

Unit 2: Atomic Structure & Electron Configuration

Content Area: **Template**

Course(s):

Time Period:

Length:

Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Unit 2: Atomic Structure & Electron Configuration

Essential Questions

- Can you predict ways that one atom might differ from another atom? Why do you think we use probability?
- How are atoms of one element different from atoms of another?
- How did our model of the atom evolve over time?
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- How do you think atoms will gain or release energy?
- How does atomic structure predict chemical behavior?
- What components make up an atom?
- What happens when electrons in atoms absorb or release energy?
- What information does an electron configuration convey?
- Why do you think it is important to understand the structure of an atom?

Objectives

- Calculate the average atomic mass of an element
- Define and calculate relative atomic mass using isotope abundances.
- Describe and diagram the photoelectric effect
- Describe the properties of protons, neutrons, and electrons.
- Describe the structure of an atom using modern atomic theory
- Describe what Bohr proposed in his model of the atom
- Describe what the quantum mechanical model determines about electrons in an atom
- Explain how Democritus and John Dalton describe atoms

- Explain how frequencies of light are related to changes of electron energies
- Explain how ions form
- Explain how isotopes of the same element differ
- Explain how sublevel of principle energy levels differ
- Explain how the change in composition of an atom can release energy
- Explain the quantum mechanical model of the atom.
- Explain what causes an atomic emission spectra
- Explain what makes one element different than another.
- Identify and describe the three types of subatomic particles
- Identify instruments used to observe atoms
- List and explain the 3 rules for writing an electron configuration
- Relate atomic structure to periodic table placement.
- Revise the atomic model
- Summarize the historical development of atomic models (Dalton → quantum).
- Write electron configurations and orbital diagrams for main-group elements.

Standards

9-12.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 of atoms.
9-12.HS-PS1-8	Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
9-12.HS-PS4-4	Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
9-12.HS-PS4-3	Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.
9-12.HS-PS4-1	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

Instructional Tasks/Activities

- Berman Lab: Average Atomic Mass
- Create models of the atom
- Electron Configuration “Battleship” Game
- Essential Question Socratic Seminar
- Flame Test Lab
- Isotope Notation Puzzle
- Models of the atom research
- Models of the Atom Research
- Orbital Diagram Sketch Challenge

- Periodic Table Placement Activity
- Quantum Model Simulation Exploration
- Quantum Model and Electron Configurations
- Review Activity
- Subatomic Particle Property Match-Up
- Unit 2 Test
- Unit 2 Test Review

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Flashcards and/or drill and practice
- Inquiry based activities with reflective discussion
- Journal / Student Reflection
- Kahoot
- Laboratory groups
- Lecture with note taking or guided notes
- Online models and simulators
- Other named in lesson
- Peer Review
- Performance
- Power Point Presentation
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Whole and small group discussions
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook

- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz

- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

Resources

- Resource 1
- Resource 2
- Resource 3
- Resource 4
- Resource 5