Guiding Question: How does the number of electrons in the outershell help up predict how elements will bond to make molecules?

Learning Goal: Explain how elements bond to make molecules using the electrons in the outer shell of an element.

Agenda
1) Review the Bohr model activity on board
2) Finish Energy Level C-notes
3) Drawing Lewis Diagrams
4) The octet rule and making molecules Notes
5) Practice the octet rule activity
6) Exit Ticket

Words of the day
Molecule

Making Molecules

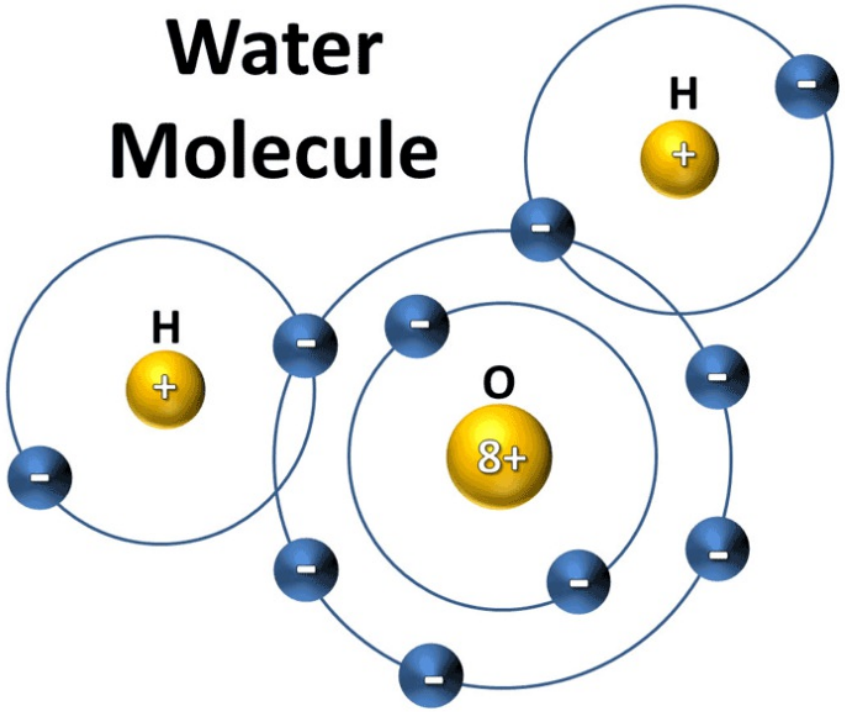
LEWIS DOT DIAGRAMS
ELEMENTS 1–20

HYDROGEN 1 **H** 1.01							HELIUM 2 **He** 4.00
LITHIUM 3 **Li** 6.94	BERYLLIUM 4 **Be** 9.01	BORON 5 **B** 10.81	CARBON 6 **C** 12.01	NITROGEN 7 **N** 14.01	OXYGEN 8 **O** 16.00	FLUORINE 9 **F** 19.00	NEON 10 **Ne** 20.18
SODIUM 11 **Na** 22.99	MAGNESIUM 12 **Mg** 24.31	ALUMINUM 13 **Al** 26.98	SILICON 14 **Si** 28.09	PHOSPHORUS 15 **P** 30.97	SULFUR 16 **S** 32.07	CHLORINE 17 **Cl** 35.45	ARGON 18 **Ar** 39.95
POTASSIUM 19 **K** 39.10	CALCIUM 20 **Ca** 40.08						

WOD

Molecules

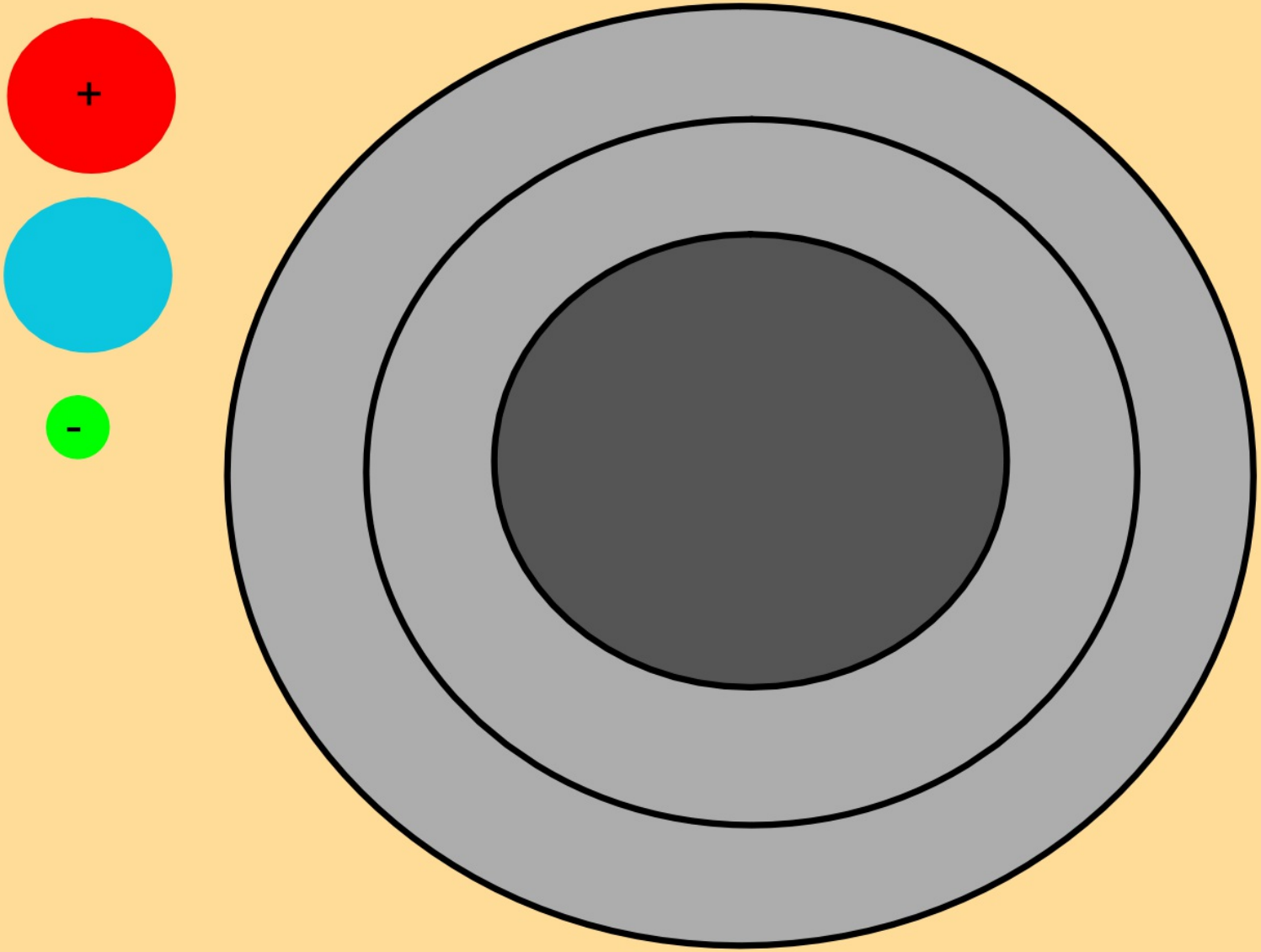
One or more atoms bonded together



NO DSR Today

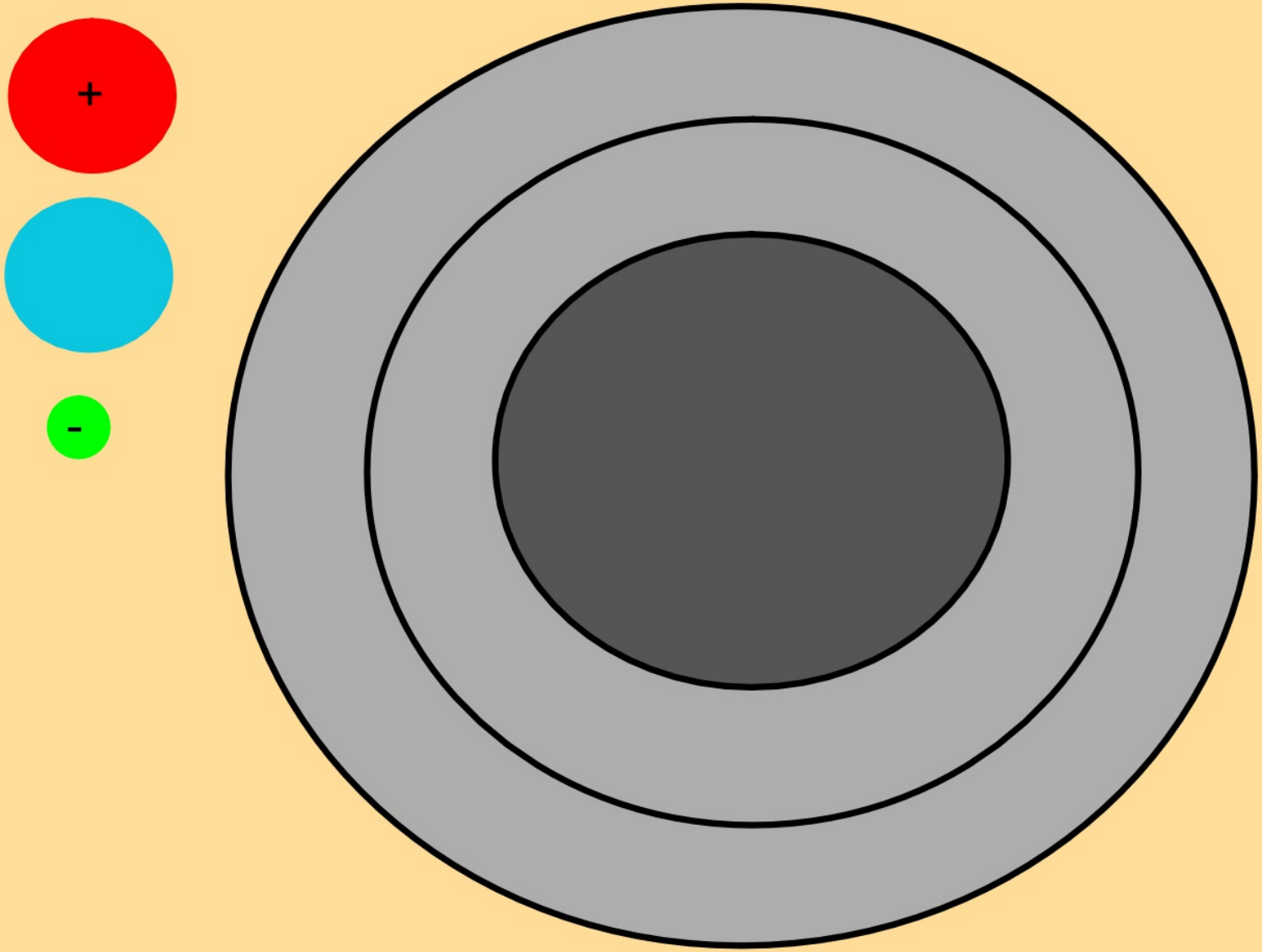
Model Fluorine - atomic number 9

Atomic mass - 18.99

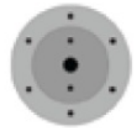
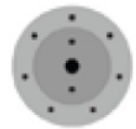
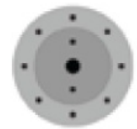
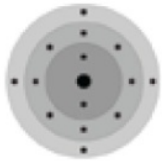
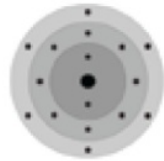
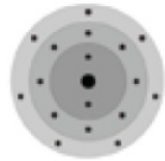
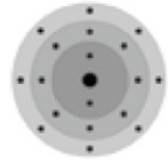
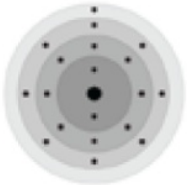
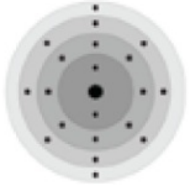


Model Beryllium- atomic number 4

atomic mass 9.01



ENERGY LEVELS
ELEMENTS 1–20

HYDROGEN 1  1.01							HELIUM 2  4.00
LITHIUM 3  6.94	BERYLLIUM 4  9.01	BORON 5  10.81	CARBON 6  12.01	NITROGEN 7  14.01	OXYGEN 8  16.00	FLUORINE 9  19.00	NEON 10  20.18
SODIUM 11  22.99	MAGNESIUM 12  24.31	ALUMINUM 13  26.98	SILICON 14  28.09	PHOSPHORUS 15  30.97	SULFUR 16  32.07	CHLORINE 17  35.45	ARGON 18  39.95
POTASSIUM 19  39.10	CALCIUM 20  40.08						

Write the number of electrons in the OUTER Shell for every element.

Patterns in Periodic Table

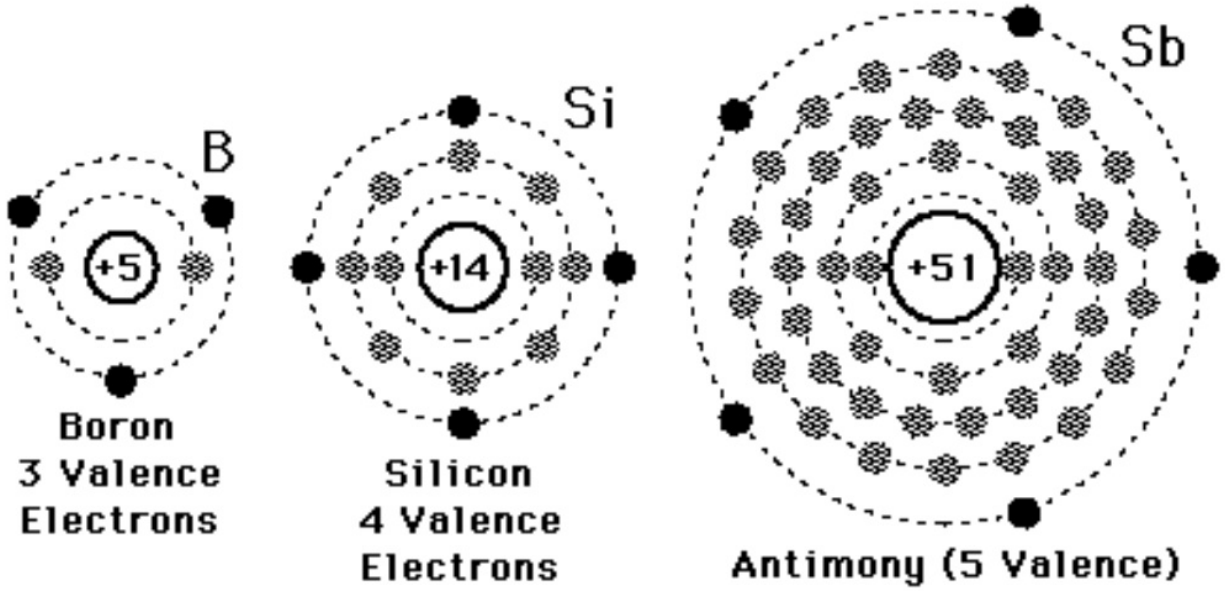
Groups/Families:

Periods:

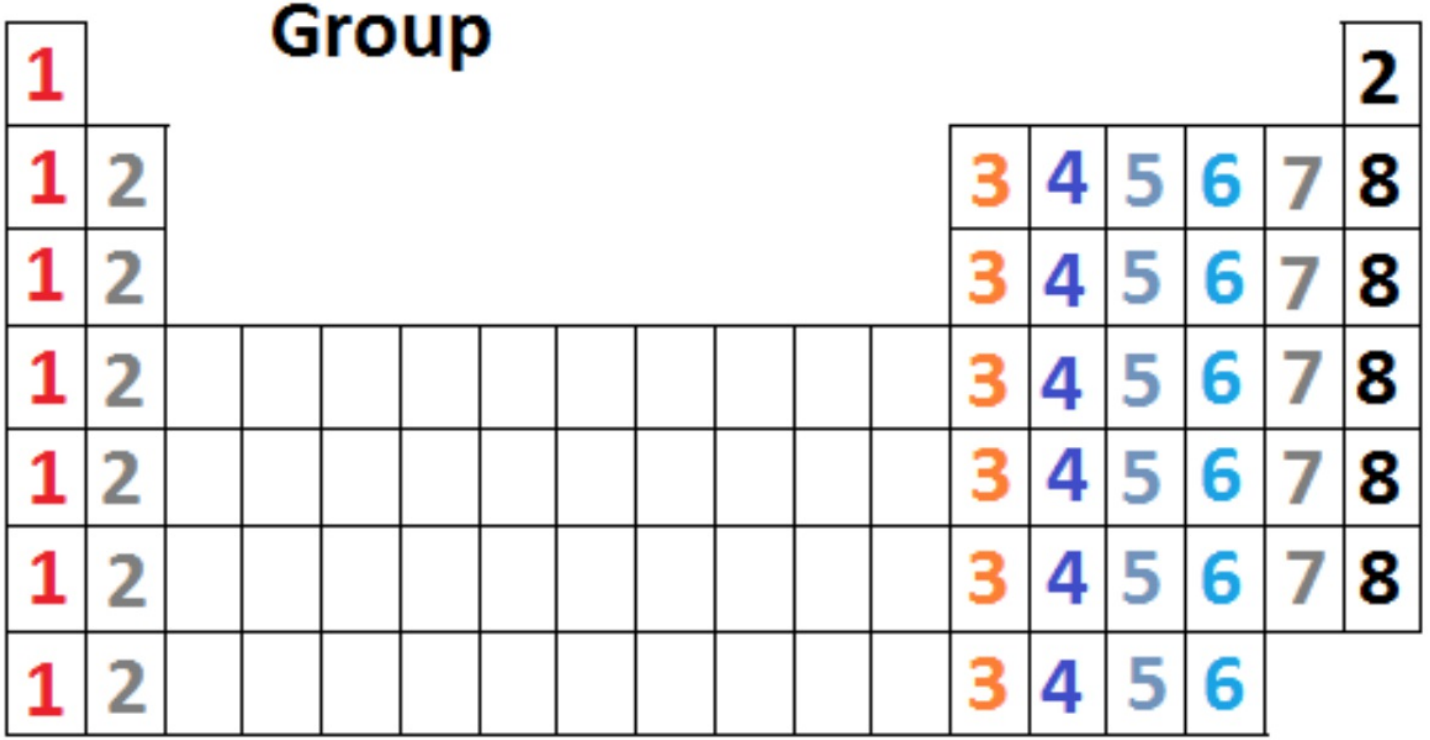
Valence Electrons

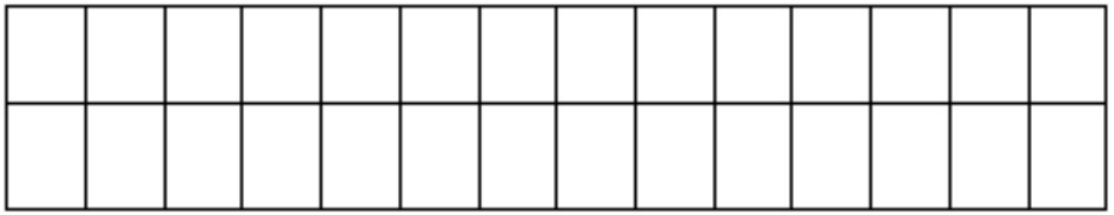
Number of electrons in the outermost shell

Examples



Valence Electrons in Each Group

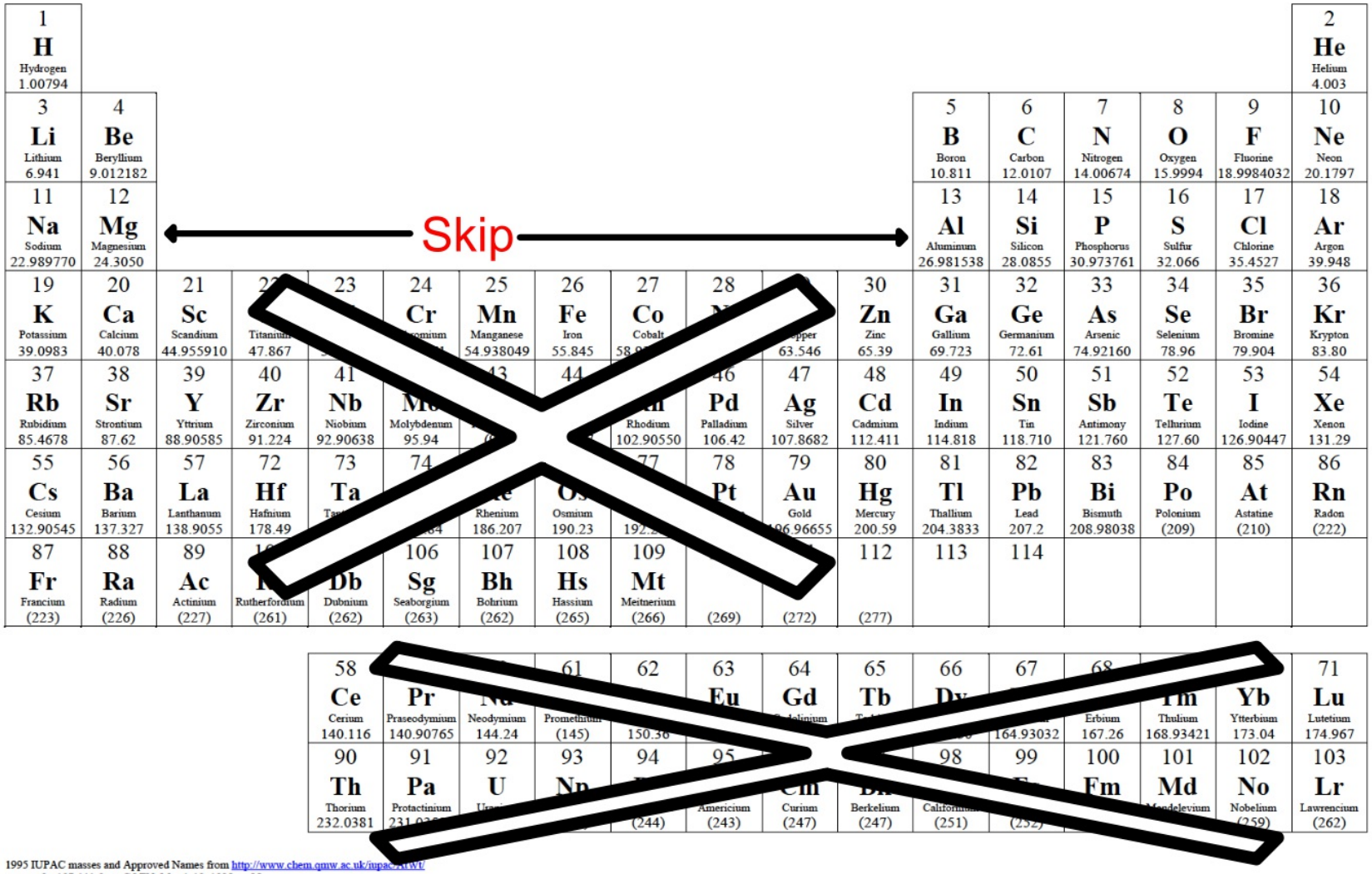




Lets put the patterns on the Periodic Table

Valence Electrons

Energy Level



Drawing Lewis Diagrams

Step 1: Write the symbol for the element

Step 2: Find the valence electrons you wrote on the periodic table

Step 3: Make a light cross on the element symbol

Step 4: Put one electron on each side in a counter-clockwise direction until you have all of the valance electrons as dots. NO MORE THEN 2 ELECTRONS PER SIDE.

Example

Cl

Cl has 7 valance electrons

1st 4 have do not have pairs

More then 4 will have pairs

LEWIS DOT DIAGRAMS
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The Octet Rule to Making Molecules

1. Atoms what to have 8 electrons in their outer shell

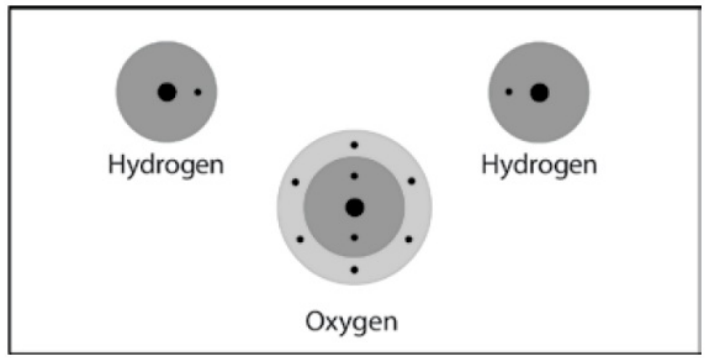
2. Atoms will either GAIN or LOOSE electrons to get to 8
   If valance Electrons < 4 then they will LOOSE
   If valance electrons are >4 they will GAIN

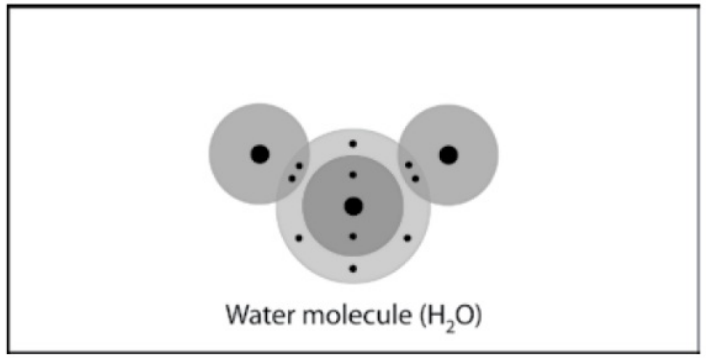
3. Atoms bond together to make a molecule. They bond in a way that all atoms have 8 electrons in the outer shell.

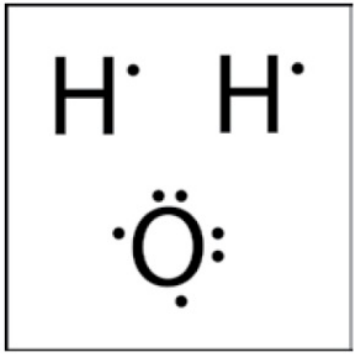
4. EXCEPTION TO THE RULE: Hydrogen want to have 2 electrons NOT 8.

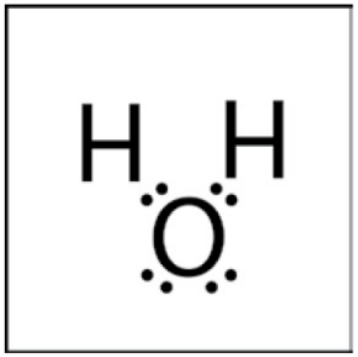
Example H_20

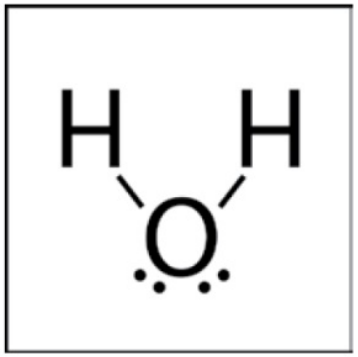
Covalent bonding in the water molecule, H_2O











http://www.middleschoolchemistry.com/multimedia/chapter4/lesson4

Let's Model this with Marshmallows

Marshmallow Molecule Lab

Purpose: To demonstrate how atoms combine to form molecules or compounds.

Materials:

5-10 Toothpicks
Large Marshmallows - Nuclesus of the atom
Small marshmallows-electrons for OUTER SHELL of atom

Step 1: Draw the Lewis dots for each element

Atom	# of Valence Electrons	Draw the Lewis Dot Diagram	Number of Electrons to get to 8	Will it gain or loose to get to 8?
Oxygen				
Hydrogen				
Carbon				
Chlorine				
Nitrogen				

Step 2: Make the marshmallow model for each of the atoms above,

1. Get a large marshmallow to represent the nucleus
2. Put the OUTER SHELL electrons around the marshmallow with tooth picks.
3. Repeat until you have made every atom at least once (Be prepared to destroy them in the next step.

Step 3: Make marshmallow molecules

1. Make 3 Chlorine atoms
2. Put them together to make a BOND. With 8 electrons for each chlorine atom.
3. Draw the model in step 4
4. Repeat steps 1 and 2 for the following molecules
    a. H2O-2 hydrogen and 1 oxygen
    b. CO2- 1 carbon and 2 oxygen
    c. CH4- 1 carbon and 4 hydrogens
    d. NH3- 1 nitrogen and 3 hydrogens.

Step 4: Draw a model of your marshmallow molecules

Cl_2	H_2O	CO_2	CH_4	NH_3
Chlorine	Water	Carbon Dioxide	Methane	Ammonia

Step 5: Draw the Lewis dot structures for the molecules

Cl_2	H_2O	CO_2	CH_4	NH_3
Chlorine	Water	Carbon Dioxide	Methane	Ammonia

Clean-up

1. Get a baggies from the teacher

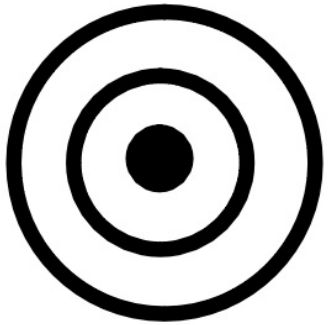
2. Put your period number and table number on the baggies

3. Put baggier in the tray on the front table.

Exit Ticket the Bohr model

Use your periodic table to answer the questions

1. Draw the Bohr model for Sodium (Na)



2. How many electrons do you predict are in the outer shell of Krypton. HINT: Use the patterns

3. How many valence electrons are there for Carbon?

LEWIS DOT DIAGRAMS
ELEMENTS 1–20

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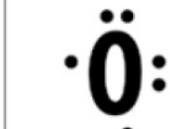
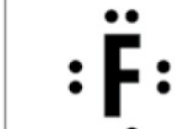
LITHIUM 3  6.94	BERYLLIUM 4  9.01	BORON 5  10.81	CARBON 6  12.01	NITROGEN 7  14.01	OXYGEN 8  16.00	FLUORINE 9  19.00	NEON 10  20.18
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POTASSIUM 19  39.10	CALCIUM 20  40.08						