Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 8 Science	Science	8	N/A (Middle School Course)

Course Description:

This course utilizes an inquiry-based framework grounded in national standards to foster advanced analytical and scientific literacy skills. Throughout the academic year, students engage in evidence-based scientific and engineering practices (including modeling phenomena, interpreting data, and constructing arguments) across four comprehensive disciplines of study.

In the physical sciences, students analyze atomic structures, chemical reactions, and the thermodynamic properties of matter. The life science and genetics modules investigate cellular growth, ecosystem dynamics, and the mechanisms of inheritance, specifically modeling how DNA mutations and reproductive methods generate biological diversity. Students then scale their understanding to evolutionary biology and geology, utilizing data from the fossil record and plate tectonics to analyze natural selection and Earth's history. Finally, the curriculum culminates in Earth and space systems, where students evaluate gravitational forces and the celestial geometry responsible for cyclical patterns such as tides, eclipses, and seasonal variations.

Aligned Core Resources:	Connection to the *BPS Vision of the Graduate*
Grade 8 - MS Science Instructional Guide Next Generation Science Standards (NGSS) Cluster/Item Specifications Specifications for Middle School • MS-ESS1: Earth's Place in the Universe • MS-ESS2: Earth's Systems • MS-PS1: Matter and its Interactions • MS-PS2: Motion and Stability: Forces and Interactions • MS-LS1: From Molecules to Organisms: Structures and Processes • MS-LS2: Ecosystems: Interactions, Energy, and Dynamics • MS-LS3: Heredity: Inheritance and Variation of Traits • MS-LS4: Biological Evolution: Unity and Diversity	**Meaningfully Contribute to a Global Society** Collaboration during labs and inquiry related activities, social and cross-cultural skills during small and large group discussions and activities **Effectively Communicate in a Global Society** Media literacy through lab activities, investigations and projects, communication, information literacy **Demonstrate Academic Knowledge and Skills** Checking content mastery through labs and assessments, opportunities for critical thinking and problem solving during independent and group analysis
Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
N/A	Equity Curriculum Review Audit (Gr. 6-8 Science)

Standard Matrix

Standard		Unit 1	Unit 2	Unit 3	Unit 4
MS-ESS1-1	Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.				✔
MS-ESS1-2	Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.				✔
MS-ESS1-3	Analyze and interpret data to determine scale properties of objects in the solar system.				✔
MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.				✔
MS-PS2-5	Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.				✔
MS-LS1-1	Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	✔			
MS-LS2-4	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	✔	✔		

MS-LS1-4	Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.		✔		
MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	✔	✔		
MS-LS3-2	Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	✔			
MS-LS4-5	Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.		✔		
MS-LS4-2	Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.		✔		
MS-LS4-3	Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.		✔		
MS-LS4-4	Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.		✔		
MS-LS4-6	Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.		✔		
MS-ESS1-4	Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.		✔		
MS-ESS2-2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.				✔
MS-ESS2-3	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.		✔		
MS-LS4-1	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.		✔		
MS-PS1-1	Develop models to describe the atomic composition of simple molecules and extended structures.			✔	
MS-PS1-3	Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.			✔	
MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.			✔	
MS-PS1-2	Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.			✔	
MS-PS1-5	Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.			✔	
MS-PS1-6	Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.			✔	

Unit Links

Grade 8 Science
- Unit 1: Cell, Genetics and Heredity
- Unit 2: Natural Selection and Evolution
- Unit 3: Chemistry
- Unit 4: Space

Use of Instructional Time (181 School Days)
- ➔ Maximum of 177 Content and Assessment Days
- ➔ 2 Culture and Climate Days at the start of the year
- ➔ 2 half-days before long school breaks

Unit Title	
Unit 1: Cell, Genetics and Heredity	
Relevant Standards	
MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells MS LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. MS-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	
Essential Question(s)	**Enduring Understanding(s)**
• How do cells create more cells? • How is genetic information passed from parent to offspring? How does this create genetically diverse offspring and genetic variation and diversity? • How do variations in DNA impact outcomes in organisms?	• Cells can only be created from existing cells • Genetic information is passed from parent to offspring in the form of DNA through sexual reproduction. Sexual reproduction creates genetically diverse offspring by combining DNA of 2 genetically different parents. This in turn creates diversity within the larger population and helps species live longer. • Variations in DNA can also occur which then impact the protein created and then the traits of the organism. This follow the central dogma of DNA → Protein → Trait
Demonstration of Learning	**Pacing for Unit**
Various models, quizzes, labs, tests, projects (see Lesson Sequence and Grade 8 - MS Science Instructional Guide)	~60 days
Family Overview (link below)	**Integration of Technology:**
Grade 8 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
Multicellular, unicellular, bacteria, prokaryote, eukaryote, DNA, nucleus, chromosomes, mate, breed, probability, gene, genetics, genome, genotype, phenotype, environment, growth, development, DNA, predator, prey, competition, biodiversity, development, allele, dominant trait, recessive trait, hereditary information, Punnett square, protein. NGSS Middle School Science Specifications	Ziploc bags, marbles, paper clips, multicolor beads, toothpicks, (any assorted small items), pennies, microscopes, prepared specimen slides for microscopes, graph paper, poster paper, large easel pads, assorted play-doh, dice, colored pencils, markers, rulers, Inner Fish Movie DVD, PTC paper
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions**
• Collecting data, graphing, and analyzing traits within a population, exponential growth • Probability for predictions of outcomes for offspring • Health/wellness topics (genetic diseases, sexual reproduction)	• Dominant traits are “stronger” than recessive ones • Punnett Squares will show exactly what is going to happen from an outcome • Traits are only controlled by 1 gene • Mutations are always “bad”
Connections to Prior Units	**Connections to Future Units**
7th grade cells/human body	High school biology Unit 2- Natural Selection and Evolution
Differentiation through *Universal Design for Learning*	

	Engagement	Representation	Action & Expression
LT1	Conduct a "Classroom Inventory of Traits" (e.g., earlobe attachment, tongue rolling). Use anonymous digital polling (like Mentimeter) to show real-time diversity in the room.	Provide information about human genetic diversity in multiple formats. Use a short documentary video and/or infographic.	Students will all take a poll on certain traits they have, generate a graph to show the variation of traits in the classroom and have students create a written summary or graph to represent the data and see the classes diversity
LT2	Show time-lapse videos of a seed growing into a tree or a salamander embryo developing. Ask: "Where did the extra 'stuff' come from?"	Provide color-coded diagrams of mitosis of use interactive digital simulations (like PhET or Gizmos) where students can manipulate cell division.	Students will choose a mode of presentation: act it out, draw a comic strip, make a poster to explain how cell division is responsible for an organism's growth
LT3	Use a "Climate Roulette Wheel" where you divide the classroom floor into two ecosystems using masking tape. • Side A (Asexual): Every student is handed an identical card: *"Optimal Temperature: 22°C (72°F)."* • Side B (Sexual): Every student gets a unique card with a range of temperature tolerances (e.g., Some have 15°C, some 22°C, some 30°C). • Spin a digital wheel or pull a card that changes the classroom "weather" drastically (e.g., *An Ice Age hits! The temperature drops to 12°C!*).	Use graphic organizers (like a Venn diagram or T-chart) with visual icons (e.g., a lightning bolt for speed/asexual, a jigsaw puzzle for variety/sexual) to help students organize advantages and disadvantages.	Students act as "Species Consultants." They choose how to deliver their advice to an endangered species: write a quick paragraph for survival recommendations, create a pros/cons poster, or record a 30-second audio clip.
LT4	Use a "Who's the Parent?" games with photos of animals (dogs, birds) where students match offspring to parents based on visible traits.	Use colored beads, Lego bricks, or distinctly colored paper strips to represent genetic information moving from parent to offspring. Use interactive digital simulations (like PhET or Gizmos) that allow students to "breed" virtual organisms and see the DNA transfer in real-time.	Students write a "Genetic Will" for an organism, describing exactly what "assets" (traits/genes) they are leaving behind to their offspring and how.
LT5	Relate the concept to a smartphone: The phone is the Chromosome, the apps are the Genes, and the specific settings/versions of those apps are the Alleles.	Utilize nesting tools to visually demonstrate this "Russian doll" concept. You can use physical nesting boxes (a small box inside a bigger box) or an interactive digital graphic where zooming in reveals the smaller structures.	Students build 3D models using everyday objects (e.g., beads, pipe cleaners, or LEGOs) to show how these structures fit inside one another
LT6	Use a "Create a Monster" activity, where students flip coins to determine which alleles they get from "Mom" and "Dad" monsters, resulting in a unique baby monster.	Provide "Guided Diagrams" where some parts are filled in and others are blank, allowing students to focus on the flow of information rather than just drawing.	Students can draw or use digital drawing tools (like Canva or Jamboard) or physical manipulatives (colored yarn to represent chromosomes) to record their model. Draw or build their "offspring monster" to represent the randomized traits they got. They demonstrate understanding by tagging their monster with a label explaining why it has 3 eyes (For example EE is dominant for 3 eyes "Got one 'E' from Mom and one 'E' from Dad").
LT7	Frame it as a "Genetic Mystery." Use the "Blue People of Kentucky" or a fictional royal family mystery that students must solve using a pedigree.	Provide scaffolding for Punnett squares. Offer templates with varying levels of support—some completely blank, some with color-coded boxes, and some partially filled in. Use step-by-step interactive modules to	Give students a choice of "Case Files." They can write a "Doctor's Report" explaining the probability of a trait or create a video tutorial teaching a peer how to solve the square.

		teach logic.	
LT8	Play the game of "Telephone." The original message is the DNA; the "mutation" is the error that happens down the line, changing the final "trait" (the sentence).	Use a "sentence mutation" analogy. Show how changing one letter in a sentence (e.g., "The cat ate the rat" to "The bat ate the rat") changes the entire meaning, just like changing a DNA base pair changes a protein. Provide "before and after" DNA sequence strips. Show "Before and After" visuals of proteins. Use the "Recipe Analogy": If you change one word in a recipe (Salt instead of Sugar), the "trait" of the cookie changes completely.	Students explore a real world mutation (like the Rock Pocket Mouse changing color to survive on dark lava rock). They choose how to model the effect: design a "Before & After" comic strip, write a short diary entry from the perspective of the mouse, or use a digital simulator (like PhET) to record a video explanation.

Supporting Multilingual/English Learners (*CELP standards*)

	Emerging	Expanding	Bridging
LT1	I can identify physical traits that make humans different by pointing to or labeling pictures using simple words.	I can describe how humans have different traits using sentence frames (e.g., "One way humans are different is...").	I can explain how genetic differences create diversity in human populations using specific academic science vocabulary.
LT2	I can label the stages of cell division using a visual model or color-coded sequencing cards that match the colors used in the classroom diagram.	I can summarize how cell division helps organisms grow using a graphic organizer or sequence words.	I can explain using a word bank how cell division is responsible for an organism's growth.
LT3	I can match pictures of advantages and disadvantages to the correct type of reproduction on a basic T-chart.	I can compare sexual and asexual reproduction using sentence frames (e.g., "An advantage of sexual reproduction is...").	I can judge whether a plant or animal species will survive a disaster based on how they reproduce.
LT4	I can show which traits come from parents by drawing lines on a simple family trait diagram.	I can describe how parents pass traits to their offspring using simple sentences.	I can write a short paragraph explaining the exact path genetic information takes across generations.
LT5	Color-code the smartphone analogy activity strictly to the 3D building materials (e.g., Chromosome = Blue Pipe Cleaner = Blue Phone Case; Gene = Red Bead = Red App).	I can order alleles, genes, traits, and chromosomes from smallest to largest using a visual model.	I can explain the difference between a chromosome, a gene, and an allele, and how they all end up making a physical trait.
LT6	During the "Create a Monster" activity, provide a visual checklist where a "Heads" coin flip corresponds directly to a red sticker and "Tails" to a blue sticker.	I can create and label a diagram to show how parents create offspring with different traits.	I can create a model and explain exactly how sexual reproduction makes sure that children look different or similar to their parents.
LT7	Use a color-coded grid. Dominant letters (B) are bolded and red; recessive letters (b) are lowercase and blue.	I can fill in a partially completed Punnett square and state the most likely outcome.	I can analyze a punnett square/pedigree and explain how a trait was passed down through generations.
LT8	Use the "Telephone" game visually. Give the student a picture sequence with one deliberate error introduced, and have them point out where the error occurred and circle the parts of the sequence it affected.	I can use a model to show how a DNA mutation changes a trait, using sentence frames to explain the change.	I can model how DNA mutations can change the outcome of a trait.

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 8 - MS Science Instructional Guide
Learning Sequence 1: Intro to Phenomenon (~2 Days) How is Albinism inherited?			
1 - 2	**Learning Target 1** I can explain how humans have different genetics to create diversity.	• I can use a model to demonstrate how humans inherit traits.	

Learning Sequence 2: Cells and Reproduction (~27 Days)		
3-9	**Learning Target 2** I can explain how cell division is responsible for an organism's growth.	• I can list the reasons why cells divide. • I can use evidence to explain the purpose of asexual reproduction for cell growth. • I can create a model that shows how an organism uses asexual reproduction to repair a cut. • I can explain why unicellular and multicellular organisms use cell division to create identical daughter cells for growth.
10-13	**Learning Target 3** I can evaluate the advantages and disadvantages (patterns) of sexual and asexual reproduction on a species' chance of (cause and effect) survival.	• I can identify components of asexual reproduction. • I can identify components of sexual reproduction. • I can identify advantages and disadvantages of each type of reproduction.
13-27	**Learning Target 4** I can apply concepts of reproduction to describe how genetic information is passed on.	• I can explain that genetic information is passed to organisms through cell division. • I can explain that DNA is organized on chromosomes and that chromosomes are divided during cell division. • I can explain that two contributing sources of DNA (chromosomes) are required for reproduction in mammals. • I can compare and contrast each method of reproduction. (time, type of cells, genetic diversity, amount of daughter cells, number of parents) • I can construct an explanation to explain which method of reproduction would be needed to heal a cut on a hand. • I can construct an explanation to explain how an amoeba reproducing in a pond increases its species' chances of survival. (reading passage)
28	**Flex Day**	
29	**Cell Division and Reproduction Quiz**	
Learning Sequence 3: Genetics and Heredity (~21 Days)		
30-31	**Learning Target 5** I can explain the relationship between alleles, genes, traits, and chromosomes.	• I can determine which traits I have using a traits inventory chart. • I can analyze which traits are most and least common within our class population
32-38	**Learning Target 6** I can create a diagram to model how sexual reproduction produces genetic variation from parents to offspring.	• I can define a gene and use a model of a chromosome to explain where a gene can be located. • I can explain the relationship between genes and traits. • I can list traits of an organism and represent different alleles for each trait. • I can explain the relationship between genes and alleles and how alleles are a factor in genetic diversity. • I can use a model to differentiate between and relate chromosomes, DNA, genes, and alleles. • I can create a model to track the inheritance of a trait from parents to offspring. • I can analyze the genetics of two parents in the potential of a gene being present in their offspring.
39-47	**Learning Target 7** I can analyze and draw conclusions from a pedigree/punnett square.	• I can predict the probabilities of an offspring inheriting a given trait. • I can use a punnett square to organize the potential inheritance of a trait. • I can use a punnett square to predict the likeliness of a trait being inherited. • I can evaluate the potential of a trait being present in

		offspring using either a punnett square or pedigree chart.
48-49	**Flex Days**	
50	**Pedigrees and Punnett Squares Quiz**	
Learning Sequence 4: DNA & Traits (~10 Days)		
51-58	**Learning Target 8** I can create a model to explain how mutations in DNA can affect the outcome of an organism's traits.	• I can identify the structure and function of DNA. • I can define a genetic mutation. • I can define the function of a protein in organisms. • I can explain how DNA codes for proteins which determine an organism's traits. • I can differentiate between harmful, helpful, and neutral mutations. • I can model how structural changes in DNA can lead to harmful, helpful, and neutral mutations • I can explain the connection between genes, proteins and traits. • I can explain how changes in DNA bases may affect the outcome of the protein
59	**Flex Day**	
60	**Heredity and Genetics Test**	

Unit Title	
Unit 2: Natural Selection and Evolution	
Relevant Standards	
MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. MS LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth, under the assumption that natural laws operate today as in the past. MS-LS4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in embryological development across multiple species to identify relationships not evident in the fully formed anatomy. MS-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. MS-LS4-5 Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms. MS-LS4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic timescale is used to organize Earth's 4.6-billion-year-old history. MS-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions	
Essential Question(s)	**Enduring Understanding(s)**
What evidence from the fossil record is there to determine that organisms change over time?	Organisms change over time in response to the changing environment. Organisms that have traits that help them survive will live longer, reproduce more often, and therefore pass those beneficial traits down to offspring. Organisms that do not have beneficial traits will die off before they are able to reproduce and pass any of the traits down. Over time, this changes the frequency of specific traits in a given population. Over millions of years this is called evolution which occurs through natural selection.
Demonstration of Learning	**Pacing for Unit**
Various models, quizzes, labs, tests, projects (see Lesson Sequence and Grade 8 - MS Science Instructional Guide)	~19 days
Family Overview (link below)	**Integration of Technology:**
Grade 8 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
Natural selection, artificial selection, evolution, adaptation, resources, reproduction, offspring, breeding, genetic engineering, DNA, cloning, inherit, hereditary, proteins, diversity, trend, beneficial, probability, distribution, adaptation, DNA, dominant traits, recessive traits, homologous, analogous, diversity, extinction,, extinct, unicellular, multicellular, organelles, ancestry, species, evolve,	Listed in the Unit 1 since these bundles are connected

Opportunities for Interdisciplinary Connections:	Anticipated misconceptions
• Graphing • Mathematical representation of changes in traits in population over time due to Natural Selection • History of life on Earth - relative fossil dating, superposition	• Organisms want to adapt to their environment, so they choose to change • Humans always negatively impact the environment and organisms living in it
Connections to Prior Units	**Connections to Future Units**
• Unit 1- heredity and how DNA is passed from parent to offspring • Unit 1- a mutation can result in an adaptation • 7th grade, fossil record/sedimentary rocks	High school biology Unit 4- space - Earth's creation and geologic timeline

Differentiation through *Universal Design for Learning*

	Engagement	Representation	Action & Expression
LT1	"Mammoth Mystery Investigation" analyzing climate change data, human hunting pressure, and habitat loss during the Pleistocene epoch.	Cause-and-effect timeline mapping environmental shifts (warming temperatures, loss of tundra vegetation) alongside mammoth population decline.	Write a case study analysis or construct a digital timeline explaining how environmental shifts and low genetic diversity drove mammoth extinction.
LT2	"Dog Breeding vs. Wild Wolves" comparing how humans select dog traits (e.g., size, coat) vs. how nature selects traits in wild wolves.	Comparative T-chart highlighting key components: selective agent (human vs. environment), variation, overproduction, differential survival, and trait inheritance.	Sort real-world scenarios into natural or artificial selection and present a written or visual breakdown comparing their selective pressures.
LT3	"Family Trait Inventory" investigating inherited physical traits passed down through sexual reproduction versus acquired non-genetic traits.	Punnett square visual models, pedigree charts, and diagrams contrast sexual reproduction (genetic shuffling) with asexual reproduction.	Solve genetic cross scenarios using Punnett squares or create an infographic illustrating how selected traits pass across generations.
LT4	"Rock Pocket Mouse / Peppered Moth Simulation" tracking coat color shifts before and after environmental changes (lava flows, industrial soot).	Line graphs and frequency distribution charts showing trait shifts (e.g., dark coat % vs. light coat %) over multiple generations in changing environments.	Analyze population frequency data and write a Claim-Evidence-Reasoning (CER) essay describing how a trait's prevalence changed over time.
LT5	"Bird Beak Adaptation Lab" testing different tool "beaks" on various food types to observe survival and reproductive success rates.	Evolutionary fitness diagram showing how favorable trait variations lead to higher survival, successful mating, and greater offspring production.	Record a video presentation or draft an explanatory narrative describing how a specific trait variation provides a competitive advantage.
LT6	"Fossil Layer Timeline Puzzle" excavating and sequencing fossil stratum cards to trace anatomical changes in horse or whale ancestors.	Geologic time scale charts, fossil layer diagrams (strata), and evolutionary tree diagrams showing appearance, diversification, and extinction events.	Analyze a fossil record dataset and write an empirical evidence summary detailing patterns of life, anatomical shifts, and mass extinctions over time.

Supporting Multilingual/English Learners (*CELP standards*)

	Emerging	Expanding	Bridging
LT1	I can point to and label visual causes of mammoth extinction (e.g., humans, ice melting) using an illustrated word bank. I can match pictures of parent organisms to offspring showing inherited traits (e.g., long fur to long fur).	I can describe why the woolly mammoth went extinct and how it inherited traits using sentence frames (e.g., "The mammoth went extinct because its inherited traits did not help it...").	I can explain the biological causes for the woolly mammoth extinction using Unit specific vocabulary. I can explain the different paths (dominant, recessive, or artificial selection) that organisms take to inherit specific traits from their parents.
LT2	I can sort pictures of animals into categories of "shaped by nature" (Natural Selection) or "shaped by humans" (Artificial Selection).	I can describe the components of natural and artificial selection using a comparative T-chart or sentence starters.	I can compare and contrast the core components of natural selection and artificial selection to show how they both change a species.
LT3 &4	I can circle or point to the traits in a picture that help an animal hide or survive in its environment. I can identify if a trait went up or down	I can use data from a simulation to describe how a trait increases or decreases over time using a graphic organizer.	I can use scientific evidence and vocab to explain how nature selects for or against specific traits, causing them to increase or decrease in a population over time.

	by looking at a simplified bar graph or population chart.		I can explain how helpful trait variations give certain individuals a competitive advantage to survive and reproduce in their environment.
LT5	I can label a diagram of rock layers to show which fossils are the oldest (bottom) and newest (top). I can match fossil drawings to modern animals that look similar to them.	I can describe patterns in the fossil record (like change or extinction) using a timeline and sentence frames.	I can analyze and interpret fossil data to explain how life on Earth has changed, branched out, or gone extinct throughout history using a timeline, images and data..

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 8 - MS Science Instructional Guide (rev. 2026)
Learning Sequence 1: Introduction to Phenomenon (~2 Days) The case of the missing wooly mammoths			
1-2	**Learning Target 1** I can explain the biological causes for the woolly mammoth extinction.	• I can use a model to explain a scientific phenomenon using my initial thinking.	
Learning Sequence 2: Natural vs. Artificial Selection (~10 Days)			
3-5	**Learning Target 2** I can identify the components of natural selection and artificial selection. **Learning Target 3** I can explain the different ways organisms can inherit selected traits from parents	• I can explain how traits are naturally selected. • I can explain how traits are artificially selected • I can differentiate between natural selection and artificial selection. (timing, human vs nature, causes, reasons, environmental factors) • I can use scientific evidence to demonstrate/model how artificial selection affects the genetic population of a species. • I can create and defend a model to demonstrate which type of selection (artificial/natural) would be best to reverse engineer a Woolly Mammoth.	
6	**Artificial Selection Quiz**		
7-10	**Learning Target 4** I can use evidence to describe how, over time, natural selection may lead to increases and decreases of specific traits in a population. **Learning Target 5** I can explain how variations of traits in a population can increase individuals' probability of surviving and reproducing.	• I can define and identify adaptations in a species. • I can identify reasons why an organism would need certain adaptations in order to survive in specific environments/conditions. • I can organize data into a graph to determine if an adaptation is helpful, harmful or neutral in a population. • I can connect the adaptations of a species to the predominance of that trait in the population. • I can use patterns as evidence to predict future generations of traits in a population. • I can use evidence to argue if factors related to an adaptation led to the extinction (cause and effect) of the woolly mammoth.	
11	**Flex Day**		
12	**Natural Selection Quiz**		
Learning Sequence 3: Fossil Patterns (~7 Days)			
13-17	**Learning Target 6** I can analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life throughout history.	• I can use patterns as evidence from the fossil record to show common ancestry • I can explain/model common ancestry between organisms using embryological evidence. • I can use evidence from the fossil record to support the argument that organisms change over time.	

		• I can identify homologous and analogous structures between organisms. • I can create a model to demonstrate how the woolly mammoth could be reverse engineered using a living ancestor.
18	**Flex Day**	
19	**Fossil Record Quiz**	

Unit Title
Unit 3: Chemistry

Relevant Standards

MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures
MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine whether a chemical reaction has occurred.
MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed
MS-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
MS-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Essential Question(s)	Enduring Understanding(s)
What is matter made of? How does the natural world constantly satisfy the Law of Conservation of Matter?	Everything is made of matter, which is made of atoms even though we can't see them. All matter is neither created nor destroyed, it is just recycled into something different over and over and over again.
Demonstration of Learning	**Pacing for Unit**
Various models, quizzes, labs, tests, projects (see Lesson Sequence and Grade 8 - MS Science Instructional Guide)	~45 days
Family Overview (link below)	**Integration of Technology:**
Grade 8 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
Element, compound, mixtures, homogenous, heterogeneous, pure substances, solution, reactant, product, compound, matter, mass, volume, density, solubility, dissolve, flammability, odor, gas, solid, liquid, chemical bonds, atom, molecule, pure substance, particle, pressure, carbon dioxide, negative impact, natural gas, oil, phase, phase change, thermal energy, kinetic energy, pure substance, compound, thermometer, melting, freezing, condensation, vapor, heat, vibrate, collide,	Iodine, hydrogen peroxide, distilled water, gloves, cornstarch, baking soda, vinegar, sand, salt, iron fillings, coffee filters, beakers, magnets, Vitamin C tablets, luminol, glow sticks, balloons, alka seltzer tablets, matches, candles, powdered laundry detergent, steel wool, digital scales, calculators, stopwatches
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions**
There are many opportunities for students to practice Science and Engineering Practice skills during this unit by demonstrating a chemical reaction.	• Every chemical reactions results in an explosion • Once something is "destroyed' it is gone forever
Connections to Prior Units	**Connections to Future Units**
Math- solving equations 7th grade energy transfer	High school chemistry High School Physical Science

Differentiation through *Universal Design for Learning*

	Engagement	Representation	Action & Expression
LT1	Give pairs a plastic syringe (no needle) capped with a piece of clay or a finger. Challenge them to push the plunger all the way down. When it bounces back or resists, ask: *"If the tube is completely*	Provide multiple ways to "see" the unseen. Use macro-to-micro animations (like zooming into a balloon filled with gas) and provide a structured CER (Claim, Evidence,	Provide choices for constructing their first argument. Students can complete a simple C-E-R (Claim, Evidence, Reasoning) writing template with sentence starters: "Even though I can't

	empty, what is fighting against your hand?" Place a blown-up balloon over the mouth of an empty glass bottle. Submerge the bottom of the bottle in a bowl of ice water, and watch the balloon suddenly deflate and get sucked *inside* the bottle. Ask: *"What just happened here? Write a rumor, a guess, or a bold statement explaining the trick."*	Reasoning) graphic organizer. Offer sentence stems for the initial claim (e.g., "Even though I cannot see the air, I argue it exists because...").	see air, it is matter because..."
LT2	The "Lego Deconstruction" Challenge: Dump a pile of mismatched Lego bricks on a table. Challenge students to sort them. Explain that individual bricks are atoms, connected bricks of the *same* color are elements (like oxygen gas), and structures built from *different* colors are compounds. Ask: *"How many unique structures can we make out of just three basic colors?"*	Create an explicit, color-coded visual key for atoms (e.g., Red = Oxygen, White = Hydrogen). Provide clear, side-by-side visual examples distinguishing an element (pure substance of one atom type) from a compound (different atoms chemically bonded).	The Sticky Note Brainstorm: Instead of making students write a formal paragraph right away, allow them to write their initial claim on a digital Padlet wall or a physical sticky note to post on the whiteboard.
LT3	The "Glow Stick vs. Hand Warmer" Sensory Lab: Crack open a glow stick (chemical reaction releasing energy/light) and open a disposable hand warmer (chemical reaction releasing heat). Have students physically hold them. Introduce the terms *exothermic* and *endothermic* through what their fingers feel, not a textbook slide. The "Alka-Seltzer Time Bomb": Drop an Alka-Seltzer tablet into a film canister filled with water, snap the lid on, and wait for it to pop. Ask: *"What invisible signals did the chemicals send to tell us they were changing into something new?"*	Use a visual checklist or icon-based anchor chart showing the 5 signs of a chemical reaction (color change, gas production, temperature change, light, precipitate). Provide simple, color-coded energy flow diagrams showing energy going in (absorbing) versus energy coming out (releasing).	Use interactive energy graphs that compare exothermic reactions (energy goes down/released) and endothermic reactions (energy goes up/absorbed). Color-code them: use bright red arrows for heat leaving a reaction, and cool blue arrows for heat entering a reaction. Have students explore a station lab. To show what they observed, they can complete a digital photo-journal where they snap pictures of the reactions and label the "signs," write a summary paragraph, or verbally check in with the teacher at each station.
LT4	The Collapsing Soda Can Stunt: Heat a small amount of water inside an aluminum soda can, then quickly invert it into ice water. The can instantly crushes itself with a loud *pop*. Ask: *"Who stepped on the can? How did temperature just manipulate the invisible air pressure inside?"*	Utilize interactive digital simulations like PhET States of Matter. This allows students to physically pump in more gas molecules, crank up the heat, and watch the pressure gauge rise while seeing how the particles behave.	Give choices for explaining the particle behavior. Students can act it out kinesthetically (e.g., standing close and vibrating as a solid, then spreading out and moving fast as a gas), draw a multi-panel comic strip, or complete a structured matching matrix.
LT5	Draw a giant T-chart on the classroom floor using painter's tape, with a balance beam/see-saw triangle drawn right in the middle under the yield arrow (-->).Give students giant whiteboards or large heavy blocks representing different molecules. If the left side has 4 Hydrogen blocks and the right side only has 2, have the students on the left side dramatically pretend to tip over because their side is "too heavy." The students must physically shout out what blocks need to be added to the lighter side to make the human see-saw perfectly level.	Provide a physical or digital Reactant vs. Product T-Chart to help students keep inventory of their atoms. Use physical tokens or colored chips to physically build the molecules on both sides of a "balance beam" graphic organizer so they can visually see when the scale is level.	Offer a "Choose Your Adventure" tier system. Level 1: Draw the molecules to show they are even. Level 2: Solve the equations using math coefficients. Level 3: Fix an incorrectly balanced equation and write a note explaining the mistake.
LT6	Frame a scenario where students are stranded on a freezing, rainy island. They have to choose between a heavy, natural	Provide alternating media types: a podcast episode discussing plastic synthesis, an infographic showing the	Students take on the role of a "Product Designer." They select an item (like a shoe or a piece of furniture) and choose

	wool blanket (absorbs water, gets heavy, but stays warm) or a lightweight, synthetic nylon jacket (waterproof, windproof, but can melt if it gets too close to the campfire). This addresses the misconceptions that "natural is always perfect" and "synthetic is always bad." It reframes the topic around human problem-solving, engineering, and real-world trade-offs.	lifecycle of a natural wood product vs. plastic, and texts with simplified definitions of "natural" and "synthetic."	how to present their material choices: pitch a design to the class arguing why they chose synthetic vs. natural materials, design a labeled poster, or write a comparative summary essay.

Supporting Multilingual/English Learners (*CELP standards*)

	Emerging	Expanding	Bridging
LT1	I can point to and label physical evidence that shows invisible air exists (e.g., a scale tipping, a balloon expanding) using simple vocabulary words. I can choose the correct claim to explain a phenomenon from a 3-choice visual menu bank.	I can state a claim about unseen matter and point to evidence using sentence frames (e.g., "I claim that air exists because when I...").	I can write an initial argument to prove that matter exists even when it cannot be seen.
LT2	I can match the vocabulary words (*atom, element, compound*) to their corresponding color-coded physical models or Lego analogies.	I can build and describe models of atoms, elements, and compounds using a visual key and simple sentences.	I can create a clear, testable claim that gives a scientific explanation for an observed phenomenon.
LT3	I can identify if a reaction feels hot or cold and circle icons representing visible clues of a chemical change (e.g., bubbles, color changes).	I can describe the characteristics of a reaction and note if energy goes in or out using a graphic organizer.	I can explain how energy moves into or out of a chemical reaction, causing temperature changes. I can analyze a chemical change and explain the specific characteristics that prove a new substance was created.
LT4	I can label images of a solid, liquid, and gas and point to what happens to particle speed when heat is added.	I can describe how temperature and pressure change states of matter using cause-and-effect sentence frames.	I can explain the relationship between temperature, pressure, and particle movement during changes in states of matter using unit specific vocab.
LT5	I can draw lines to match and tally identical atoms on the reactant side and product side of a visual equation to see if they are equal.	I can balance a simple chemical equation using a reactant/product T-chart scaffold.	I can balance a chemical equation using math and explain how it proves that mass cannot be created or destroyed.
LT6	I can sort everyday items into categories of "From Nature" or "Man-Made / Lab" using a visual T-chart.	I can compare a natural substance to a synthetic one using a Venn diagram and simple comparative words.	I can evaluate and write a paragraph comparing why society needs both natural and synthetic materials despite their environmental impacts.

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 8 - MS Science Instructional Guide
Learning Sequence 1: Introduction to Phenomenon (~4 Days) Why does a candle go out when a glass is put over it?			
1-3	**Learning Target 1** I can construct an initial argument that matter exists even if I can't see it. I can create an initial claim to explain a phenomenon	• I can explain that solids, liquids and gases contain atoms that have unique properties. • I can make observations and ask questions about the phenomenon • I can make an initial claim to explain the outcome of the phenomenon	
Learning Sequence 2: Atoms, Elements, and Compounds (~6 Days)			
4-8	**Learning Target 2** I can chemically model the ingredients of atoms, elements, and compounds.	• I can describe the structure of an atom • I can use the periodic table to find information about various elements	

		• I can compare and contrast atoms, compounds and molecules. • I can explain the difference between substance and mixtures, including how to separate them.
9	**Atoms, Molecules, Compounds Quiz**	
Learning Sequence 3: Chemical Reactions (~20 Days)		
10-18	**Learning Target 3** I can explain the relationship between energy and a chemical reaction. I can describe the characteristics of a chemical reaction.	• I can define energy. • I can define the law of conservation of energy. • I can describe the difference between chemical and physical properties. • I can use chemical and physical properties to identify a substance. • I can model the conservation of atoms in a simple chemical reaction used to break down sugar.
19-28	**Learning Target 4** I can explain the relationship between temperature, pressure, and states of matter.	• I can model the impact of temperature on the different states of matter. • I can investigate how a change in temperature impacts matter (atoms and compounds). • I can explain the relationship between temperature and pressure.
29	**Flex Day**	
30	**Chemical Physical Changes Quiz**	
Learning Sequence 4: Balancing Chemical Equations (~5 Days)		
31-34	**Learning Target 5** I can balance a chemical equation	• I can identify and define the products and reactants of a chemical reaction. • I can count the amount of atoms that are present in the reactants and products. • I can balance a chemical reaction so that the products and reactants are equal. • I can use the law of conservation of matter to prove that a chemical equation is balanced.
35	**Balancing Chemical Equations Quiz**	
Learning Sequence 5: Natural vs. Synthetic Materials (~10 Days)		
36-43	**Learning Target 6** I can compare the importance of natural vs synthetic substances.	• I can define what a natural substance is • I can define what a synthetic substance is • I can explain advantages and disadvantages of natural and synthetic substances • I can explain why synthetic substances are more popular than natural substances in today's society
44	**Flex Day**	
45	**End of Unit Test**	

Unit Title	
Unit 4: Patterns in the Sky	
Relevant Standards	
MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects MS-PS2-5 Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact MS-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and the seasons. MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system MS ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic timescale is used to organize Earth's 4.6-billion-year-old history. MS-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	
Essential Question(s)	**Enduring Understanding(s)**
What patterns can be used to make predictions about phenomena in the night sky?	Patterns control everything in the natural universe. These patterns can be used to reliably make predictions about almost all the phenomena in the night sky.
Demonstration of Learning	**Pacing for Unit**
Various models, quizzes, labs, tests, projects (see Lesson Sequence and Grade 8 - MS Science Instructional Guide)	~53 days
Family Overview (link below)	**Integration of Technology:**
Grade 8 Science - Family Overview	OpenSci Ed Virtual Labs Gizmos Demonstration PhEt Simulators
Unit-specific Vocabulary	**Aligned Unit Materials, Resources, and Technology (beyond core resources)**
Orbit, magnitude, galaxy, solar system, ellipse, proportional, period, gravity, eclipse, tide, force, day, night, vacuum, satellite, terrestrial planet, gas giant, planetary rings, dwarf planet, sun, inner planet, outer planet, comet, Inertia, force, mass, weight, orbit, names of planets	Flashlights, protractors, lightbulbs, lamps, styrofoam balls, batteries, pencil compasses, gravity table, solar eclipse goggles, globe, heat lamp, graph paper, poster paper, coloring supplies, trundle wheel, large tape measure, scientific calculators
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions**
• Graphing sunlight (length of the day and intensity of the sun) based on latitude position on Earth. • Graphing tide data based on the moon's position in orbit around the Earth. • Creating models of orbital motion (moon phases, eclipses, planetary motion).	• The moon is only visible at night. • The Northern and Southern hemispheres have opposite seasons due to the temperature variations created by changing sun intensity and length of a day. • There is no gravity in space based on astronauts experiencing microgravity. • There is no dark side of the moon. The moon has a day and night side. Due to the moon's rotation period, the same side of the moon always faces the Earth.
Connections to Prior Units	**Connections to Future Units**
Unit 2- law of superposition 7th grade plate tectonics 7th grade forces and motion 7th grade geologic timelines	High school physical science
Differentiation through *Universal Design for Learning*	

	Engagement	Representation	Action & Expression
LT1	Project an image or show a video clip of Stonehenge, an Egyptian pyramid alignment, or a Mayan temple during an equinox (where the sun creates a snake-like shadow moving down the stairs). Tell students that ancient civilizations didn't have iPhones, Google, or watches, yet they built billion-pound stone structures that perfectly predict the exact day the seasons change. Ask, how did they hack the sky? What repeating patterns did they notice that we are missing today because we look at screens instead of the horizon?"	Use time-lapse videos showing the apparent motion of stars, the sun, and the moon across the sky over 24 hours.	Students can choose how to show a cosmic pattern (like day/night or star paths): write a traditional myth explaining a constellation pattern, map a pattern out digitally on Google Slides, or use a physical flashlight and globe to verbally demonstrate the pattern to a partner.
LT2	Project an image of a famous skyscraper (like the Empire State Building or the Burj Khalifa). Tell students that the height of the building represents Earth's timeline from the bottom floor (Earth's birth) to the very top antenna (today). Ask students to guess where on the building humans first show up. Drop a digital marker down the building. Reveal that all of human history fits into a thin layer of paint on the very roof of the building, and the dinosaurs are down around the 95th floor.	Provide physical or visual timeline models (e.g., a 5-meter long cash register tape or a roll of toilet paper representing geologic time). Use side-by-side infographic size comparisons—such as showing Earth as a marble next to the Sun as a basketball.	Give choices for representing the massive scale: students can design an infographic "History of Earth" brochure, write a script for a time-travel movie, or complete a digital drag-and-drop sequencing activity. Utilize interactive zoom tools (like Scale of the Universe 2) that allow students to scroll from the size of a human all the way out to galaxies. Provide a clear, visual matrix chart that categorizes objects by size, composition (rocky vs. gas), and atmosphere.
LT3	Use a digital weight simulator where students type in their current weight to see how heavy they would be on different celestial bodies. Students can also calculate this instead of using a simulator.	Use interactive digital simulations (like PhET or Gizmos) where students can manipulate different masses to show gravity's impact.	Give choices for explaining gravity's role: write a "What If?" sci-fi survival entry describing what happens if gravity drops by half, create a step by step diagram of an orbit, or complete a structured fill in the blank concept map.
LT4	Students use a "Ball on a Stick" Lab to make observations about moon phases. Turn off the classroom lights and give each student a styrofoam ball. (The Moon) Shine a bright projector lamp from the front of the room (The Sun). As students move their own bodies (Earth) in a circle, the styrofoam ball naturally displays every single moon phase right in front of their eyes.	Provide interactive 3D models that show a split-screen view: one side showing the Sun-Earth-Moon system from space, and the other side showing how it looks from an observer standing on Earth. Use clear, aligned diagrams mapping high/low tides to specific lunar phases.	The Moon Phase Comic Strip: Students choose how to model the cycles: draw a 8-panel comic strip starring the Moon changing shapes, build a 3D stop motion video using clay models, or complete a digital labeling assessment on a platform like Canvas or Google Drawings.
LT5	Read a letter from a fictional student in Australia celebrating Christmas on a hot beach while it's snowing in Connecticut. Ask: *"If we are all on the same planet revolving around the same sun, how is this weather chaos possible?"* Give pairs a flashlight and a sheet of grid paper. Have them shine the light directly straight down (90 degree angle) and count how many grid squares are lit up (highly concentrated, bright light). Then, tilt the flashlight at a sharp angle and watch the same amount of light spread out and weaken across the paper. Ask: "How does this explain why direct summer sunlight burns your skin, while slanted winter sunlight leaves you freezing?"	Use the Seasons and Daylight Interactive (or similar interactive widgets like those on EarthFix or PBS LearningMedia) where students can drag Earth around its orbit and watch a live graph track the hours of daylight changing in real time.	Have students act as a "Meteorologist." They choose how to explain why it's winter in New York but summer in Australia: write a weather report transcript, record a video forecast using a globe as a prop, or fill out a structured cause and effect graphic organizer.
Supporting Multilingual/English Learners (*CELP standards*)			

	Emerging	Expanding	Bridging
LT1	I can point to and label visual patterns in the sky (e.g., day/night, changing constellations) using simple words and visual stamps.	I can describe how objects in the sky move in predictable patterns over time using a sentence frame.	I can explain the connections between moving objects in space and the predictable patterns we see from Earth.
LT2	I can sort celestial objects by size from smallest to largest and identify where humans belong on a visual geologic timeline.	I can compare the sizes of different space objects and describe human existence on a timeline using scale words.	I can explain the massive scale of Earth's history and write a summary showing how small human existence is compared to geologic time. I can analyze a scale chart of the solar system to explain how different space objects compare to each other in size and distance.
LT3	I can circle variables (e.g., larger mass, closer distance) that make a gravity vector arrow grow stronger in a visual simulation.	I can describe how gravity keeps planets in motion using a cause-and-effect graphic organizer.	I can explain how gravity acts as the structural glue that controls the orbits and movements of objects across the universe.
LT4	I can sequence cards of the 8 moon phases in order and match an eclipse to its matching 3-body visual alignment.	I can sequence moon phases and describe the alignment of the Sun, Earth, and Moon during eclipses.	I can explain the relationship between the moving positions of the sun, Earth, and moon, and how they create phases, tides, and eclipses.
LT5	I can point to and select which picture shows summer vs. winter based on the length of a shadow and the number of daylight hours on a chart and/or graph.	I can describe how Earth's tilt causes different seasons using a diagram and sentence starters.	I can explain how the constant angle of Earth's tilt creates opposite seasons in the Northern and Southern hemispheres as we orbit the sun.

Lesson Sequence	Learning Target	Success Criteria	Resources/Assessments/ Assured Learning Experiences See: Grade 8 - MS Science Instructional Guide (rev. 2026)
Learning Sequence 1: Introduction to the Phenomena (~2 Days)			
1-2	**Learning Target 1** I can make connections between objects in the sky and patterns in the universe.	• I can make observations and ask questions about phenomena seen in the sky	
Learning Sequence 2: Objects in the Night Sky (~11 Days)			
3-12	**Learning Target 2** I can explain human existence relative (scale) to Earth's geologic time. I can analyze the differences in scale properties for different celestial objects (planets, stars, sun, moons, asteroids, comets) in Space.	• I can identify simple patterns in the night sky. • I can differentiate between stars, planets and other objects seen in the night sky. • I can estimate and calculate relative size and distance of objects in space. • I can analyze, interpret, and illustrate scale properties of objects in space.	
13	**Scale of the Solar System Quiz**		
Learning Sequence 3: Gravity and Orbital Motion (~11 Days)			
14-22	**Learning Target 3** I can explain how gravity impacts patterns and motion in the universe and on Earth.	• I can model the motion of the Earth, Sun, and Moon. • I can define gravity. • I can develop a model to describe the role of gravity in the patterns and motions within the universe. • I can relate orbital periods of different planets to the strength/magnitude of the Sun's gravity. • I can comprehend and illustrate that gravity is the force that keeps the solar system, the Milky Way Galaxy, and the universe together and in motion.	
23	**Flex Day**		

24	**Gravity Quiz**	
Learning Sequence 4: Moon Phases, Eclipses, Tides (~11 Days)		
25-34	**Learning Target 4** I can explain how moon phases, tides, and eclipses are related to the movements of the sun, Earth and moon.	• I can model the motion of the moon around the Earth • I can use evidence to explain how the motion of the Earth, Sun and Moon causes moon phases • I can identify and model moon phases • I can identify the location of the Sun, Earth and moon in a lunar eclipse • I can identify the location of the Sun, Earth, and Moon in a solar eclipse • I can describe the frequency of solar and lunar eclipses throughout the year • I can explain how the position of the moon impacts the Earth's tides
35	**Moon Quiz**	
Learning Sequence 5: Seasons (~18 Days)		
36-50	**Learning Target 5** I can explain how seasons are affected by Earth's position around the sun and the angle of Earth's tilt on its axis.	• I can define and identify key vocabulary (longitude, latitude, northern hemisphere, southern hemisphere, equator) about the Earth • I can create a graph to organize and analyze data on day lengths for each month. • I can identify the length of a day fluctuates more at locations closer to the poles. • I can describe how daylight hour patterns change at different geographic locations (latitudes) on Earth throughout the year • I can identify the sun's intensity is higher the closer a location is to the equator. • I can use evidence to explain why the Earth is tilted • I can make the conclusion that although the length of the day is longer at the poles in the summer than near the equator, the angle of the sun is more intense, leading to a warmer climate near the equator.
51	**Seasons Quiz**	
52	**Flex Day**	
53	**End of Unit Test**	