

TxCETP Course Component: Introduction of Valence and Covalent Bonds

This material is based on work supported by the National Science Foundation under Grant No. DUE 9987332.

II. Activities

Inquiry A: *The Atoms*

Objective: Students creates an organizational scheme based on own criteria.

Time Frame for Activity: 15 minutes

Materials:

Assorted Legos®

Quantity of each color	Size
4	1X1
2	1X2
1	1X3
1	1X4

Procedure:

1. Get the students into groups.
2. Hand each group a bag of Legos® listed above.
3. Allow the students to play with the Legos® without instruction for a few minutes.
4. After a few minutes, ask the students to separate the Legos® into individual pieces.
5. Instruct the students to organize the Legos® for the next procedure.
6. Have the students to make a note on how they organized their Legos®.
7. Ask the students how they organized the Legos® and draw their organizational chart(s) on the board. (If the first organizational chart is not based on size and color, lead the students towards this type of organizational system.)
8. Introduce atomic structure, bond orbitals, and valence concepts.
9. Let students compare the Lego® block structure to the ability of the elements to bind to other elements. Receptacles and prongs correspond to valence. Different elements are represented by different colors. Different elements may have the same or different numbers of valence electrons as others. (See the charts below.)

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Lego® Organizational Chart

	1X1 (+)	1X2 (+)	1X3 (+)	1X4	1X3 (-)	1X2(-)	1X1(-)
Red							
Blue							
Yellow							
White							

Modified Periodic Table

	1A	2A	3A	4A	5A	6A	7A
Period 2	Li	Be	B	C	N	O	F
Period 3	Na	Mg	Al	Si	P	S	Cl
Period 4	K	Ca	Ga	Ge	As	Se	Br
Period 5	Rb	Sr	In	Sn	Sb	Te	I

10. Let students construct CO₂, CH₄, and H₂O as typical biological molecules.

Formative Assessment:

1. How many valence electrons does carbon have?