**Lesson Plan**

**Teacher: Holland Sloan**

**Subject: Chemistry**

**Lesson: Predicting Chemical and Physical Properties of an Atom**

**Standards:** CHEM1.PS1. 12. Explain the origin and organization of the Periodic Table. Predict chemical and physical properties of main group elements (reactivity, number of subatomic particles, ion charge, ionization energy, atomic radius, and electronegativity) based on location on the periodic table. Construct an argument to describe how the quantum mechanical model of the atom (e.g., patterns of valence and inner electrons) defines periodic properties. Use the periodic table to draw Lewis dot structures and show understanding of orbital notations through drawing and interpreting graphical representations (i.e., arrows representing electrons in an orbital).

SEP: Using Mathematics and Computation Thinking

CCC: Pattern

DCI: Matter and Its Interactions: Structure and Properties of Matter

**Objectives:** Students will use mathematics and computation thinking as they predict chemical and physical properties of elements, highlighting the patterns of the periodic table.

**Materials and Resources:** The students will be completing an escape room activity to show mastery of balancing chemical equations. The BreakoutEDU box will be needed as well as a 4-digit lock, a 3-digit lock, a direction lock, and a word lock.

The following hand outs are also required: Can You Answer Questions on the Periodic Table, Periodic Table Clue Cards

**Instructional Procedure:**

Beginning: Teacher will begin class with a “speed dating activity” to review material before participating in the escape room activity. Half of the students will remain in their seats while the other half of the class will rotate to different partners in timed intervals. The time limit is based on teacher’s discretion, but 2-3 minutes is recommended. During this time, the students will participate in a series of “speed dates” asking questions over specific sections of their notes to review concepts needed to completer escape room activity. Teacher will be monitoring during activity to make sure students are on-track.

Middle: The class will begin an escape room activity. Teacher will use all hand out materials for this activity. Teacher will review the introductory story of the escape room. As students decipher clues, they will write the codes down on their activity sheet. Students are only allowed to go to the lock box once **all** codes are determined. Students should have a time limit on this activity. The amount of time allowed should be set based upon students’ ability levels. The maximum amount of time is one hour, but most students break out within 30 minutes. For an honors class, the timer should be set for 30 minutes or less. Students can unlock the box and receive a prize. This allows students to use their critical thinking skills while also showing mastery of standard(s). Students will be in groups during this activity and following their assigned roles.

End/Closure: Students will return to front of the classroom for a closure assessment. Students will be given an assessment card that is provided by the teacher. The card has four elements listed with specific information of each element. Students are to analyze information on cards and identify if there are any false or incorrect statements. Students are then to correct these statements with true statements or corrected calculations. Teacher will be monitoring student engagement and listening to student discussion of assessment card.

**Grouping:** Students will be in groups of two to three based upon heterogeneous mixtures. Students will assign roles within their group and make sure the roles are being followed. Suggested roles are as follows: facilitator, communicator, and reporter. The facilitator is responsible for collecting materials and keeping the group on-task. The communicator is the only person within the group allowed to ask the teacher questions. Group communication must happen first before the teacher is asked questions. The reporter is responsible for recording data to share with the group and submits any final paperwork required by the teacher.

**Exit Ticket:** Students will submit assessment cards as their exit ticket.