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| **Lesson Plan:**  |

**Learning Outcomes:**

1. Recognize and correct mistakes in chemical formulas of ionic compounds
2. Construct ionic compounds from at least 2 different elements
3. Understand that elements are made of the same atom, while compounds are made of at least 2 different atoms, thus elements

**Big Ideas and skills**

1. Write compound names and chemical formulas of ionic compounds
2. Explain how ionic compounds are creating using the periodic table

**PLOs:**

**C3** write and interpret chemical symbols of elements and formulae of ionic compounds

**Skills developed to meet development goals**

1. Self-directed learning
2. Critical thinking
3. Collaborative skills
4. Asking questions
5. Creativity
6. Leadership

**Material and equipment needed**

**-** students' textbooks

**Assessment Plan:**

**Formative -**

**Hook and Introduction**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 10 min |  | *
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**Development**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 15 min | * Brainstorming differences and similarities between ionic and covalent compounds - group directed learning
 | * Have students get into groups of 3-4 to brainstorm the differences and similarities between ionic and covalent compounds. They have their textbooks as reference
* Encourage students to assign roles and delegate tasks that either cater to students' strengths or skills they want to work on - note taker, facilitator, presenter
 | * Collaborative - students work together to achieve a task. They can set goals and delegate tasks to finish on time.
* Critical thinking - logically reasoning out the similar and different traits of ionic and covalent compounds
* Self-directed learning - this is tied in the collaborative effort that students achieve a learning goal as a team
* **Learning outcomes** - Understand that elements are made of the same atom, while compounds are made of at least 2 different atoms, thus elements
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| 10 min | * Group merge
 | * Have each group join up with at least 1 other group
* The groups compile their findings, discuss discrepancies, and create a summary of what they found
* Teacher checks groups to see if they missed any points and may ask the class a probing question
 | * Collaborative - groups discuss each others' ideas and being honest and respectful of different thoughts
* Leadership - Students delegating time for each other to share thoughts and ideas. Roles are assigned based on individual goals and each student consistently stays in role
* **BI** " Classify natural changes in our environment as physical or chemical changes**" -** do they get this?
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| 15 min | * Venn-diagram on board, students get to write on board the similarities and differences
 | * Group conglomerates take turns writing bullet points on the Venn diagram on the chalkboard
* After all the points are exhausted, class discusses each bullet point to assess its validity
 | * Collaboration - how are students working as a class to develop a mutually beneficial product? How are students addressing other students who might have something to share to the class? How are they helping other learn the material? Are certain students stepping up to the plate to lead the discussion and what they need to cover? (Leadership)
* Self-directed learning - are students asking questions if they don't understand a concept? Are they making sure they understand the material?
* **Learning outcomes - 1)** Understand and identify the differences between physical and chemical changes**2)** Categorize natural and artificial processes as physical and chemical changes (ex. state changes)**3)** Provide examples of chemical and physical changes
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| 20min | * Inquiry into chemical formulas
 | * Students go back into their original groups and are given a sheet containing chemical formulas of ionic compounds. They are also given examples of incorrect chemical compounds and are asked why these combinations aren't possible (ex. why do we have NaCl and not NaCl2?). Students can use their textbooks and periodic table to figure this out. Each group writes out an explanation.
 | * **BI** - Explain how ionic compounds are creating using the periodic table
* **Learning outcome** - Recognize and correct mistakes in chemical formulas of ionic compounds
* Asking questions - are students asking questions and sharing their questions with the group as they figure out the problem? How are they using these questions to drive their learning?
* Collaborative directed learning - students work closely as a group to understand the problem and to figure out a solution
* Creativity - the solution need not be correct, but the group needs to be able to argue their point. What can the students come up with that's outside the scope of the course?
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| 5min | * Group merge\*\*if students need more time in their groups, this merging process will happen next class
 | * Each group joins with at least 1 other group and the groups share what they found and discuss the reasoning they came up with
 | * Collaborative directed learning - in order to convince another group that one's solution is correct, good communication and respect needs to be in place for learning to happen. Are students creating this for themselves?
* Critical thinking - how are students logically reasoning out their idea during group discussions?
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**Closure**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 5 min | * Debrief on process and that we're going to continue this exercise the next lesson
 | - Make sure groups have their explanations worked out. If not, it is for homework as a group to arrive at an explanation - this will be their progress report- Ask students how they found this exercise- Introduce a app game they can get for free: School of Dragons - Alchemyhttps://itunes.apple.com/us/app/school-dragons-alchemy-adventure/id885038943?ls=1&mt=8**Introduce challenge -** **1) Find the scientific error in this game****2) Suggest ways to improve this game. The new idea must improve BOTH the education and the entertainment experience of the game.** *Deadline: in written form and on the day of Unit Test* | Progress report - this will show student's critical thinking skills as well as their understanding of writing chemical formulas from their ionic composition |