



## Unit 1 Atoms and the Periodic Table

### High School Physical Science

#### Unit Length and Description:

#### 11 Instructional Weeks

Students will use the periodic table to predict the relative properties of elements based on the atom's patterns of valence electrons and composition of the nucleus. Students will also develop models to illustrate the changes in the composition of the nucleus and the energy released during the processes of fission, fusion, and radioactive decay.

#### Science Standards:

- HS-PS1-1** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level and the composition of the nucleus of atoms.
- HS-PS1-8** Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the process of fission, fusion, and radioactive decay.

#### Enduring Understandings- Unit Anchor Phenomenon:

On August 6, 1945, during World War II, an American bomber dropped an atomic bomb over the Japanese city of Hiroshima. The Hiroshima atomic bomb was approximately 9.84 ft. in length with a diameter of 28 in., yet it wiped out 90 percent of the city of Hiroshima and killed 80,000 people.

#### Essential Questions- Reflective Summaries:

- Develop a model to illustrate the changes in the composition of an atom and the energy released during a fission and fusion reaction.
- How are fission and fusion reactions different? Use evidence from your model to support your response.
- What role do fission and fusion reactions play in powering atomic bombs?
- How is uranium-235 different from uranium-238?
- Why is uranium-235 used to power atomic bombs instead of uranium-238?
- How is energy generated in an atomic bomb different from energy generated in a nuclear reactor?