Kenai Peninsula Borough School District
Science: Chemistry
Unit 3: PERIODIC TABLE - USES

NGSS 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 of atoms.

HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS1-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

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.

HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

MATH STANDARDS:

MP.2
Reason abstractly and quantitatively. (HS-PS3-1),(HS-PS3-2),(HS-PS3-3),(HS-PS3-4),(HS-PS3-5) HS-PS1-2),(HS-PS1-3),(HS-PS1-7),(HS-PS1-8)
a. decontextualize to abstract a given situation and represent it symbolically and manipulate the representing symbols.
b. reflect during the manipulation process in order to probe into the meanings for the symbols involved
c. create a coherent representation of the problem
d. make sense of quantities and their relationships in problem situations
e. attend to the meanings of quantities
f. use flexibility with different properties of operations and objects
g.translate an algebraic problem to a real-world context
h. explain the relationship between the symbolic abstraction and the context of the problem

i. compute using different properties
j. consider the quantitative values, including units, for the numbers in a problem

MP.4	Model with mathematics. (HS-PS3-1),(HS-PS3-2),(HS-PS3-3),*(HS-PS3-4)*,(HS-PS3-5) *(HS-PS1-2),(HS-PS1-3),(HS-PS1-7),(HS-PS1-8)* In grades 9-12 mathematically proficient students will: • apply mathematics to solve problems in everyday life, society, and workplace • identify important quantities in a practical situation and map the relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas • consistently interpret mathematical results in the context of the situation and reflect on whether the results make sense • apply knowledge, making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later • make assumptions and approximations to simplify a situation, realizing the final solution will need to be revised • identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, and formulas • analyze quantitative relationships to draw conclusions • improve the model if it has not served its purpose
HSN.Q.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),(HS-PS2-5),(HS-PS2-6) *(HS-PS1-2),(HS-PS1-3),(HS-PS1-7),(HS-PS1-8)*
HSN.Q.2	Define appropriate quantities for the purpose of descriptive modeling. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),(HS-PS2-5),(HS-PS2-6) *(HS-PS.7),(HS-PS1-8)*
HSN.Q.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-PS2-1),(HS-PS2-2),(HS-PS2-4),(HS-PS2-5),(HS-PS2-6) *(HS-PS1-2),(HS-PS1-3),(HS-PS1-7),(HS-PS1-8)*

ELA Standards:

RST.11-12.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-PS2-1),(HS-PS2-6)

RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (HS-PS1-1)
WHST.9-10.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-PS2-6)
WHST.11-12.8	8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. (HS-PS1-3)
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS1-3)
SL.9-12.5	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. *(HS-PS3-1),(HS-PS3-2),(HS-PS3-5)*

ESSENTIAL QUESTIONS

1. Explain the significance and rows and columns in the periodic table.

2. Describe the relationship between atom and element?

BIG IDEAS:

1. Understand how to use the periodic table.

2. Know the different sections of the periodic table.

Vocabulary: Group, Family, Period, Metal, Nonmetal, Noble gas, Metalloids, Halogen, Alkali metals, Alkali earth metals, Octet rule, Periodic trend, Symbol