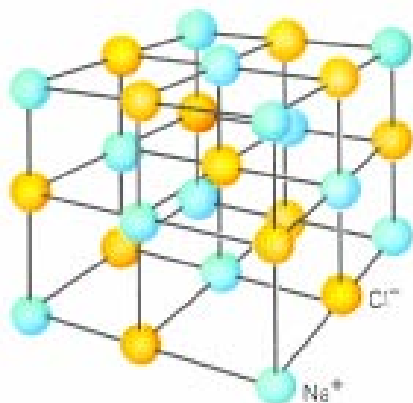
Not Quite Drawn to Scale...



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Crystal Structure of NaCl



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