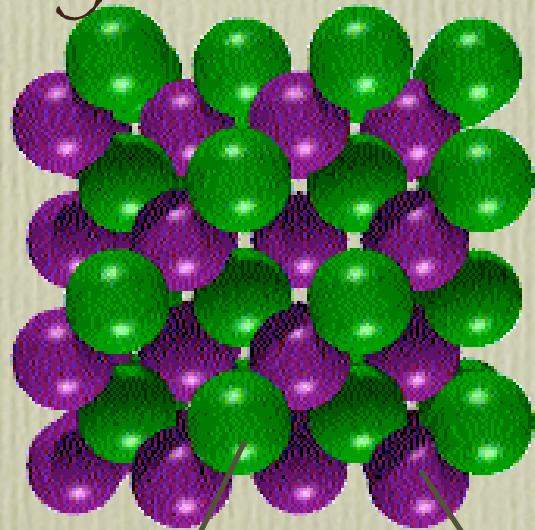


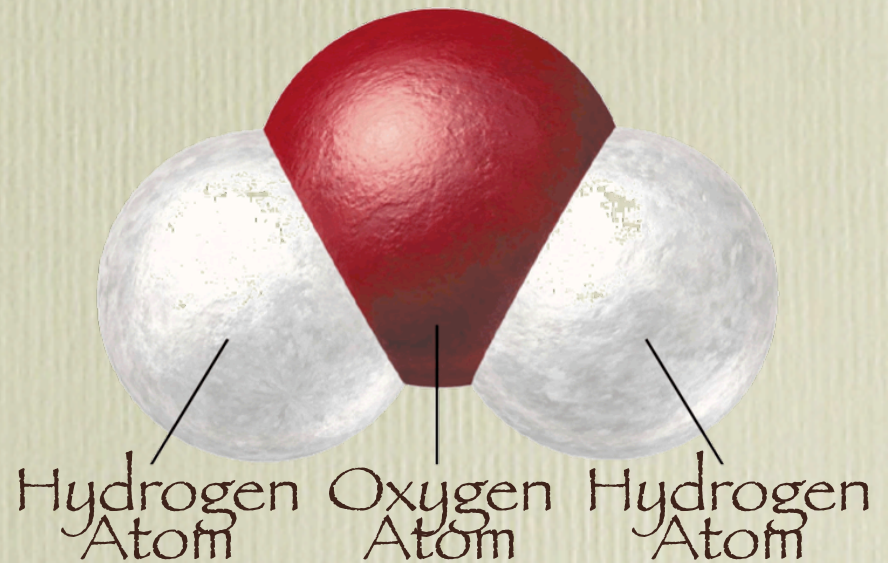
The Structure of Ionic & Covalent Compounds

FeS Crystalline Lattice



Iron(II) cation Sulfide anion

Water Molecule

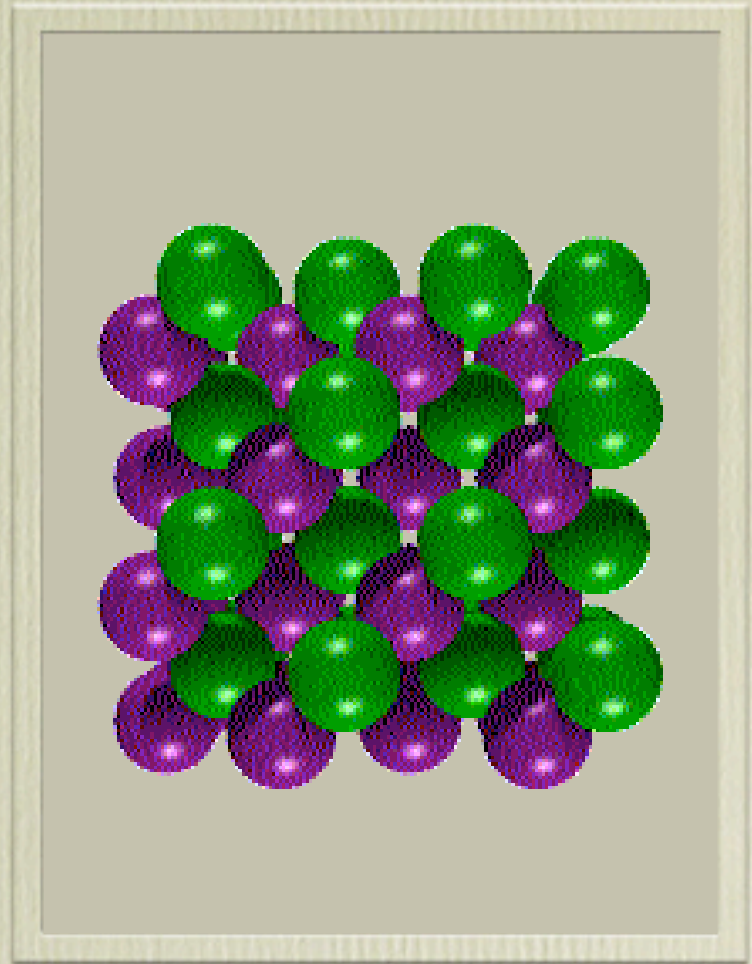


Hydrogen Atom Oxygen Atom Hydrogen Atom

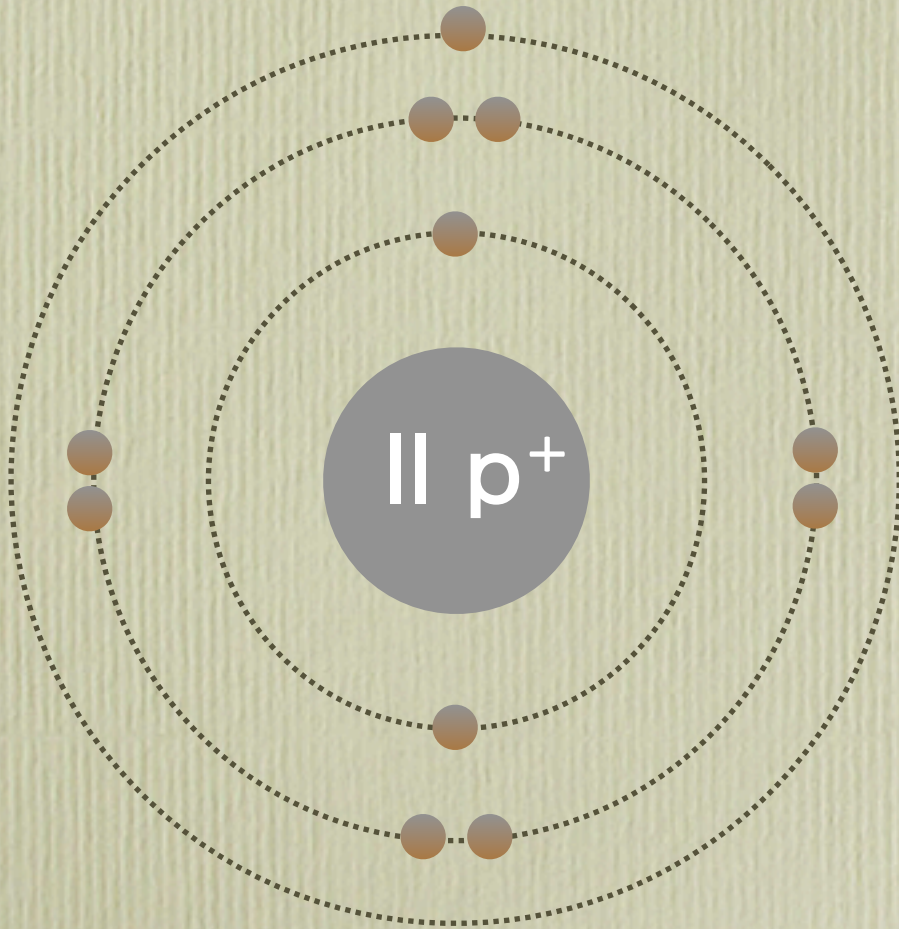
Ionic Compounds form a crystalline lattice

A crystalline lattice is a repeating pattern of ions. The cations (+ ion) and the anions (- ions) attract each other.

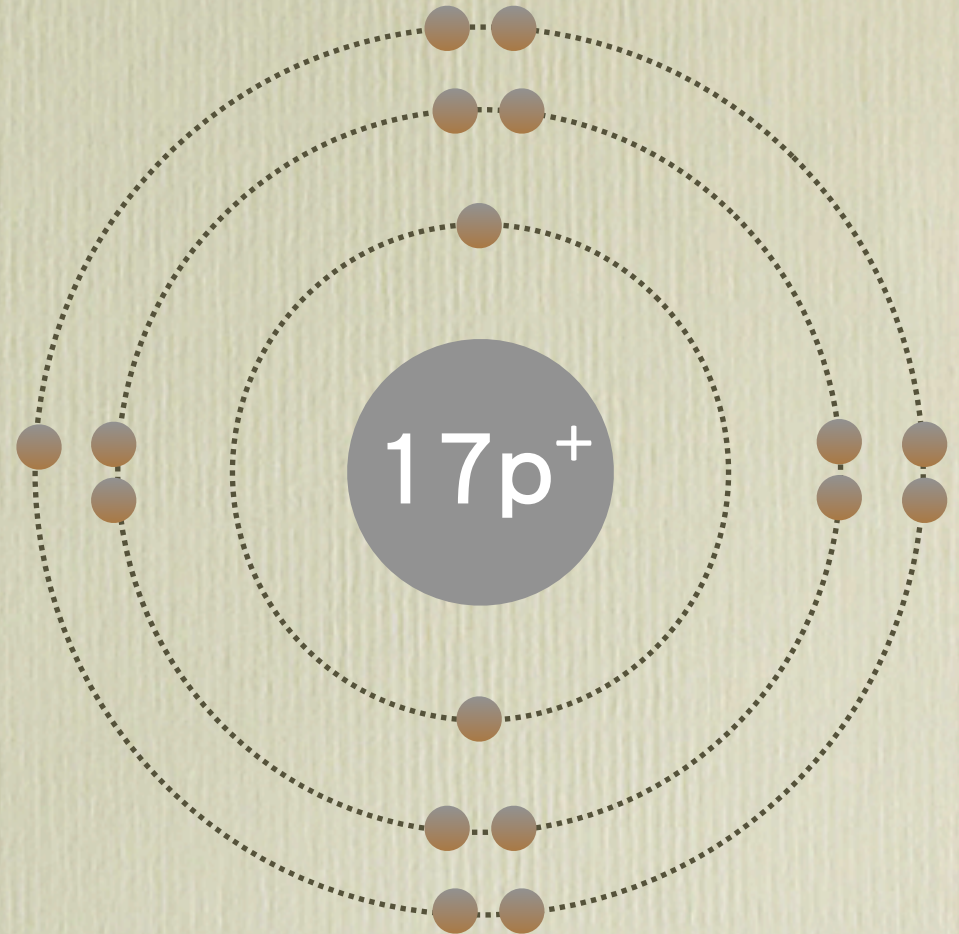
The attraction between the ions is called an ionic bond.



Sodium Chloride

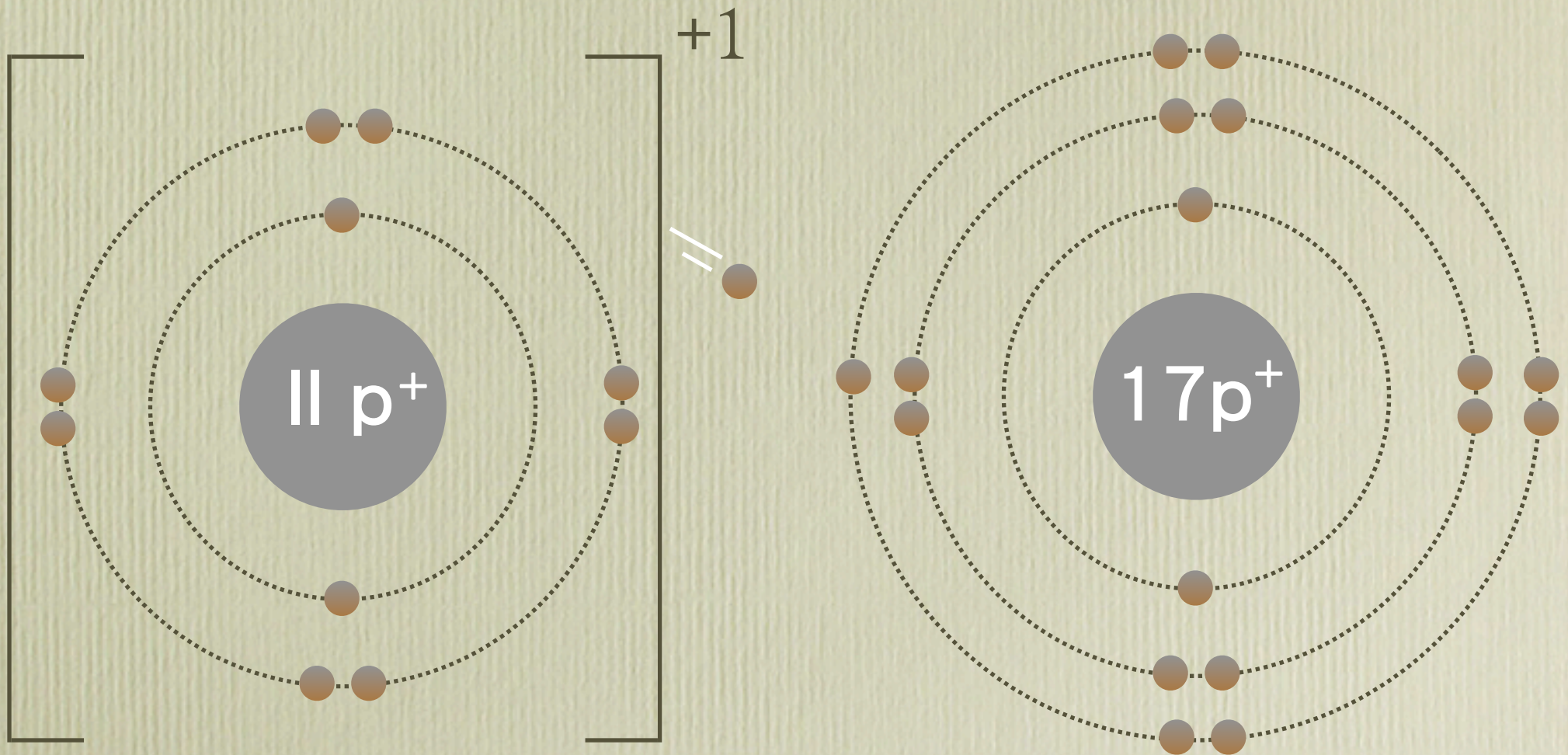


Sodium Atom



Chlorine Atom

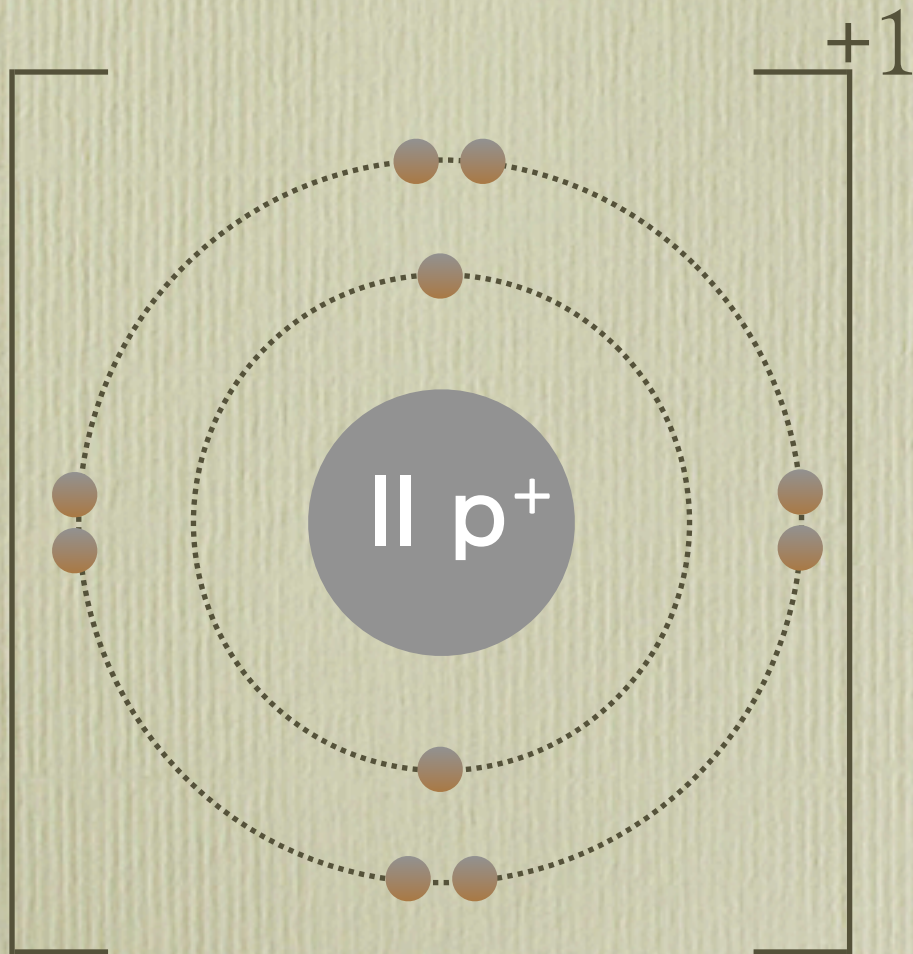
Sodium Chloride



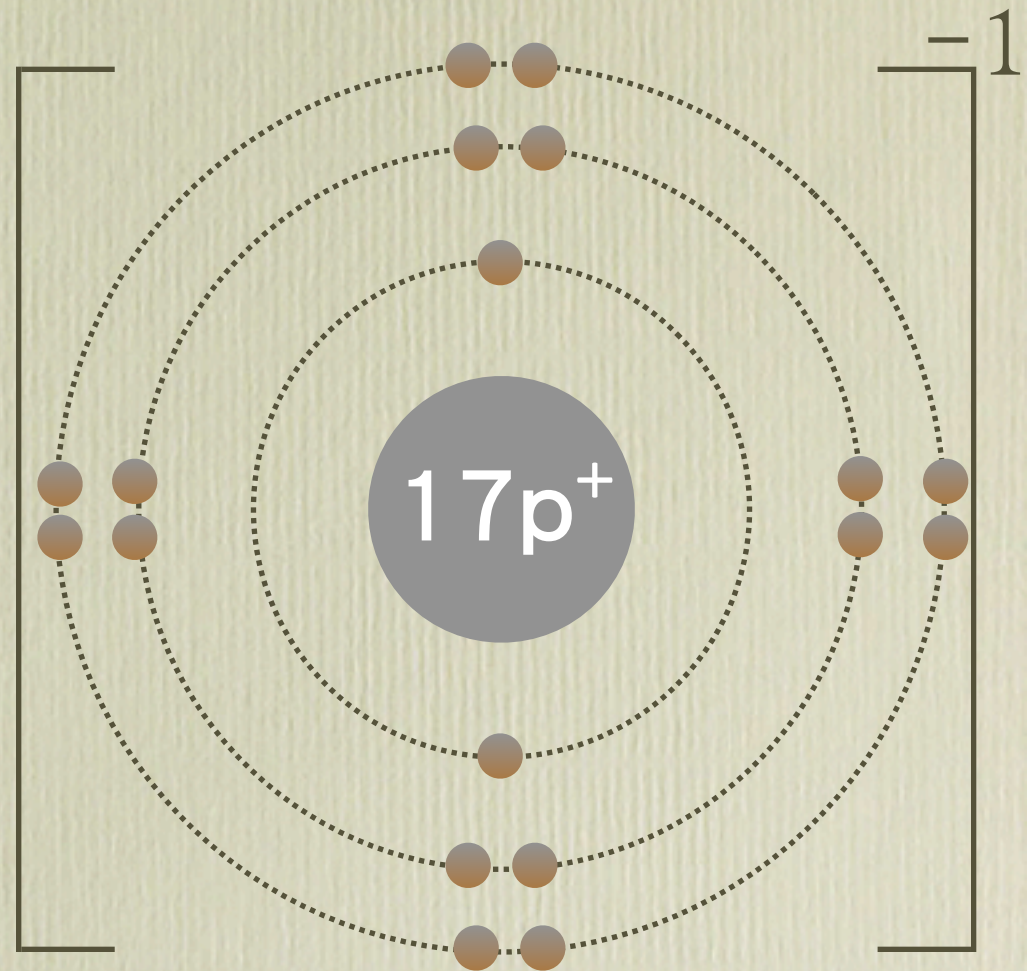
Sodium Cation

Chlorine Atom

Sodium Chloride

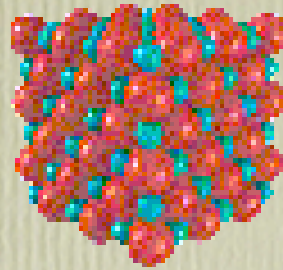


Sodium Cation

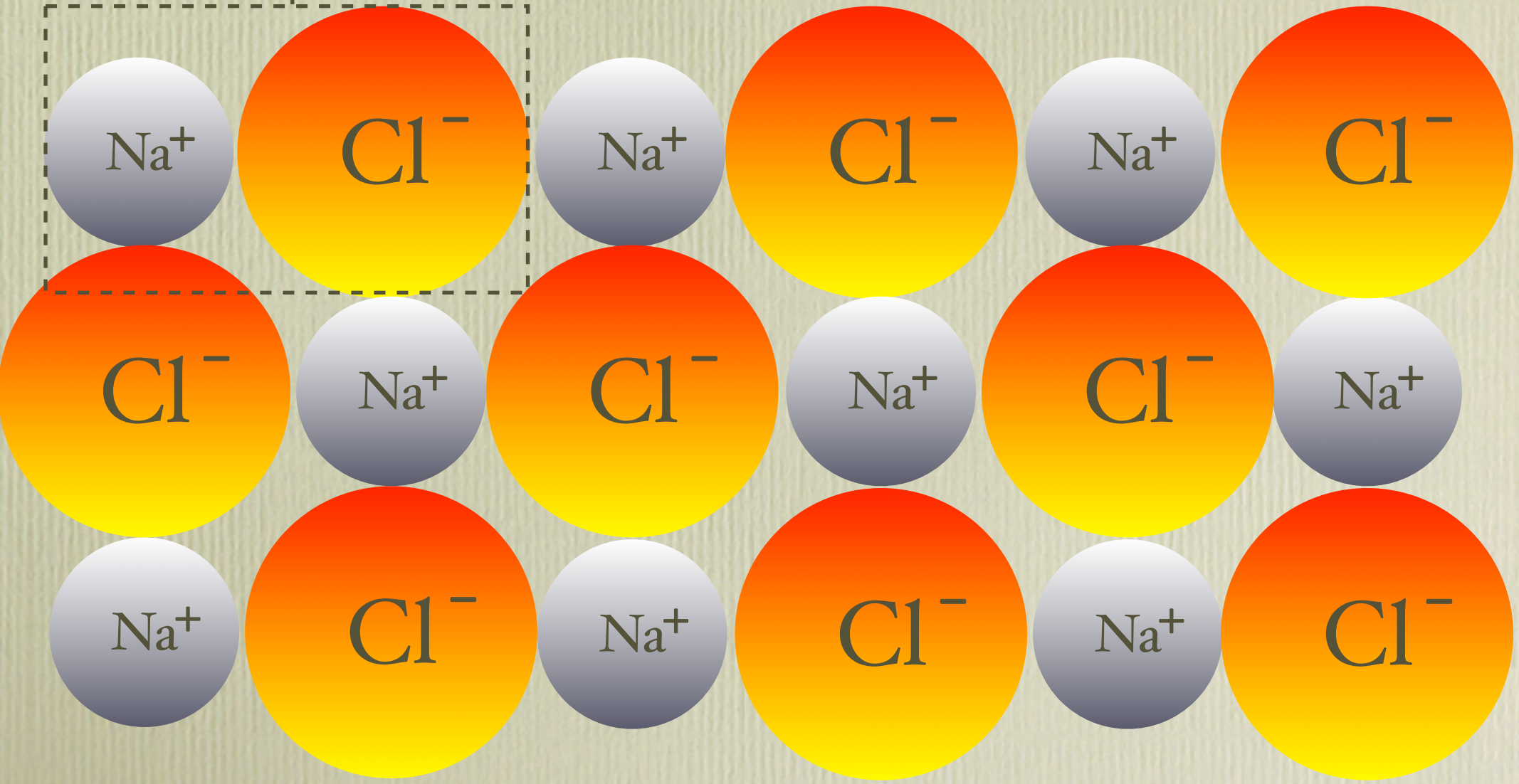
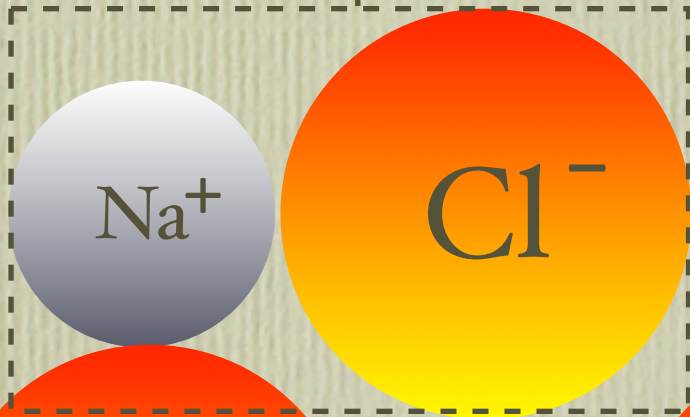


Chloride Anion

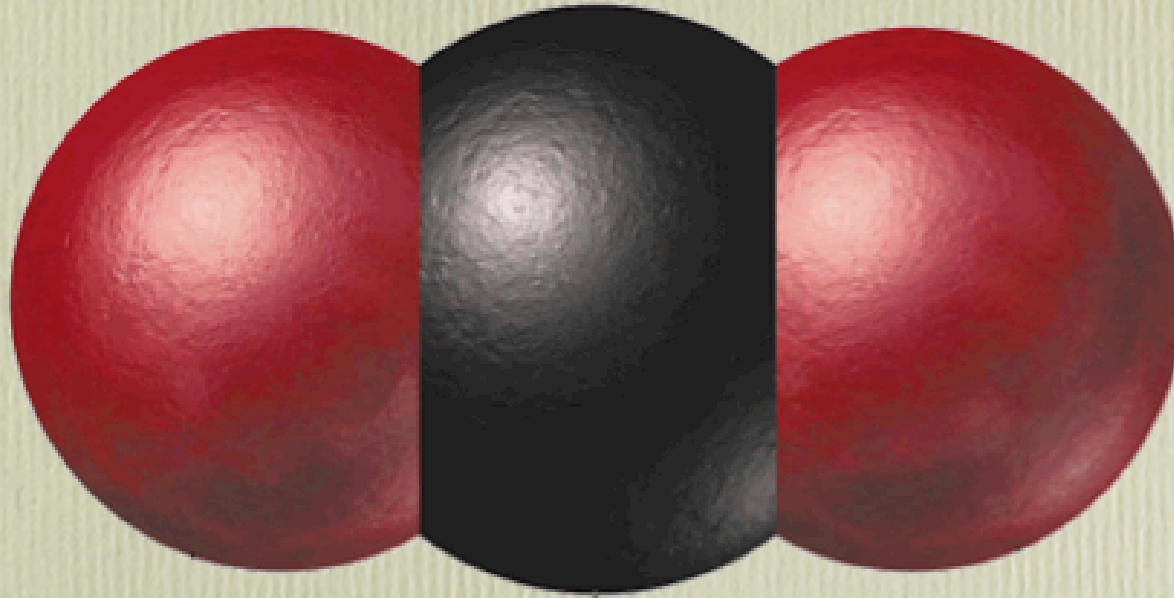
Let's construct a crystalline lattice of NaCl.



Unit Cell

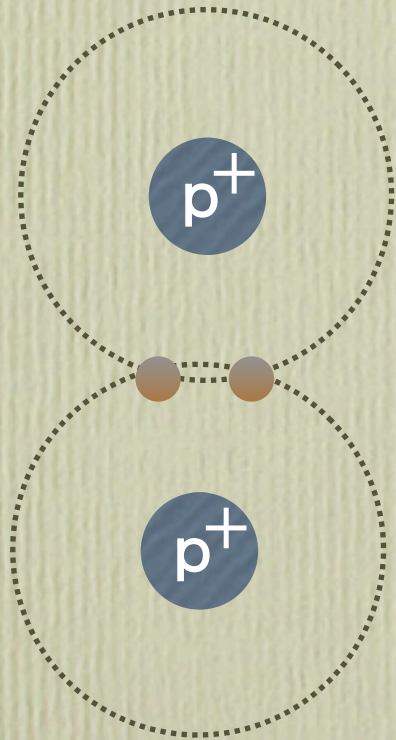


Covalent Compounds form Molecules

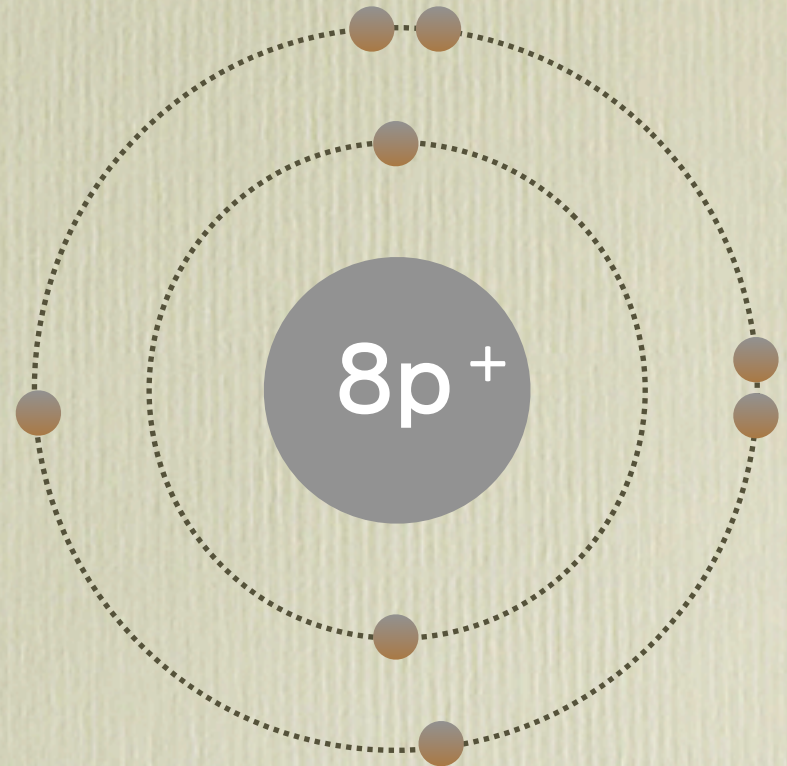


Two nonmetals share valence electrons to complete their outer electron energy level. The attraction for the shared pair of electrons is a covalent bond. This force holds the atoms together in a molecule.

Formation of Water

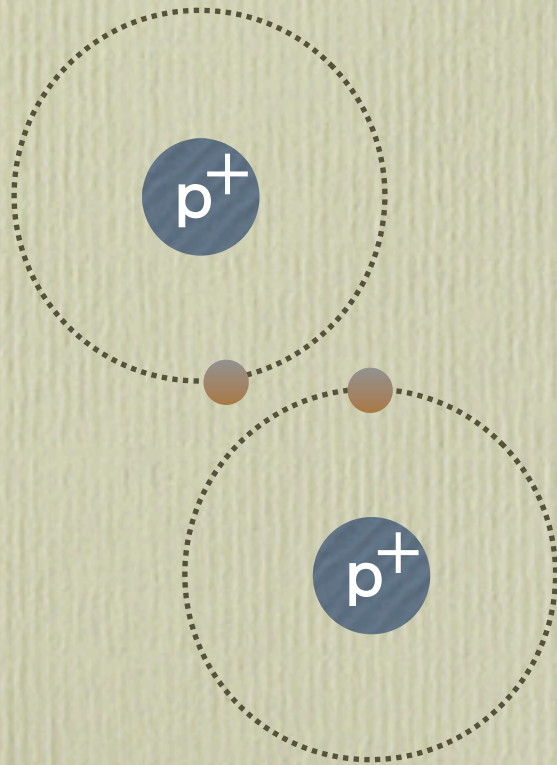


Hydrogen Atoms

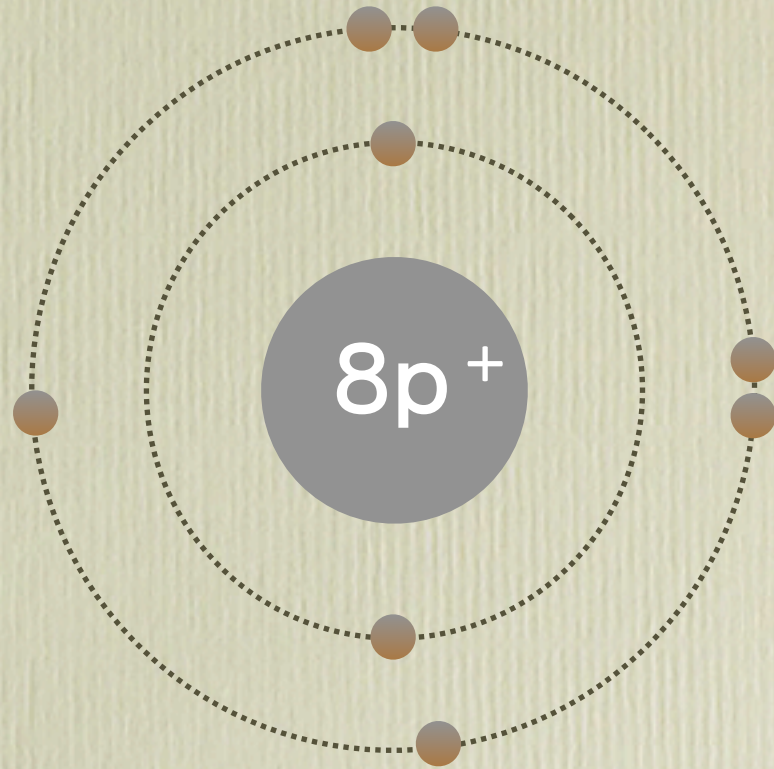


Oxygen Atom

Formation of Water

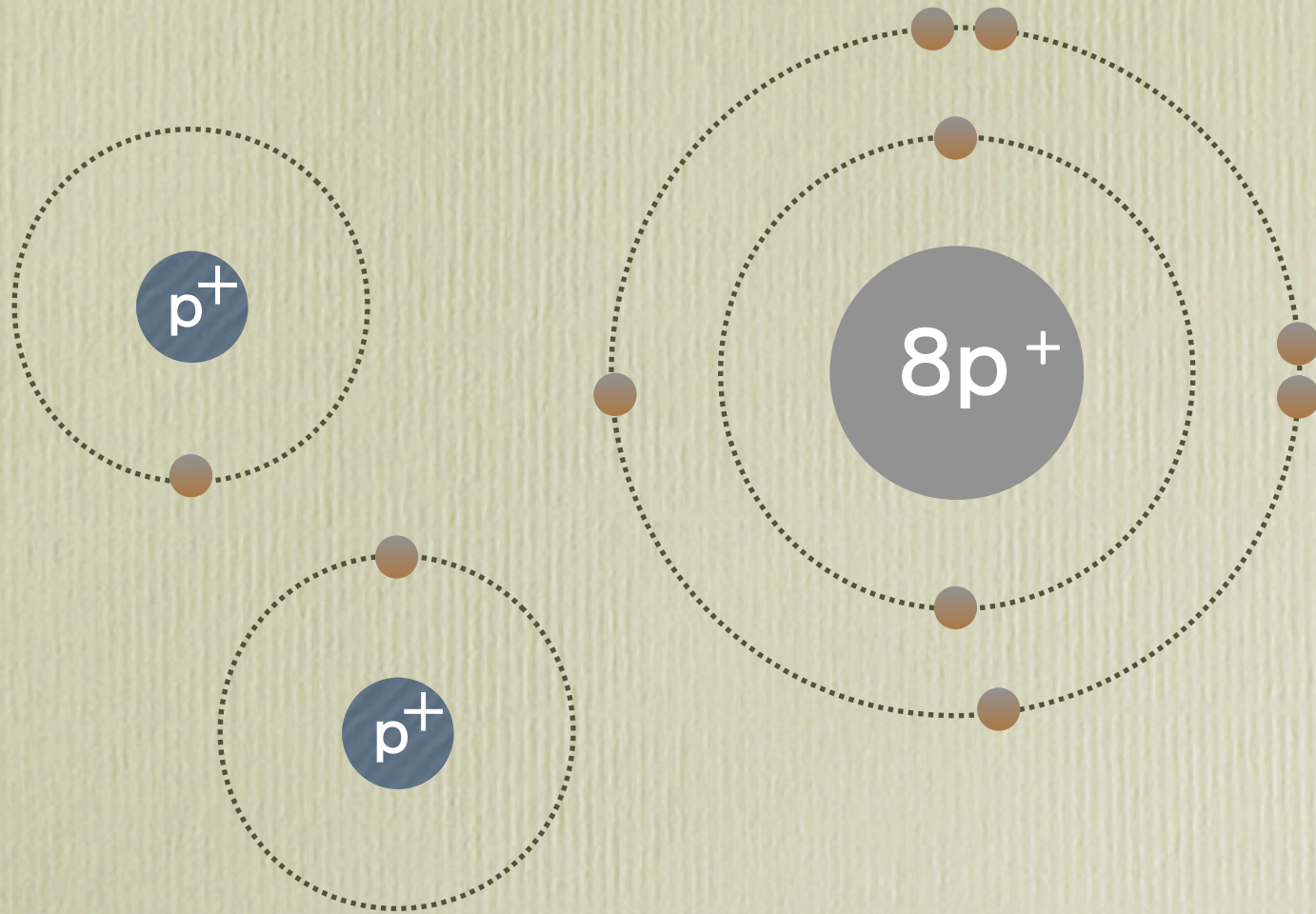


Hydrogen Atoms

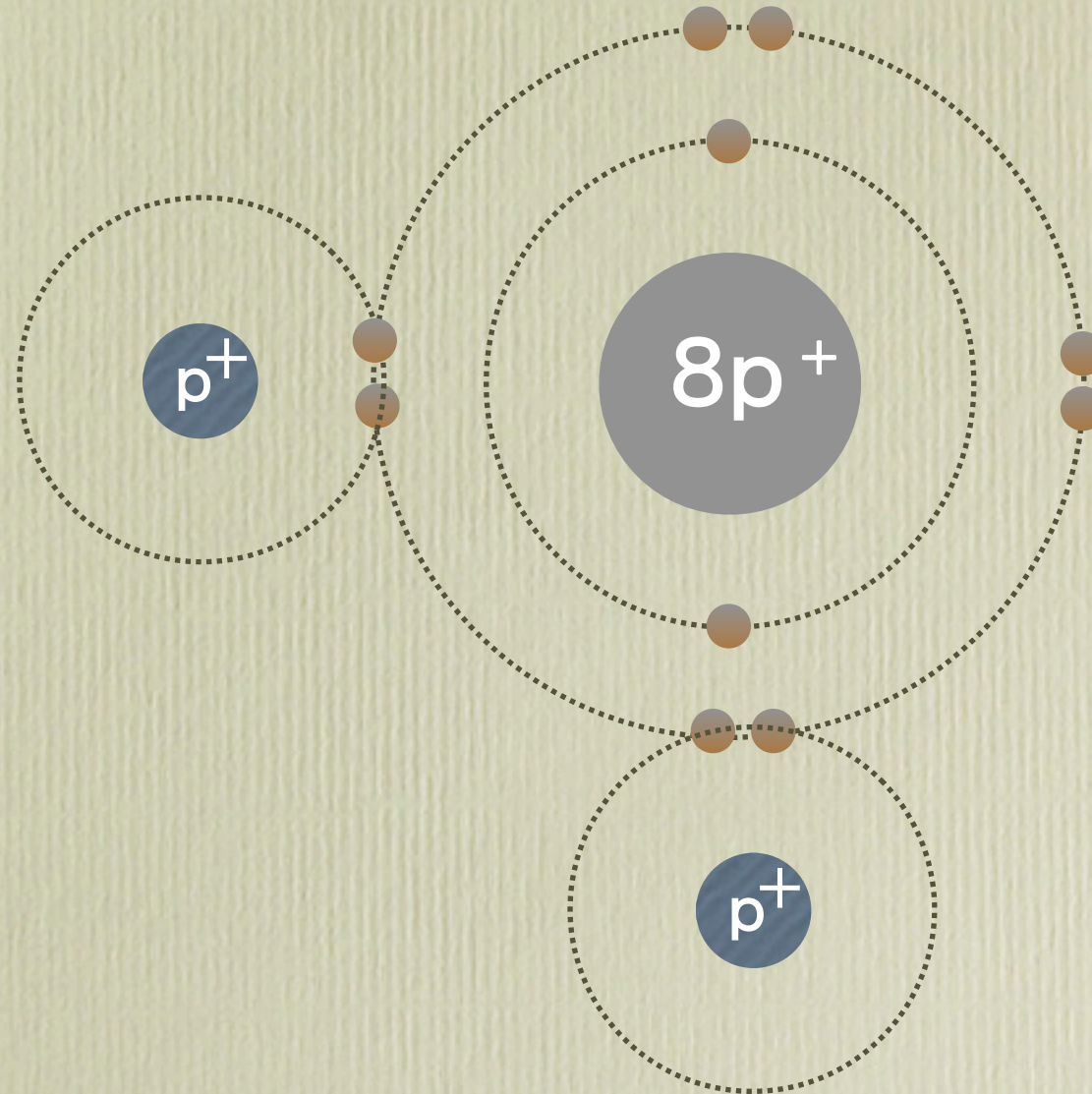


Oxygen Atom

Formation of Water

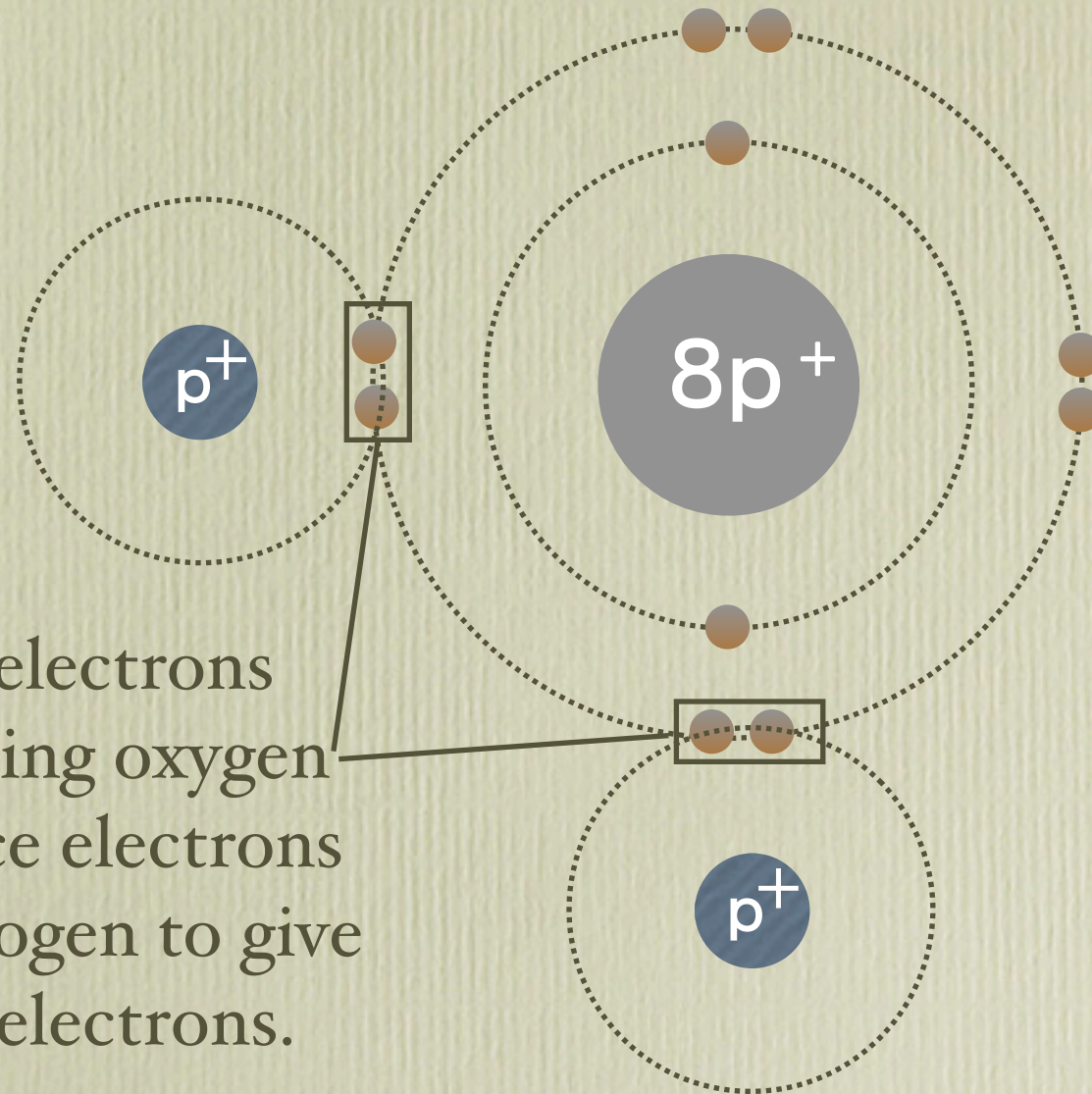


Water



Water Molecule

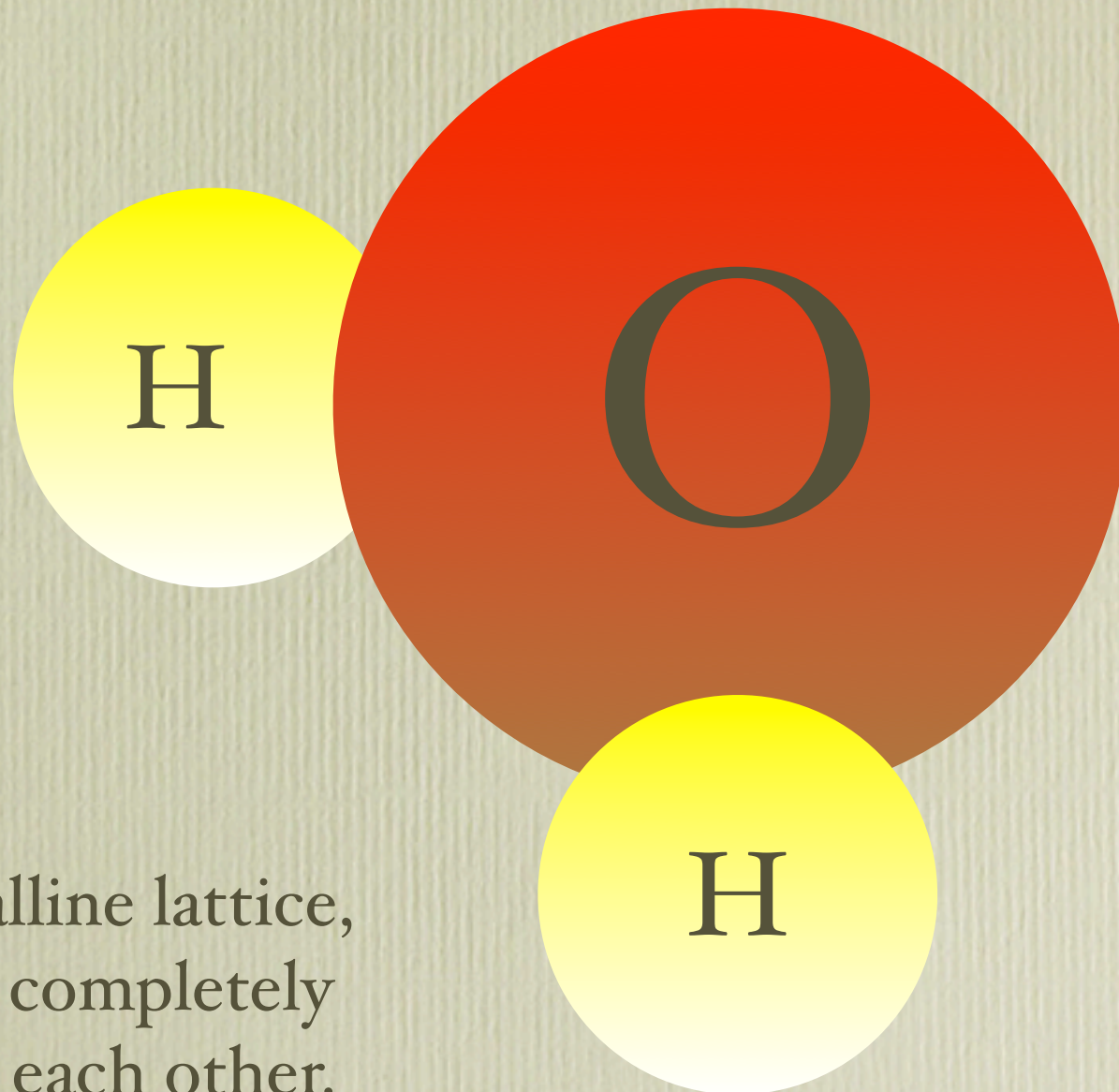
Water



Shared pair of electrons spend time orbiting oxygen to give it 8 valence electrons and orbiting hydrogen to give them 2 valence electrons.

Water Molecule

Water



Unlike a crystalline lattice,
molecules are completely
separate from each other.

Water Molecule

Drawing Dot Models of Molecules

Sulfur diiodide



Drawing Dot Models of Molecules

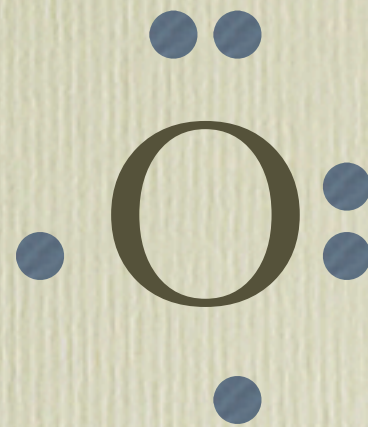
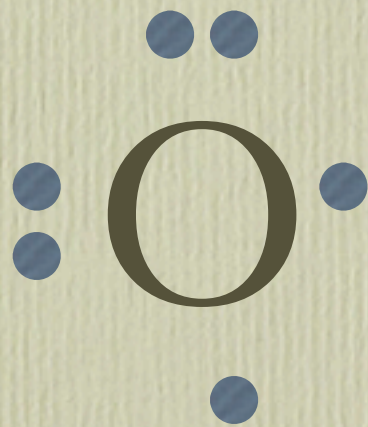
Sulfur diiodide



Box in shared pairs of electrons.

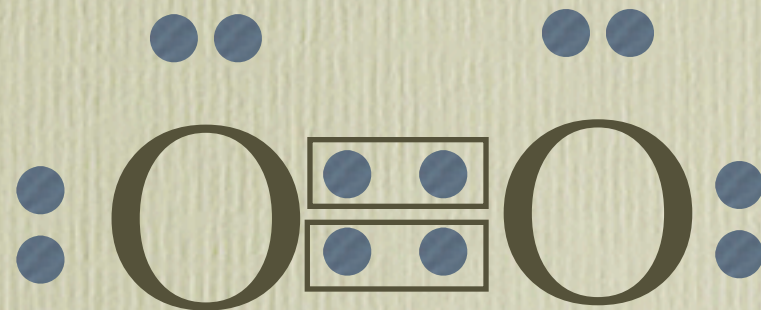
Drawing Dot Models of Molecules

Diatomic Oxygen



Drawing Dot Models of Molecules

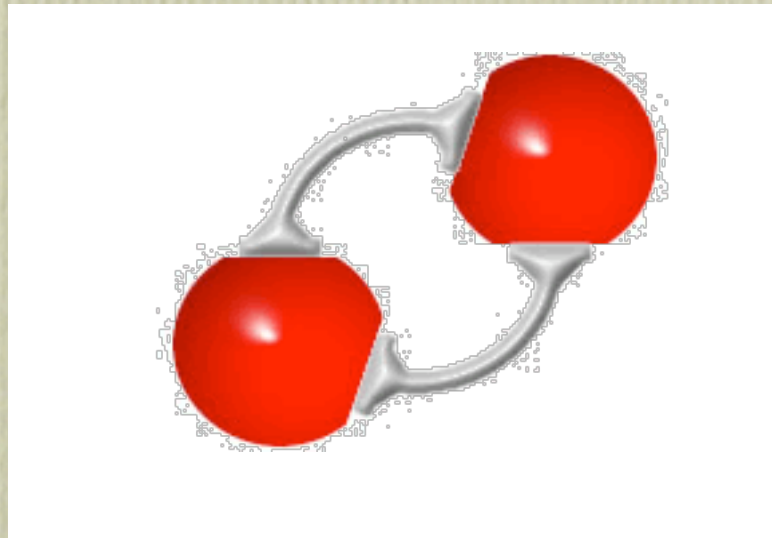
Diatomic Oxygen



Double Covalent bond between two oxygen atoms - two shared pair of electrons.

Drawing Dot Models of Molecules

Diatomic Oxygen



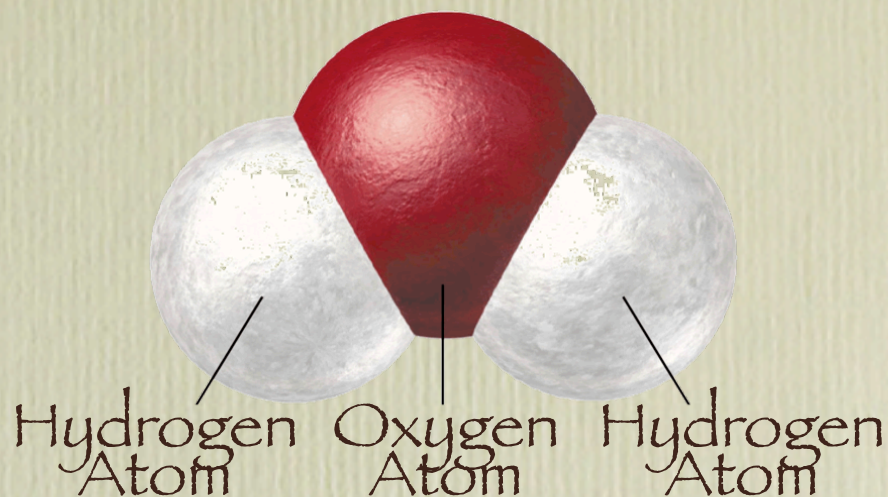
Double Covalent bond between two oxygen atoms - two shared pair of electrons.

Structure Summary



Ionic compounds are made up of ions that align to make up a crystalline lattice. The smallest repeating part of a crystalline lattice is a unit cell (aka. unit cell.)

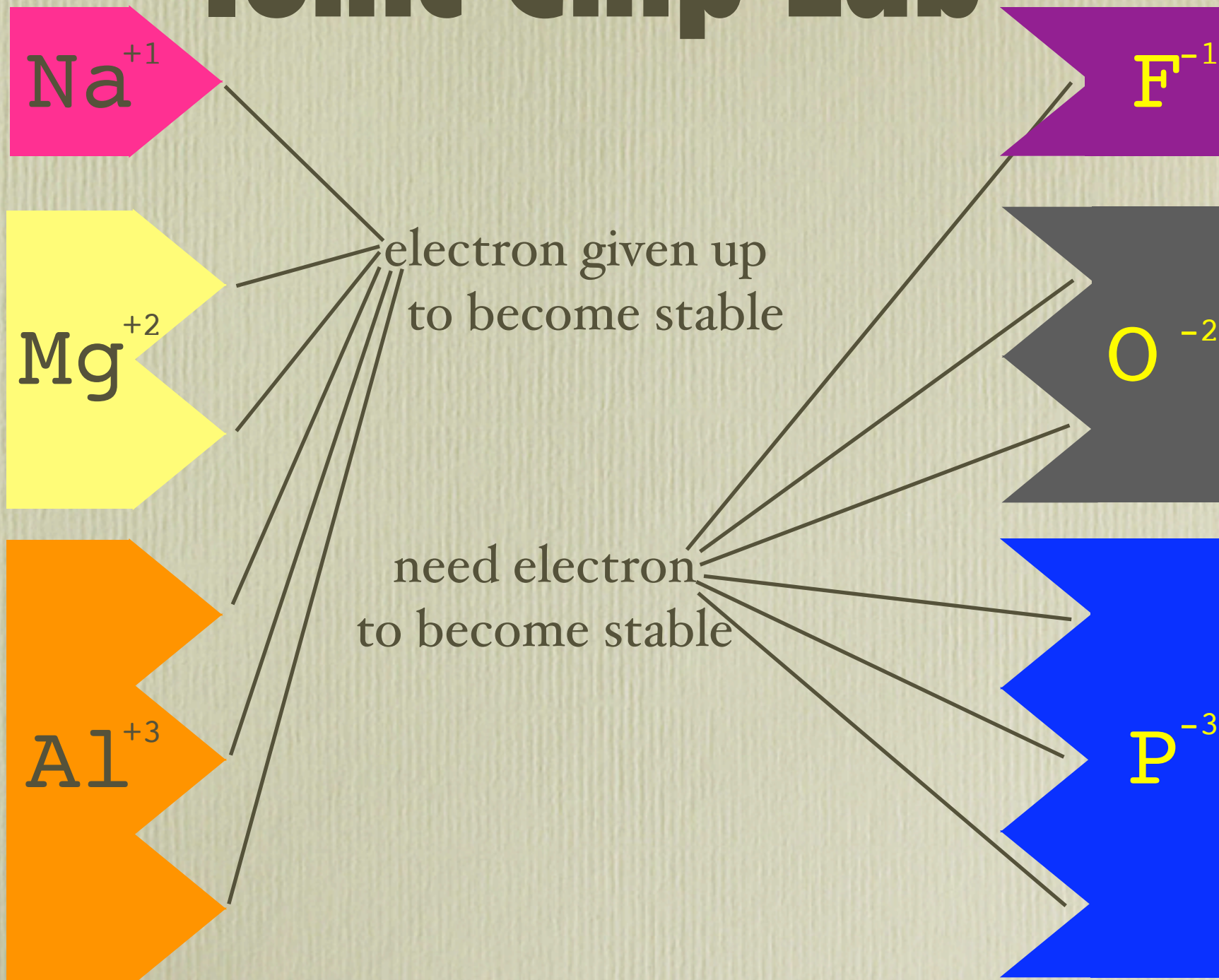
An ionic bond is the attraction between + and - charged ions.



Covalent compounds are made up of atoms that share electrons. These atoms combine to form a molecule.

A covalent bond is the attraction between the nuclei of the atoms and the shared pairs of electrons.

Ionic Chip Lab



1A

Aluminum Fluoride

7A

2A

3A

7A

7A

7A

6A

3A

5A