TCSS Physical Science
Unit 2 – Atomic Structure Information

Milestones Domain/Weight: Atomic and Nuclear Theory and the Periodic Table 25%

Georgia Performance Standards:
SPS1. Students will investigate our current understanding of the atom.
a. Examine the structure of the atom in terms of: proton, electron, and neutron locations; atomic mass and atomic number; atoms with different numbers of neutrons (isotopes); explain the relationship of the proton number to the element's identity.
SPS4. Students will investigate the arrangement of the Periodic Table.
a. Determine the trends of the following: Number of valence electrons; Types of ions formed by representative elements; Location of metals, nonmetals, and metalloids; Phases at room temperature.
b. Use the Periodic Table to predict the above properties for representative elements

Purpose/Goal(s):
- Students will understand the structure of the atom.
- Students will determine trends on the Periodic Table.
- Students will use the Periodic Table to predict properties for elements.

Content Map: Unit 2 – Atomic Structure Content Map

Prerequisites: Unit 2 – Atomic Structure Middle School Standards

Unit Length: Approximately 20 days

Click on the links below for resources by Concept:

Concept 1: Atomic Structure

Concept 2: Periodicity

TCSS Physical Science **Atomic Structure** Unit Information

Concept, Essential Question(s), and Standard(s)	**Vocabulary**	**Resources [Back to Top]**	**Assessment**
Concept 1: Atomic Structure EQ1: How do subatomic particles of an atom affect its characteristics? EQ2: What properties can be used to compare subatomic particles? EQ3: How are isotopes of the same element different? EQ4: How do atoms become ions? SPS1a. Examine the structure of the atom in terms of: proton, electron, and neutron locations; atomic mass and atomic number; atoms with different numbers of neutrons (isotopes); explain the relationship of the proton number to the element's identity.	Essential* Atom Atomic Mass Atomic Number Electron Element Isotope Neutron Proton Proton Number Supplemental** Electron Cloud Energy Level Ion Nucleus Valence Electron *Essential vocabulary listed in the GPS Standards **Supplemental vocabulary listed in the state frameworks and/or other state document	**Animations/Videos** **PhET Build an Atom** **PhET Isotopes and Atomic Mass** **Atomic Structure** (2:01) – Explains the basic atomic structure and outlines the roles of protons, neutrons, and electrons **Isotopes** (2:06) – Explains what isotopes are, using Carbon-12, Carbon-13, and Carbon-14 as examples **Notes** **Atomic Structure** – Multi-Day PowerPoint for the atomic structure graphic organizer and isotope graphic organizer. Also, the PowerPoint includes practice question, activators and summarizers. **Atomic Structure Graphic Organizer** – Used with the atomic structure PowerPoint **Proton, Neutron, and Electron Venn Diagram** – Student copy of the Venn Diagram found in the atomic structure PowerPoint **Isotope Graphic Organizer** – Used with the atomic structure PowerPoint **Practice/Worksheets/Labs** **Acrostic for Protons, Neutrons, and Electrons** – Student writing assignment for protons, neutron, and electrons **Isotopes Practice** – Student worksheet with practice isotope problems	Concept 1: Sample Assessment Items

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Concept, Essential Question(s), and Standard(s)	**Vocabulary**	**Resources [Back to Top]**	**Assessment**
Concept 2: Periodicity EQ1: How does knowing the trends of the periodic table help scientists predict properties of the representative elements? SPS4a. Determine the trends of the following: Number of valence electrons; Types of ions formed by representative elements; Location of metals, nonmetals, and metalloids; Phases at room temperature. SPS4b. Use the Periodic Table to predict the above properties for representative elements.	Essential* Ion Metal Metalloid Nonmetal Periodic Table Valence Electron Supplemental** Family Group Noble Gases Oxidation Number Period *Essential vocabulary listed in the GPS Standards **Supplemental vocabulary listed in the state frameworks and/or other state document	**Animations/Videos** **Reading the Periodic Table** (2:22) – This video shows how to read the periodic table. The terms "atomic number" and "atomic mass." **Groups and Periods Song** (2:48) – This song is based on the 60's tune "Happy Together." This song should help students remember the difference in meaning between Group Numbers and Period Numbers. **Reaction (Explosion) of Alkali Metals with Water** (3:15) – This video clips shows the reactions of the alkali metals with water as you move down the table. **Notes** **Periodic Table PowerPoint** – Multi-day PowerPoint for the trends on the periodic table vocabulary and periodic table graphic organizer. **Trends on the Periodic Table Vocabulary** – Graphic organizer for the students to fill out when the teacher uses the Periodic Table Notes PowerPoint (slides 14-29) **Valence Electrons and Energy Levels Remediation** – Remediation activity for students after a formative assessment **Periodic Table Graphic Organizer** – Visual graphic organizer for the periodic table trends to be used with the Periodic Table Notes PowerPoint (slides 31-52) **Practice/Worksheets/Labs** **Mendeleev Lab** – The students construct a rough periodic table with the cards provided and then find a "best fit" for the unknown elements. **Periodic Table Practice 1** – Student activity sheet where the students determine valence electrons; energy levels; metal, nonmetal, or metalloid; and phases at room temperature **Periodic Table Practice 2** – Student activity sheet where the students determine the symbol; name; atomic number; atomic mass; protons; electrons; neutrons; phase of matter; metal, nonmetal, or metalloid; energy levels; valence electrons	Concept 2: Sample Assessment Items

		Periodic Table Jeopardy – Jeopardy PowerPoint review for the periodic table	