

Curriculum Unit Map - MS Science
Taneyville R-II School
2022-2023

Grade 8th grade Subject: Science Quarter: 1st

Unit Title: Science practices

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8ETS1.A.1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <p>ETS1.B.1,2, Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <p>Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p>	<p>Differentiation</p> <p>Expectations</p> <p>Perspectives</p> <p>Variables</p> <p>investigate/investigations</p> <p>observe/observations</p> <p>Data</p> <p>Opinion</p> <p>Claim</p> <p>Evidence</p> <p>Reasoning</p> <p>Lab Equipment</p> <p>Microscope</p> <p>Scientific Method</p> <p>Inference</p> <p>Measuring</p> <p>Temperature</p> <p>Lab Safety</p> <p>Rules/guidelines</p>	<p>Week 1</p> <p>Set up and establish routines:</p> <p style="padding-left: 40px;">(1) Daily expectations</p> <p style="padding-left: 40px;">(2) Science notebook procedures</p> <p style="padding-left: 40px;">(3) Daily questions</p> <p>Learn lab safety Rules</p> <p>Kesler Lab Safety Escape Room</p> <p>Week 2</p> <p>CER activities- commercials, interactive museum heist investigation, CER project (creating scene in which classmates have to find evidence make a claim and include reasoning)</p> <p>Week 3</p> <p>M&M experiment following/practicing scientific method and utilizing lab equipment and lab safety procedures.(Focus on gathering data, setting up and completing labs)</p>	<p>MUST pass lab safety test AND sign lab contract</p> <p>Exit slips</p> <p>Projects</p> <p>Escape room results</p> <p>Lab safety test</p> <p>CER written statements meeting rubric guidelines</p> <p>Successfully completing scientific method lab</p> <p>Lab report</p>

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Grade 8th grade Subject: Science Quarter: 1

Unit Title: Introduction to Matter

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer presentations showing different molecules with different types of atoms.]</p> <p>6-8.PS1.A.2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.]</p> <p>Supporting Standards:</p> <p>6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact Society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.]</p> <p>6-8.PS1.A.4 Develop a model that describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gasses to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert</p>	<p>Topic 1: Lesson 1: matter, substance, physical property, chemical property, atom, element, molecule, compound, mixture (PS1.A.1) Lesson 2: mass, volume, weight, density, Lesson 3: physical change and chemical change</p> <p>Topic 2: Lesson 1: solid, liquid, surface tension, viscosity, gas Lesson 2: thermal energy, temperature, melting point, freezing point, boiling point, vaporization, evaporation, condensation, sublimation, Lesson 3: pressure, Charles Law, Boyle's Law</p>	<p>Topic 1: Introduction to Matter</p> <p>-5E lesson model:</p> <ol style="list-style-type: none"> Engage-Activating prior knowledge- (pg.5 topic 1) and hands on lab (pg. 42 topic 2) Explore (station labs)-Topic 1 lab (pg. 40-41) Topic 2 lab (pg. 82-83) Explain (powerpoint/students take notes over listed vocabulary topics 1 & 2) Elaborate Vocabulary Choice Board <p>Sub plans:</p> <p>Case Study: An Epic Disaster (analyzing and interpreting data)</p> <p>Savvas Interactivity online component (pg. 31- lesson 3)</p>	<p>5E lesson model:</p> <ol style="list-style-type: none"> Evaluation (quizzes, homework, test) Sticky note quiz or quizzz for each lesson to review from the day before handout/worksheet (as needed) that reviews the notes Test at the end of each TOPIC <p>(Topic 1 lessons 1-3 and Topic 2 lessons 1-3)</p>

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atoms. Examples of pure substances could include water, carbon dioxide, and helium.]			
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Grade 8th grade Subject: Science Quarter: 1-2

Unit Title: Chemical Reactions

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS1.A.2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.]</p> <p>6-8.PS1.A.3 Gather, analyze, and present information to describe that synthetic materials come from natural resources and how they impact Society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.]</p> <p>6-8.PS1.B.1 Develop and use a model to describe how the total number of atoms remains the same during a chemical reaction and thus mass is conserved. [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms that represent atoms.]</p> <p>6-8.PS1.B.2 Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. [Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.]</p> <p>Supporting Standards: 6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and</p>	<p>Topic 9</p> <p>Lesson 1: mixtures, colloids, suspension, solution, solvent, solute, solubility, dissolve</p> <p>Lesson 2: physical change, chemical change, reactant, product, exothermic reaction, endothermic reaction,</p> <p>Lesson 3: Law of Conservation of Mass, open system, closed system, decomposition</p> <p>Lesson 4: Synthetic, natural resource, polymer</p>	<p>-5E lesson model:</p> <ol style="list-style-type: none"> Engage-What happens when chemicals react? (pg. 394) Explore (station labs)- <ol style="list-style-type: none"> Lesson 1-mixtures and solutions Lesson 2-chemical change Lesson 3-modeling chemical reactions Lesson 4-producing useful materials <p>Plastic project in Stem is done as well to support this standard.</p> <ol style="list-style-type: none"> Explain: powerpoint/students take notes over vocabulary from each lesson. Elaborate vocabulary choice board <p>Sub plans: Case study: Is plastic really so fantastic? Pg. 436-437</p>	<p>5E lesson model:</p> <ol style="list-style-type: none"> Evaluation (quizzes, homework, test) Sticky note quiz/quizz to review from the day before and for each lesson homework -worksheet that reviews the notes (hardcopies) Test at the end of each unit-Savvas Editable test

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<p>methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer presentations showing different molecules with different types of atoms.</p> <p>6-8.PS1.A.4 Develop a model that describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gasses to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]</p>			
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Grade 8th grade Subject: Science Quarter:

Unit Title: Forces and Motion

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS2.A.1 Apply physics principles to design a solution that minimizes the force of an object during a collision and develop an evaluation of the Solution.</p> <p>6-8.PS2.A.2 Plan and conduct an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.]</p>	<p>Topic 10</p> <p>Lesson 1: motion, reference point, force, newton. Friction, gravity, net force, mass, density</p> <p>Lesson 2: speed, velocity, slope, acceleration</p> <p>Lesson 3: inertia Newton's laws of motion</p> <p>Lesson 4: weight</p>	<ol style="list-style-type: none"> Engage-Wingsuits discussion and Motion Commotion lab (pg. 452) Explore (station labs)- <ol style="list-style-type: none"> Lesson 1-force and motion Lesson 2-- speed, velocity and acceleration Lesson 3-Newton's Law of motions Lesson 4- friction and gravitational interactions (Savvas realize) Explain - powerpoint/students take notes Elaborate: vocabulary choice board <p>Case Study: Finding you way with GPS (pg. 468)</p>	<p>5E lesson model:</p> <p>Evaluation (quizzes, homework, test)</p> <ol style="list-style-type: none"> Sticky note quiz/quizz to review from the day before and for each lesson homework -worksheet that reviews the notes (hardcopies) Test at the end of each unit-Savvas Editable test

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Grade 8th grade Subject: Science Quarter:

Unit Title: Energy and Thermal Energy (Topic 3 & 4)

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS3.A.1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.[Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a whiffle ball versus a tennis ball.]</p> <p>6-8.PS3.A.2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. [Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include presentations, diagrams, pictures, and written descriptions of systems.</p> <p>6-8.PS3.A.3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.[Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.]</p> <p>6-8.PS3.A.4 Plan and conduct an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the temperature of the sample. [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different</p>	<p>Topic 3 Lesson 1: energy, motion, force, work, power</p> <p>Lesson 2: kinetic energy, potential energy, gravitational potential energy, elastic potential energy</p> <p>Lesson 3: mechanical energy, nuclear energy, thermal energy, chemical energy, electrical energy, electromagnetic radiation</p> <p>Lesson 4: Law of Conservation of Energy (review)</p> <p>Topic 4 Lesson 1: thermal energy, heat, temperature</p> <p>Lesson 2: Conduction, Convection, convection currents, radiation</p> <p>Lesson 3: Conductor, insulator, specific heat, thermal expansion</p>	<p>5. Engage-What would make a card jump? (uconnect lab topic 3)</p> <p>6. Explore (labs)-</p> <ul style="list-style-type: none"> a. Lesson 1-What work Is Pg.96 b. Lesson 2- mass, velocity, and kinetic energy pg.102 c. Lesson 3- Interactivity (pg. 110- roller coasters and energy) d. Lesson 4- Interactivity extreme sports (Savvas realize) e. T4- Lesson 1, 2, 3- <p>7. Explain- powerpoint/students take notes</p> <p>8. Elaborate vocabulary choice board</p> <p>Interactivity (pg. 110- roller coasters and energy) Case Study: U.S. Energy Consumption pg. 126-127 Case Study: Earth Power (pg. 156-157) Steam projects- roller coasters and rockets, Coolers (thermal energy design lab)</p>	<p>5E lesson model:</p> <ul style="list-style-type: none"> e. Evaluation (quizzes, homework, test) f. Sticky note quiz/quizzz to review from the day before and for each lesson g. homework -worksheet that reviews the notes (hardcopies) h. Test at the end of each unit-Savvas Editable test (cooler reflection is the assessment for thermal energy)

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<p>materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.</p> <p>6-8.PS3.B.1 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. [Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.]</p>			
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Grade 8th grade Subject: Science Quarter:

Unit Title: Waves and Electromagnetic radiation (Topic 5)

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS4.A.1 Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.]</p> <p>6-8.PS4.A.2 Develop and use a model to describe how waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.]</p>	<p>Topic 5</p> <p>Lesson 1: wave, mechanical wave, medium, electromagnetic radiation, transverse wave, amplitude, longitudinal wave, wavelength, frequency</p> <p>Lesson 2: reflection, refraction, diffraction, absorption, interference, standing wave, resonance, transmitted</p> <p>Lesson 3: loudness, intensity, decibel, pitch, doppler effect</p> <p>Lesson 4: Electromagnetic waves, electromagnetic spectrum, radio waves, microwaves, visible light, ultraviolet rays, infrared rays, x-rays, gamma rays, transverse waves</p> <p>Lesson 5: transparent,</p>	<p>9. Engage-What are waves? Uconnect lab topic 5</p> <p>10. Explore (station labs)-</p> <ul style="list-style-type: none"> a. Lesson 1-hands on lab- waves and their characteristics pg. 182 b. Lesson 2- wave interference interactivity pg. 193 c. Lesson 3- TELEPHONE- can use hands on lab pg. 201) d. Lesson 4-build an electromagnetic wave pg. 210 -Interactivity (Savvas realize) e. Lesson 5- describe the behavior of light - pg. 220- interactivity <p>11. Explain powerpoint/students take notes</p> <p>12. Elaborate vocabulary choice board</p>	<p>5E lesson model:</p> <p>Evaluation (quizzes, homework, test)</p> <ul style="list-style-type: none"> d. Sticky note quiz/quizz to review from the day before and for each lesson e. homework -worksheet that reviews the notes (hardcopies) f. Test at the end of each unit-Savvas Editable test

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	translucent, opaque, diffuse reflection, convex, focal point, concave	Case Study: Sound and light at the ballpark pg.186-187	
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Grade 8th grade Subject: Science Quarter
Unit Title: Electricity and magnetism (Topic 6)

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS2.B.1 Analyze diagrams and collect data to determine the factors that affect the strength of electric and magnetic forces. [ClarificationStatement: Examples of devices that use electric and magnetic forces would include electromagnets, electric motors, or generators. Examples Of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.]</p> <p>6-8.PS2.B.2 Create and analyze a graph to use as evidence to support the claim that gravitational interactions depend on the mass of interacting objects. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the sun, and orbital periods of objects within the solar system.]</p> <p>6-8.PS2.B.3 Conduct an investigation and evaluate the experimental design to provide evidence that electric and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact. . [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of</p>	<p>Lesson 1: electron, electric forces, electric field, electric current, conductor, static electricity, charge, neutral</p> <p>Lesson 2: magnet, magnetism, magnetic field, magnetic force, magnetic pole, interaction</p> <p>Lesson 3: electromagnetism, solenoid, electromagnet</p> <p>Lesson 4: galvanometer, electric motor, electromagnetic induction, generator, transformer</p>	<p>13. Engage- Making Waves pg 231-232</p> <p>14. Explore (station labs)-</p> <ul style="list-style-type: none"> a. Lesson 1-Electric currents (pg 244) b. Lesson 2- Interactivity-Magnetic forces pg. 256 c. Lesson 3-electricity and magnetism (pg. 261) d. Lesson 4- Interactivity Electric motors <p>15. Explain powerpoint/students take notes</p> <p>16. Elaborate vocabulary choice board</p> <p>Extraordinary Science- Bumblebee and electric flowers pg 249 Case Study: The X-57 Maxwell pg.276-277</p>	<p>5E lesson model:</p> <p>Evaluation (quizzes, homework, test)</p> <ul style="list-style-type: none"> g. Sticky note quiz/quizzz to review from the day before and for each lesson h. homework -worksheet that reviews the notes (hardcopies) i. Test at the end of each unit-Savvas Editable test

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tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.]			
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Grade 8th grade Subject: Science Quarter:
Unit Title: Atoms and the Periodic Table (Topic 8)

Standards	Vocabulary	Activities/Resources	Formative/Summative Assessments
<p>6-8.PS1.A.1 Develop models to describe the atomic composition of simple molecules and extended structures. [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.]</p> <p>6-8.PS1.B.1 Develop and use a model to describe how the total number of atoms remains the same during a chemical reaction and thus mass is conserved. [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms that represent atoms.]</p>	<p>Topic 8</p> <p>Lesson 1: atom, electron, nucleus, proton, neutron, atomic number, isotope, mass number</p> <p>Lesson 2: atomic mass, periodic table, chemical symbol, period, group,</p> <p>Lesson 3: compound, valence electron, reactivity, malleable, ductile, luster, semiconductor</p> <p>Lesson 4: ion, polyatomic bond, ionic bond, covalent bond, molecule, nonpolar bond, polar bond, component</p> <p>Lesson 5- acid, corrosive, indicator, base, neutralization, salt</p>	<p>17. Engage-sticky note atoms pg. 330</p> <p>18. Explore (station labs)-</p> <ul style="list-style-type: none"> a. Lesson 1-Interactivity-build an atom pg. 341 b. Lesson 2 periodic table scavenger hunt c. Lesson 3-interactivity valence electrons (pg. 363) d. Lesson 4-interactivity-ionic or covalent bond pg. 374 e. lesson 5- Acids and Bases-cabbage lab pg. 379 <p>19. Explain (powerpoint/students take notes)</p> <p>20. Elaborate: vocabulary choice board</p> <p>Case Study: Unlocking the power of the Atom pg 344-345 Extraordinary science- Acids in the human body pg. 385</p>	<p>5E lesson model:</p> <p>Evaluation (quizzes, homework, test)</p> <ul style="list-style-type: none"> j. Sticky note quiz/quizz to review from the day before and for each lesson k. homework -worksheet that reviews the notes (hardcopies) l. Test at the end of each unit-Savvas Editable test

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General Lesson Overview(5E concept):

1. Bellringer and objective (I use **I can** statements for the objective)
 2. Introduction/Engagement (I do/We do- Guided)- An engaging activity or demonstration to get them “hooked” on the concept
 3. Explore (students do -Guided/Independent)-stations and labs
 4. Explain (I do)--I use guided notes, where they fill in the blanks while I go through a powerpoint
 5. Elaborate (Student challenge projects) (students do- Independent)
 6. Evaluation (students do- Independent)
- (I like to **explore** 1st to get them even more curious about our topic and then **explain** but sometimes I do switch these)

4 DAY WEEK CHANGE: Tuesday-Intro/Engage....explore

I would like to add that ETS learning standards are covered more in depth during STEAM class.