WAUCONDA SCHOOL DISTRICT 118
UNIT PLANNING ORGANIZER

Subject: Diamonds

Grade Level or Course: 10th Grade

Unit: Two

Pacing: 47 days

STAGE 1 – DESIRED RESULTS

Anchoring Phenomenon:

I. **Where do Diamonds come from?**
- ☐ Metal vs Nonmetals
- ☐ Elements vs Ions
- ☐ Periodic Table Trends
- ☐ Lewis Dot Structure
- ☐ Bohr Models
- ☐ Ionic Bonding
- ☐ Electronegativity
- ☐ Density

Investigative Phenomenon:

1. **Where do Diamonds come from?**
   - What makes diamonds so valuable?
2. **How can we identify minerals?**
   - Students investigate properties of minerals.
3. **Metals vs. Non-metals.**
   - What are some chemical characteristics that describe a certain element?
4. **Identifying trends on the periodic table.**
   - Students apply knowledge of chemical properties to identify trends on the periodic table of elements
5. **Creating bonds modeling the earth's core.**
   - Design and construct models to develop an explanation for how Diamonds are created on the Earth based on student-generated evidence.

NGSS Performance Standards:

- HS-PS1-3: Electrical Forces and Bulk Scale Structure: 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. (Patterns)
- HS-PS1-4: Total Bond Energy Change in Chemical Reactions: Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. (Energy and Matter)
- HS-PS1-5: Collision Theory and Rates of Reaction: Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate

at which a reaction occurs. (Patterns)

- HS-PS1-7: Conservation of Atoms in Chemical Reactions: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (Energy and Matter)

NGSS - Science and Engineering Practices:

- **Constructing Explanations**: Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
- **Developing and Using Models**: Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
- **Analyzing and Interpreting Data**: Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.
- **Using Mathematics and Computational Thinking**: Mathematical and computational thinking in 9- 12 builds on K-8 experiences and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
- **Designing Solutions**: Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects. Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations.
- **Planning and Carrying Out Investigations**: Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.

NGSS - Disciplinary Core Ideas:

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NGSS - Cross-Cutting Concepts:

- **Patterns**: Students observe patterns in systems at different scales and cite patterns as empirical evidence for causality in supporting their explanations of phenomena. They recognize classifications or explanations used at one scale may not be useful or need revision using a different scale; thus requiring improved investigations and experiments. They use mathematical representations to identify certain patterns and analyze patterns of performance in order to reengineer and improve a designed system.
- **Energy and Matter**: Students learn that the total amount of energy and matter in closed systems is conserved. They can describe changes of energy and matter in a system in terms of energy and matter flows into, out of, and within that system. They also learn that energy cannot be created or destroyed. It only moves between one place and another place, between objects and/or fields, or between systems. Energy drives the cycling of matter within and between systems. In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved.
- **Structure and Function**: Students investigate systems by examining the properties of different materials, the structures of different components, and their interconnections to reveal the system's function and/or solve a problem. They infer the functions and properties of natural and designed objects and systems from their overall structure, the way their components are shaped and used, and the molecular substructures of their various materials.

STAGE 2 – EVIDENCE

Concepts (Big Ideas and Themes)	Performance Tasks (What students will be able to do)	21st Century Skills - Science and Engineering Practices
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Common Summative Assessments:

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Common Formative Assessments:

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Modified Summative Assessments:

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Modified Formative Assessments:

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STAGE 3 – LEARNING PLAN (INSTRUCTIONAL PLANNING)

Suggested Resources/Materials/Informational Texts

Suggested Research-based Effective Instructional Strategies

Academic Vocabulary/ Word Wall	Enrichment/Extensions/ Modifications	Interdisciplinary Connection
Essential Vocabulary:		