Unit 3

Physical Science: Atoms, Elements, and Compounds

Ms. Li

Sc9/E

**Prior knowledge:**

**Prescribed learning outcomes:**

**C1** use modern atomic theory to describe the structure and components of atoms and molecules

**C2** use the periodic table to compare the characteristics and atomic structure of elements

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

**C4** describe changes in the properties of matter

**Vocabulary:** alkali metal, alkaline earth metal, atom, atomic mass, atomic number, Bohr model, conductivity, covalent compounds, density, electron, element, halogens, ionic compounds, mass, melting/boiling point, molecule, multiple ion charge, metal, metalloid, neutron, noble gases, non‐metal, polyatomic ions, proton, state, subatomic particles, volume

**Student Development Goals (Ideal student)**

1) Highly motivation to learn, not for marks or grades but for:  
 a) personal interest -> develop interests that matter to them  
 b) natural thirst for knowledge  
 c) applications to real world  
 d) connections made to international/global issues

2) Mastery of the Revised Bloom's Taxonomy for all PLOs

3) Responsibility over learning and personal development

4) Mastery of skills to do well in the workforce  
 a) collaboration/teamwork  
 b) computing  
 c) leadership  
 d) creativity

5) Find meaning in their learning through:  
 a) projects  
 b) research

6) Willingness to experiment, take risks, and challenge themselves

**Policies:**

1) No retakes on quizzes and tests

2) Flex points given for spotting intended mistakes, challenge questions/puzzles, test bonus questions, and the Escape room

3) Flex points can be use to reallocate percentage weighting to favor a better mark for the student

4) Teacher will intentionally create mistakes in Powerpoint or projector notes. First student to correctly catch the mistake is awarded flex points that can be accumulated for bonuses

5) 1 Challenge question will be posted at the beginning of every Monday along with the solution to the challenge from the previous week

6) The Phorgum challenge will be worth 5 Flex points for every group member who gets it correct by the indicated time limit, and 1 Flex point for all participating members who attempted the challenge

7) Socrative questions are used to check attendance and participation.

**Materials:** Socrative questions, laptop, projector, laboratory chemicals and equipment, and quiz/pre-quiz/unit test/problems handouts.

**Extensions:** PHeT, Youtube videos, and online Jeopardy review.

**Total lessons:** 15 lessons

**Total time:** 20 hrs, 80mins per lesson

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| Lesson | Activities | Materials and Extensions | Learning Objectives | Assessment |
| 1 | **1) Class intro, social norms/expectations, unit overview**  **2) Lecture** - matter, elements, compounds, particle model, kinetic theory of motion |  | **C4** describe changes in the properties of matter | Socrative questions |
| 2 | **1) Lecture** - physical and chemical changes  **2) Undemo** - hydrogen bomb |  | **C4** describe changes in the properties of matter | Socrative questions  Undemo handout |
| 3 | **1) Police constable guest speaker** |  | **C4** describe changes in the properties of matter | Guest speaker handout |
| 4 | **1) Video** - Alchemy bogus video (critical analysis)  **2) Group work** - Scientists for the Atom  **3) Quiz** |  | **C1** use modern atomic theory to describe the structure and components of atoms and molecules | Group presentations  Quiz |
| 5 | **1) Lecture** - The atom, Bohr model |  | **C1** use modern atomic theory to describe the structure and components of atoms and molecules  **C2** use the periodic table to compare the characteristics and atomic structure of elements | Socrative questions |
| 6 | **1**) **Group work** - Bohr model problems |  | **C1** use modern atomic theory to describe the structure and components of atoms and molecules  **C2** use the periodic table to compare the characteristics and atomic structure of elements | Group work problems |
| 7 | **1) Lecture** - Bohr and Periodic table |  | **C2** use the periodic table to compare the characteristics and atomic structure of elements | Socrative questions  Questions teacher asked in class |
| 8 | **1) Phorgum Challenge!** |  | **C2** use the periodic table to compare the characteristics and atomic structure of elements | Collaboration  Challenge solution  Reflection handout |
| 9 | **1) Quiz**  **2) Lecture** - Bohr compounds, covalent/ionic |  | **C3** write and interpret chemical symbols of elements and formulae of ionic compounds | Quiz |
| 10 | **1) Lecture** - naming compounds, covalent/ionic |  | **C3** write and interpret chemical symbols of elements and formulae of ionic compounds | Socrative questions |
| 11 | **1) Group work** - compound naming + formulas |  | **C3** write and interpret chemical symbols of elements and formulae of ionic compounds | Group work hand-in |
| 12 | **1) Quiz**  **2) Review rules for Escape room**  **3) Work period or investigation period** |  |  | Quiz |
| 13 | **1) ESCAPE ROOM!!!** |  | **C1** use modern atomic theory to describe the structure and components of atoms and molecules  **C2** use the periodic table to compare the characteristics and atomic structure of elements  **C3** write and interpret chemical symbols of elements and formulae of ionic compounds  **C4** describe changes in the properties of matter | Collaboration  Solving the puzzles and escaping the room |
| 14 | **1) Review period** |  |  |  |
| 15 | **UNIT TEST** |  |  |  |

**Cool Videos**

Quantum levitation

https://www.youtube.com/watch?v=Ws6AAhTw7RA&feature=youtube\_gdata\_player

Slinky Drop  
https://www.youtube.com/watch?v=wGIZKETKKdw