Physics
Curriculum Mapping
2019-2020
Christina Strid

<table>
<tr><td colspan="2">Unit: Physics Toolkit</td><td>Time: August 2019</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">Reason quantitatively and use units to solve problems
Write expressions in equivalent forms to solve problems
Solve equations and inequalities in one variable
Make interferences and justify conclusions from sample surveys, experiments and observational studies</td></tr>
<tr><td>Differentiation/Assessment:</td><td>Classroom Management and Environment:</td><td>What will the students be doing?</td></tr>
<tr><td>Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.</td><td>The classroom is set up using nine tables. The students move into different groups to practice speech and listening skills. Overall the environment is structured and has rules and procedures in place.</td><td>The students will be discussing what physics is, how to use the scientific method, using significant figures and dimensional analysis with the metric system.</td></tr>
<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will upon in this course.</td><td>Scientific methods
Modeling
SI units
Dimensional Analysis
Accuracy
precision</td><td>Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.</td></tr>
<tr><td>Reflection:
This chapter is a review of science concepts from previous courses.</td><td colspan="2">Essential Questions:
What is physics?
What are scientific methods?
Why are significant figures important?
Why is the metric system important in science?</td></tr>
<tr><td>Relevance
Most of these concepts are a review from previous science courses.</td><td colspan="2">Students need to understand how to use mathematics in physics.</td></tr>
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Unit: *Linear Motion*	**Time:** *September- October 2019*

Standards Taught

- *HS-PS2-1 Analyze data to support the claim that Newton's Second Law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.*
- *Write expressions in equivalent forms to solve problems*
- *Solve equations and inequalities in one variable*
- *Make interferences and justify conclusions from sample surveys, experiments and observational studies*

Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using nine tables. The students move into different groups to practice speech and listening skills. Overall the environment is structured and has rules and procedures in place.*	*The students will be describing motion, position-time graphing, velocity, acceleration, force, weight, Newton's laws, vectors and friction.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will upon in this course.	*Motion* *Velocity* *Acceleration* *Force* *Weight* *Newton's laws* *Vectors* *friction*	*Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.*
Reflection: *This unit is important in the study of motion and forces. This is hands on and students did well with this unit.*	**Essential Questions:** • *How is motion related to velocity and acceleration?* • *How are force, motion and weight related?* • *How are vectors important in the study of physics.*	
Relevance	Students will use their skills from the first chapter to student the concepts of linear motion.	

<table>
<tr><td colspan="2">Unit: Motion in Two Dimensions, Gravitation and Rotational Motion</td><td>Time: November 2019</td></tr>
<tr><td colspan="3">Standards Taught</td></tr>
<tr><td colspan="3">HS-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system
Interpret functions that arise in applications in terms of the context
Reason quantitatively and use units to solve problems.
Create equations that describe numbers or relationships.
Analyze functions using different representations.</td></tr>
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<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will upon in this course.</td><td>Projectile
Circular motion
Planetary motion
Rotational motion
equilibrium</td><td>Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.</td></tr>
<tr><td>Reflection:
Student build on their knowledge of linear motion to circular motion.</td><td colspan="2">Essential Questions:
Why is projectile motion important?
How does circular motion relate to rotational motion?
How do projectiles and circular motion relate to our lives?</td></tr>
<tr><td>Relevance</td><td colspan="2">The students expand their knowledge of motion to rotational motion.</td></tr>
</table>

Unit: *Momentum, Work and Energy*	**Time:** *December 2019*

Standards Taught

- *HS-PS2-2– Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system*
- *HS-PS2-3 -Design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*
- HS-PS3-1 *Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.*
- Interpret functions that arise in applications in terms of the context
- Reason quantitatively and use units to solve problems.
- Create equations that describe numbers or relationships.
- Analyze functions using different representations.

Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using nine tables. The students move into different groups to practice speech and listening skills. Overall the environment is structured and has rules and procedures in place.*	*The students will be discussing momentum, impulse, work and energy*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will upon in this course.	*Impulse* *Momentum* *Conservation*	*Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.*
Reflection: *Students understood these concepts well.*	**Essential Questions:** • *How are impulse and momentum related?* • *How does work and energy relate to machines?* • *What are the forms of energy and how are they conserved?*	
Relevance	Conservation and Energy are important concepts in physics.	

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<tr><td colspan="2">Unit: Thermal Energy</td><td>Time: January 2019</td></tr>
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<tr><td colspan="3">HS-PS3-4 Plan and carry out an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform
Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
Interpret functions that arise in applications in terms of the context
Reason quantitatively and use units to solve problems.
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<tr><td>Prior Knowledge Needed</td><td>Vocabulary</td><td>Assessments</td></tr>
<tr><td>Students have a foundation in science that they will upon in this course.</td><td>Thermal
Energy
Heat
Changes of state
temperature</td><td>Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.</td></tr>
<tr><td>Reflection:
Students did well on this topic. They had some previous knowledge.</td><td colspan="2">Essential Questions:
How do heat and energy relate?
How does a substance change state and what energy is required?</td></tr>
<tr><td>Relevance</td><td colspan="2">Energy is an important concept studied in physics.</td></tr>
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<tr><td colspan="2">Unit: Vibrations and Waves</td><td>Time: February 2019</td></tr>
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<tr><td colspan="3">HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy
Interpret functions that arise in applications in terms of the context
Reason quantitatively and use units to solve problems.
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Unit: Electricity and Magnetism	**Time:** *March-April 2020*

Standards Taught

- *HS-PS2-5 Plan and carry out an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.*
- *HS PS3-5 Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.*
- *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.*
- *Interpret functions that arise in applications in terms of the context*
- *Reason quantitatively and use units to solve problems.*
- *Create equations that describe numbers or relationships.*
- *Analyze functions using different representations.*

Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using nine tables. The students move into different groups to practice speech and listening skills. Overall the environment is structured and has rules and procedures in place.*	*The students will be studying electricity and magnetism , static electricity, series and parallel circuits, and electromagnetism.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will upon in this course.	*Charge* *Electrostatic force* *Electric fields* *Current and circuits* *magnetism*	*Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.*
Reflection: *This is a new topic but we worked through how electricity and magnetism work together.*	**Essential Questions:** • *Why is understanding electricity important?* • *How do electricity and magnetism work together?*	
Relevance	Energy is an important concept studied in physics. Electricity and magnetism work together in many ways.	

Unit: Subatomic Physics	**Time:** *May 2020*

Standards Taught

- *HS ESS1-2 Construct an explanation of the Big Bang Theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. Interpret functions that arise in applications in terms of the context*
- *Reason quantitatively and use units to solve problems.*
- *HS ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation*
- *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.*
- *Create equations that describe numbers or relationships.*
- *Analyze functions using different representations.*

Differentiation/Assessment:	**Classroom Management and Environment:**	**What will the students be doing?**
Students who needed the extra help received guided notes, extra individual practice, modified questions and shortened tests.	*The classroom is set up using nine tables. The students move into different groups to practice speech and listening skills. Overall the environment is structured and has rules and procedures in place.*	*The students will be investigating the particle model of waves, atomic models, the nucleus, nuclear decay and reactions and the building blocks of matter.*
Prior Knowledge Needed	**Vocabulary**	**Assessments**
Students have a foundation in science that they will upon in this course.	*Modeling* *Nucleus* *Nuclear decay* *Fission* *fusion*	*Students will answer questions in class, participate in discussions, daily assignments and take chapter tests.*
Reflection: *Students did well on this topic. They had some previous knowledge.*	**Essential Questions:** • *Why is it important to understand nuclear energy?* • *Why do we study atoms and their movement?*	
Relevance	Nuclear power is an important topic to understand.	