

II. Activities

Inquiry A: *The Table*

Objective: Students create an organizational scheme based on their own criteria.

Time Frame for Activity: 15 minutes.

Materials:

Assorted Legos®

Quantity of each color	Size
8	1X1
4	1X2
2	1X3
1	1X4

Draw a plus (+) on half of the 1X1, 1X2, and 1X3 and minus (–) on the other half of the 1X1, 1X2, and 1X3.

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® as they would like for the next procedure.
6. Have the students 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 by asking the groups if anyone had used a different organizational method.)
8. Compare the Lego® Organization to the Periodic Table. (Be specific to demonstrate the similarities between a 1X1 blue and a 1X1 red and the reactivity of Li and Na.)

TxCETP Course Component: *Introduction to Periodic Trends “Lego® my Periodic Table”*
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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

9. Introduce the terms group and period and relate these terms to size and color.

NOTE: Steps 7-9 in Inquiry A can be discussed after the Inquiry B procedures with the Legos® have been finished (After step 8 in the procedure of Inquiry B).

Formative Assessment:

1. Ask the students how they organized their Legos®?
2. How does the organization of the Legos® correlate to the Periodic Table?
3. What is a group?
4. Could you use the Periodic Table to predict how elements react and/or combine to make compounds?

Note: The Formative Assessments were designed to give the instructor and students feedback on the knowledge gained from the exercise. Therefore, the formative assessment may be done verbally as a dialog between the instructor and students.

Inquiry B: *Elementary Reactivity*

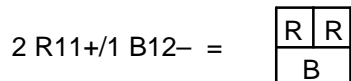
Objective: Students will combine elements to form compounds.

Time Frame for Activity: 15-20 minutes.

Materials: Assorted Legos® (See Inquiry A, Materials).

Procedure:

1. Instruct the students to make 3 models using the Legos® with the restriction that the models have a neutral charge (a positive for every negative) and with no uncoupled receptacles or prongs. Example: a blue 1X2 on top of a white 1X2, two red 1X1 on top of a yellow 1X2, or a blue 1X3 and a white 1X1 on top of a red 1X4.
2. Observe the students' progress and assist groups that are having difficulties.
3. Allow the student enough time to complete the three models.
4. Instruct the students to write a brief non-action description (symbolic, non-graphic) of their models so that another group can reproduce their models. (Example: $2 R^{1+}1 B^{2-}$ or $R^+1_2B^-2$, not put two red 1X1 on a single blue 1X2. The students should be allowed to develop their own symbolic language.)
5. Once the groups are finished, have them exchange their descriptions with another group and reproduce the other group's models.
6. Ask the students to make notes of any difficulties that they have reproducing the models from the written descriptions.
7. When the students have completed the models have them check the reproduced models with the other group.
8. Ask one of the groups for their descriptions and draw a graphical representation of the models on the board.



9. Using the Organizational Chart of the Legos® drawn earlier and the Periodic Table, relate the Lego® model to a chemical compound. (Example: $2 R^{1+}1 B^{2-}$ could be Li_2S)
10. Introduce the concept of combining positive ions (cations) and negatives ions (anions) in a fashion to give a neutral charge.

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Formative Assessment:

1. Will Calcium combine with Magnesium to give a neutral compound? Why?
2. List five elements that could combine with sulfur to form chemical compounds.
3. What is a cation? Give an element that would form a cation?

Inquiry C: *The Compounds*

Objective: Students predict and evaluate the chemical formula of neutral compounds.

Time Frame for Activity: 10-15 minute.

Materials: Assorted Legos® (See Inquiry A, Materials).

Procedure:

1. Instruct the students to make bilayer models (described in Inquiry B Procedure 1) using one of the 1X2 or 1X3 Legos® as the base.
2. Choose a couple of groups' models and graphically represent the models on the board.
3. Discuss the structures and the possible additional structures with the students.
4. Instruct the students to predict how many (–) 1X1 will combine with one (+) 1X2, 1X3, or 1X4.
5. Ask the students to predict how many Cl[–] will combine with the ions of Ca, Al, or Si. Demonstrate the correlation to the Legos®. (Refer to the Periodic Table and Lego® Organizational Chart)
6. Instruct the students to make a model with 2 (–) 1X2 and 1 (+) 1X3. Ask them to evaluate the model and tell you what is wrong with it?
7. Write AlO₂ on the board and ask the students to evaluate the chemical formula. Correlate this problem to the previous Lego® example.

Formative Assessment:

1. How many chlorine atoms will combine with potassium? Why?
2. What is the correct formula of barium iodide?
3. Is the correct formula of sodium oxide, Na₂O?