

To Do

Housekeeping:

- 1) Add text to standards for ES, PS
- 2) Chapters for LS, PS
- 3) Write pacing guides, organize handouts, files

Questions:

- 1) Where to teach Dinosaurs? NGSS says Life Science, but I feel it belongs in Earth Science with geologic time....
- 2) Where to teach Natural Resources? ES with mining in Alaska or PS with Energy?
- 3) Make a block in each course for Nature of Science, Welcome to NBMHS?
- 4) Will we have BrainPop and Moby Max next year?

Concepts not covered in this curriculum that is in textbook/Nitty Gritty Science materials, pushed to HS:

- 1) LS: Hardy Weinberg, Human Body Systems
- 2) ES: Herzberg-Russell Diagram of stars,
- 3) PS: Buoyancy, Fluid Dynamics

Future Work:

- 1) Incorporate more place-based/culturally-relevant lessons from ADFG, Village Science, UAF Math in Cultural Context
- 2) Align with K-5



Nome Public Schools
Middle School Science Curriculum
January 2026

Written by Jennifer Berry, NBMHS Science Teacher

Grade 6 Science

Grade(s): 6 Length: Two semesters	<p>Course Overview: Sixth grade science focuses on Earth’s systems, astronomy, and gravity. In astronomy, the students will model the solar system to observe, describe, and predict the motion of various bodies in our solar system. In Earth’s systems, students will explore the history of our changing planet through impacts of water, rock, and soil cycles on Earth’s surface processes, and construct weather and climate observations to explain influences on Earth’s surface. Throughout the year, interwoven into the curriculum content, students will design and conduct repeatable scientific investigations to continue to develop an awareness that different ways of thinking, curiosity, and the exploration of multiple paths are involved in scientific inquiry.</p> <p>Adopted Textbook: <i>iScience: Earth & Space</i>. McGraw Hill, 2012, 2017</p> <p>Next Generation Science Standards (NGSS): https://www.nextgenscience.org/</p>
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Units (Recommended Order)	
Semester 1	Semester 2
<ul style="list-style-type: none"> • Intro to NBMHS/Nature of Science • Formation of the Universe and Space Exploration • The Solar System • The Dynamic Earth 	<ul style="list-style-type: none"> • Rocks, Minerals, Natural Resources, Geologic Change • Circulation of Earth’s Air and Water • Weather and Climate/Natural Hazards Performance Expectations*

Notes:

- *Science process skills are best taught in context. Therefore, the performance expectations will be incorporated into the units below. Not all of these performance expectations will be incorporated into every activity; however, the opportunities to learn these skills will be provided throughout the course.

UNIT 1: FORMATION OF THE UNIVERSE/SPACE EXPLORATION

Timing: Semester 1, Quarter 1

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience Unit 5: Exploring the Universe: Ch. 19 Exploring Space*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Ch. 19: Lesson 1: Observing the Universe	5	–How do humans observe and explore space?	–Electromagnetic spectrum –Refracting telescope –Reflecting telescope –Radio telescope	–Big Bang Reading –Doppler Effect video –Red Shift/Blue Shift –Scientific Notation worksheet –Electromagnetic Spectrum worksheet –Prism lab –Textbook reading, questions		–worksheets –prism –videos
Ch. 19: Lesson 2: Early History of Space Exploration	3	–What are some ways that people use space technology to improve life on Earth?	–rocket –satellite –space probe –lunar –Project Apollo –space shuttle	–Balloon rocket lab –Apollo 11 video of moon walk –Felix Baumgartner video –Blue Origins video –Space Technology advances webquest –Space Shuttle foldable –Textbook reading, questions		–videos –balloons, straws, string
Ch. 21 Constellations, Galaxies, Black Holes	5	–How do we name constellations?		–Constellation stories (Roman/Greek, Alaska Native, other cultures) –”How Raven Created the World” –Constellation Brain Pop –Galaxies Brain Pop –Black Holes Brain Pop –Textbook reading, questions	–Inupiaq creation story: “How Raven Created the World” –Yup’ik Sky Map (UAF) –Indigenous Creation Myth videos	–Brain Pop
Unit Project	3	–Creative Writing: Would you go to Mars? –Constellation Myth				
Standards:	MS ESS1-2, MS ESS1-3, MS PS2-4					

UNIT 2: THE SOLAR SYSTEM

Timing: Semester 1, Quarter 1

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience Unit 5: Exploring the Universe: Ch. 20: The Sun-Earth-Moon System*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Ch. 2: How did the Solar System and Earth form?	2	–Explain formation of solar system and Earth	–gravity –density –bya	–Scale of Solar System Project –Textbook reading, questions	Native American/ Alaska Native stories	–11x17 paper
Ch. 20: Earth – Sun – Moon System: –lunar phases, eclipses, tides	3	–Develop and use a model of the Earth-Sun-Moon system to describe the cyclic patterns of the sun and moon.	–Orbit –Phase –Eclipse –Umbra –Penumbra	–Eclipse nay nay video –Eclipse lab with flashlights –Monthly moon chart –Phases of the Moon foldable –Textbook reading, questions	Native American/ Alaska Native stories	– lab:flashlight s,sun, earth, moon balls –coloring pages of planets –Brain Pop
Seasons	3	–Develop and use a model of the Earth-Sun-Moon system to describe the seasons.	–Season –Tilt –Solstice –Equinox	–Seasons Brain Pop –Solstice foldable –Textbook reading, questions	– Inupiaq/Yup’ik Seasons of Subsistence	–Brain Pop
Tides	3	Develop and use a model of the Earth-Sun-Moon system to describe tides.	–Tide –Spring tide –Neap tide –Bore tide	–Notes –Tides video –Turnagain Arm Bay of Fundy bore tide videos –Textbook reading, questions	–Turnagain Arm bore tide	–Notes –videos
Aurora	2	–Explain how the Aurora works and the height of the colors	–Aurora borealis/australis	–Aurora notes –Art project	–Inupiaq stories	
Unit Project	2	–Aurora art project				
Standards:		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.				

UNIT 3: THE DYNAMIC EARTH

Timing: Semester 1, Quarter 2

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience Ch. 6 and 7*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Ch. 6 Formation of Earth's Layers	2	–Develop a model of Earth's layers	–crust (oceanic and continental) –mantle –lithosphere –core –asthenosphere	–Make a paper model of Earth's layers –foldables –BrainPop –Textbook reading, questions		–11x17 poster
Continental Drift	5	–Develop a model of Pangaea using Alfred Wegener's theory.	–Alfred Wegener –Continental Drift Theory	–Make a model of Pangaea puzzle –BrainPop –Textbook reading, questions		–USGS lesson
Plate Tectonics	5	–Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	–Tectonic Plate –Plate Tectonics –Convection Current –Convergent boundary –Divergent boundary –Transform boundary –Seafloor spreading	–Convection current foldable –Seafloor spreading foldable, TPR –Plate tectonics webquest –Textbook reading, questions		– diagram
Ring of Fire	2	–Explain how the Ring of Fire relates to plate boundaries		–Ring of fire worksheets –webquest –video –Textbook reading, questions		– worksheets –videos
Volcanoes	5	–Compare the three types of volcanoes and the forces that cause them	–Cinder cone –Shield volcano –Composite volcano –Volcanic arc –Hotspot	–Mt. St. Helens video, ash demo –Hawaii hotspot lab –Volcanoes foldable –Volcanoes reading –Volcano math ws –BrainPop –Textbook reading, questions	–Alaskan volcanoes	– worksheets, videos –BrainPop

Earthquakes	5	<ul style="list-style-type: none"> -Compare the types of faults and associated earthquakes with plate boundaries 	<ul style="list-style-type: none"> -Epicenter -Hypocenter -Seismometer -P, S, Love waves -Thrust fault -Reverse fault -Normal fault -Strike slip fault 	<ul style="list-style-type: none"> -Major earthquakes stories: 1964 AK, 2018 AK, 2004 Indonesia, 1994 Northridge -BrainPop -Textbook reading, questions 	<ul style="list-style-type: none"> -1964 quake -2018 quake 	<ul style="list-style-type: none"> -videos -BrainPop 	
Unit Test	3			<ul style="list-style-type: none"> -Baking soda volcano project 			
Standards:	MS ESS2-1, MS ESS2-2, MS ESS2-3						

UNIT 4: ROCKS, MINERALS, NATURAL RESOURCES, GEOLOGIC CHANGE

Timing: Semester 2, Quarter 3

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience Ch. 4, 5, and 1*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
The Rock Cycle	7	–Know that sedimentary, igneous, and metamorphic rocks contain evidence of the minerals, temperatures, and the forces that created them.	–Mineral –Igneous Rock –Sedimentary Rock –Metamorphic Rock –Rock Cycle	–Rock cycle diagram –Webquest –BrainPop –Textbook reading, questions		– worksheets , videos –BrainPop
Minerals and Rocks	7	–Compare minerals and rocks and the forces that make them	–Mineral vocab –Rock vocab	–Adopt a mineral –Mineral ID ws –Mineral ID lab –Rock ID lab –BrainPop –Textbook reading, questions	–Nome area geology	– worksheet, videos, rock boxes –BrainPop
Natural Resources	5	–Construct an evidence-based explanation of the formation of natural resources (such as oil, propane, and natural gas) are the result of past geoscience processes. –Gather information and explain how synthetic materials come from natural resources and impact society.	–Natural Resources –Renewable Resource –Nonrenewable Resource	–Petroleum in Alaska map –Oil spill lab –Gold in Alaska map –Graphite in Western Alaska map –PFD lesson –BrainPop –Textbook reading, questions	–Petroleum in Alaska map –Oil spill lab –Gold in Alaska map –Graphite in Western Alaska map –PFD lesson	–BrainPop
Geologic Change and Surface Processes	5	–Explain how geoscience processes have changed the Earth’s surface at varying times and spatial scales.	–Weathering –Sediment –Erosion –Deposition –Landforms –Glaciers	–Foldable –webquest –Landforms ws –BrainPop –Textbook reading, questions –Missoula floods video –Albedo/snow ice melt lab (UIC)	–Alaska glaciers	–BrainPop –worksheets

Topography /Mapping	5	<ul style="list-style-type: none"> -Read a topographic map -Draw a cross-section -Read a compass -Use a GPS 	<ul style="list-style-type: none"> -Topography -Compass Rose -Scale -Legend -Magnetic Declination -Latitude/Longitude -Azimuth -Cross-section -Contour line -Rule of Vees 	<ul style="list-style-type: none"> -Reading topographic maps -3D topo table lab -Reading a compass -How a GPS works -Textbook reading, questions 	<ul style="list-style-type: none"> -Topo maps of Nome Quadrangle 	<ul style="list-style-type: none"> -topo maps -worksheets 	
Unit Test/Project	2			<ul style="list-style-type: none"> -Landform diorama 			
Standards:	MS ESS2-1, MS ESS2-2, MS ESS2-3						

UNIT 5: CIRCULATION OF EARTH'S AIR & WATER

Timing: Semester 2, Quarter 3

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience Earth and Space Science*,

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Circulation in the Earth's Atmosphere	3	–Identify and analyze movements of air masses from regions of high to low pressure (convection currents) and the effects on weather.	–Convection –Coriolis Effect –Air Pressure –Jet Stream –Atmosphere –Circulation –Density –Energy System –Hemisphere –Longitude, Latitude –Tropics of Cancer/Capricorn	–Atmosphere foldable –Air currents map –Cloud types ws –BrainPop –Textbook reading, questions	–10th century Scandinavian navigation –15th/16th century European navigation	–BrainPop –worksheets
Circulation in the Earth's Oceans	3	–Describe the effects of the ocean on Earth's weather.	–Ocean Current –Density –Salinity –Temperature –Sea –Ocean –Sound	–Ocean currents map –BrainPop –Textbook reading, questions	–Bering Sea/Norton Sound –Pacific Islander navigation	–BrainPop –worksheets
The Water Cycle	3	–Describe and illustrate the water cycle, and the forces that drive it (gravity and sunlight).	–Evaporation –Condensation –Transpiration –Crystallization –Precipitation –Runoff –Groundwater Flow	–Water Cycle foldable –BrainPop –Textbook reading, questions		–BrainPop –worksheets
Unit Test/Project	2 days			–Water cycle poster or Ocean current poster		
Standards:	MS ESS2-4, MS ESS2-6					

UNIT 6: WEATHER & CLIMATE

Timing: Semester 2, Quarter 3

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience Earth and Space Science*,

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Weather and Weather Prediction	5	<ul style="list-style-type: none"> –Identify and analyze movement of air masses from regions of high to low pressure (convection currents), and the effects on the weather. –Describe the effects of the ocean and the water cycle on the weather. 	<ul style="list-style-type: none"> –Weather –Air Mass –Front –Weather Forecast –Hurricane/Typhoon –Tornado 	<ul style="list-style-type: none"> –Hurricanes vs. Typhoons –Weather in Western Alaska maps –BrainPop –Textbook reading, questions 	<ul style="list-style-type: none"> –Inupiaq weather prediction –Ex-Typhoon Halong, Merbok –Weather/Climate in Western Alaska 	<ul style="list-style-type: none"> –BrainPop
Influences on Climate	5	<ul style="list-style-type: none"> –Describe how unequal heating and the rotation of the Earth determines regional climates. 	<ul style="list-style-type: none"> –Climate 	<ul style="list-style-type: none"> –Textbook reading, questions 		
Unit Test	3					
Standards List:	MS-ESS2-5, MS-ESS2-5					

UNIT 7: RESOURCES IN EARTH'S SYSTEMS

Timing: Semester 2, Quarter 4

Teaching Time Required: All estimated teaching times are based on a 50 minute period.

Textbook: *iScience*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials	
Human Population and Resource Use	5	–Construct an argument, supported by evidence, for how increases in human population and per- capita consumption of natural resources impact Earth’s systems.	–Per Capita Consumption –Population	–Story of Stuff video –Needs vs. Wants –Recycling in Nome	–Recycling in Nome		
Resource Use and Earth’s Systems	5	–Construct an argument, supported by evidence, for how increases in human population and per- capita consumption of natural resources impact Earth’s systems –Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	–Pollution –Deforestation –Extinction –Greenhouse Gas –Resource Use –Climate Change	–Greenhouse Lab PhET –6 Degrees Can Change the World video –Warming Arctic (Rick Thoman) –BrainPop	–Warming Arctic (Rick Thoman)	–BrainPop	
Unit Test	1						
Standards:	MS ESS3-1, MS ESS3-2						

SCIENTIFIC PROCESS SKILLS

Timing: All year

Teaching Time Required: Varies

Textbook: Embedded throughout

Objectives

- Ask questions, predict, observe, describe, measure, classify, make generalizations, infer, and communicate.
- Plan and carry out scientific investigations of various types (such as systematic observations or experiments), identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- Select appropriate tools for collecting qualitative and quantitative data and record measurements (volume, mass, distance) in metric units.
- Develop a model describing the phenomenon.
- Conduct research to learn how the local environment is used by a variety of competing interests (e.g. competition for habitat/resources, tourism, oil, mining companies, and hunting groups).
- Use standard safety practices for all classroom laboratory and field investigations.

Grade 7 Science

Grade(s): 7 Length: two semesters	Course Overview: <i>Science 7</i> is an introductory course designed to expand seventh grade students' understanding of the natural world by focusing on the characteristics of living things, cellular organization, the diversity of life, and how organisms and populations change over time in terms of biological adaptation, heredity and genetics, evolution, natural selection, and changes over time in Earth's history. Adopted Textbook: <i>iScience Life Science</i> . McGraw Hill, 2017 Next Generation Science Standards (NGSS): https://www.nextgenscience.org/
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Units (Recommended Order)	
Semester 1	Semester 2
<ul style="list-style-type: none"> • Introduction to NBMHS, Nature of Science • Cells and Organization in Organisms • Reproduction, Heredity, and Growth • Evolution 	<ul style="list-style-type: none"> • Classification of Organisms • The History of Life on Earth • Matter and Energy in Living Systems • Ecosystem Dynamics • Performance Expectations*

Notes:

- *Science process skills are best taught in context. Therefore, the performance expectations will be incorporated into the units below. Not all of these performance expectations will be incorporated into every activity; however, the opportunities to learn these skills will be provided throughout the course

UNIT 1: CELLS & ORGANIZATION IN ORGANISMS

Suggested Pacing: Semester 1, Quarter 1

Teaching Time Required: 17 days

Textbook: *iScience, Life Science, Ch. 1*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Ch. 1: Characteristics of Life	1	–Define the 6 Characteristics of Life		Video notes –worksheets –Textbook reading, questions		worksheet, textbook
Ch. 2: Cell Structure / Function	5	–Modern Cell Theory –Students use a model to describe how a cell's functions are performed by specific cell structures.	–Cell Membrane –Cell Wall –Chloroplast –Nucleus –Organelle (list)	–Video notes –BrainPop – Moby Max –microscope lab –Textbook reading, questions		–BrainPOP, Moby Max –microscopes, slides
Plants vs animals vs prokaryotes	5	–Students compare plants vs animals vs prokaryotes		–Videos –worksheets –Textbook reading, questions	Relate plants and animals to the land in Western Alaska	Coloring pages from Biology Corner
Photosynthesis Cellular Respiration	3		–Photosynthesis –Cellular Respiration	–Coloring sheets –BrainPop, Moby Max –Textbook reading, questions		
Cell Cycle	3	–Define cell cycle Compare mitosis and meiosis	mitosis prophase metaphase anaphase telephase cell cycle interphase meiosis reproduction	–Amoeba Sisters video notes (Cell Cycle, Mitosis, Meiosis) –Onion cell mitosis worksheet –PMAT foldable –Cell cycle foldable –Textbook reading/questions		–videos, worksheets, textbook
Unit Test/Project	5	Students compare plants vs. animals vs. prokaryotes		Students build a model (poster) of a plant, animal, and prokaryote cell defining the organelles and comparing how they affect organism function		

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-LS1-2** Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function
- **MS-LS1-3** Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- **MS-LS1-8** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

UNIT 2: REPRODUCTION, HEREDITY, & GROWTH

Timing: Semester 1, Quarter 2
Teaching Time Required: 20 days
Textbook: *iScience, Life Science*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Inheritance and Reproduction	7	–Investigate how genetic factors influence an organism’s traits, describe how asexual reproduction results in offspring with identical genetic information, and how sexual reproduction results in offspring with genetic variation.	–Allele –Asexual Reproduction –Chromosome –DNA –Gamete –Gene –Inheritance –Offspring –Sexual Reproduction –Trait –Probability –Punnett Square	–Amoeba sisters heredity video –Punnett Square worksheets –BrainPop –Moby Max –Larkey lab –Doohicky Bug lab –Textbook reading, questions		
Plant Reproduction & Growth	5	–Explain how genetic and environmental factors affect the growth and reproduction of plants.	–Pollination –Seed Dispersal –Environmental Factor –Fertilization –Genetic Factor –Germination	–BrainPop –Moby Max –Seed germination lab –Textbook reading, questions		–seeds
Animal Reproduction & Growth	7	–Explain how an animal’s behavior influences its reproductive success and survival.	–Asexual Reproduction –Behavior –Environmental Factor –Fertilization –Genetic Factor –Reproductive Success –Sexual Reproduction –Variation	–BrainPop –Moby Max –Textbook reading, questions		
Unit Test/ Labs	3					
Standards:		<ul style="list-style-type: none"> • 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-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. 				

UNIT 3: EVOLUTION

Timing: Semester 1, Quarter 2

Teaching Time Required: 24 days

Textbook: *iScience, Life Science*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Genetic Change and Traits	7	–Explain how DNA works	–Adaptation –DNA –Gene Mutation –Protein –Amino Acid –Chromosome –Environment –Sequence –Trait	–Amoeba Sisters video –BrainPop –Moby Max –DNA coloring –Textbook reading, questions		
Natural Selection	7	–Compare genotypes and phenotypes –Explain how natural selection works	–Allele Frequency –Evolution –Extinction –Natural Selection –Variation –Genotype –Phenotype –Population	–BrainPop –Moby Max –Natural Selection video Galapagos –Speciation foldable –Natural selection Phet Lab –Textbook reading, questions		
Human Influence on Traits	7	–Compare natural selection to artificial selection	–Artificial Selection –Biotechnology –Genetic Engineering –Genetically Modified Organism (GMO) –Selective Breeding	–BrainPop –Moby Max –Textbook reading, questions		
Evidence of Common Ancestry	3	–Students will be able to analyze patterns in data to provide evidence for evolutionary relationships among organisms.	–Evolution –Common Ancestry –Anatomy –Embryology	–Evolutionary biology packet –Textbook reading, questions		

Unit Test	1					
Standards:	<ul style="list-style-type: none">• MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism					

UNIT 4: CLASSIFICATION OF ORGANISMS

Suggested Pacing: Semester 1, Quarter 1

Teaching Time Required: 17 days

Textbook: *iScience, Life Science*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Classification of organisms	5	–Students will classify organisms by domain, kingdom structure	–domain –kingdom –phyla –family –order –genus –species	–videos, worksheets, foldable –BrainPop –Moby Max –Textbook reading, questions		
Dichotomous Keys	5	–Students use dichotomous keys to classify animals	–classification –dichotomous key	–worksheets –BrainPop –Moby Max –Textbook reading, questions		
Plants	5	–Students describe parts of a plant and body systems and compare to humans and animals	–leaf –pistil –stamen –pollen –xylem –phloem –bark	–BrainPop –Moby Max –Textbook reading, questions	–Plants of Nome Area and their uses	
Animals	10	–Students classify types of animals	–animal –porifera, –platihelminthes –nematodes –annelids –molluscs –echinoderms –arthropods –cnidarians –crustaceans –chordates –endothermic/ecto	–BrainPop –Moby Max –Textbook reading, questions	–Animals of Nome area and their uses –Dissect ptarmigan	–Need donation of birds

Unit Test/Project	6			Animals Alaska Research project/presentation		
Standards:	<ul style="list-style-type: none"> • MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism 					

UNIT 5: THE HISTORY OF LIFE ON EARTH

Timing: Semester 2, Quarter 4
Teaching Time Required: 25 days
Textbook: *iScience*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Fossil Record	6	–Explain how patterns in fossil data can be used to provide evidence for the history of life on Earth.	–Fossil –Radiometric Dating –Fossil Record	–Design-a-saur lab –BrainPop –Moby Max –Archaeopteryx lab –Textbook reading, questions	–Fossils of Western Alaska and their uses in Alaska Native art	
Patterns of Change in Life on Earth	5	–Analyze patterns in the fossil record to explain changes in life on Earth over time.	–Extinction	–5 major extinctions video –BrainPop –Moby Max –Textbook reading, questions		
Unit Test/ Labs	2 days					
Standards:	<ul style="list-style-type: none"> • MS-LS4-1: Students who demonstrate understanding can: 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: Students who demonstrate understanding can: 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: Students who demonstrate understanding can: 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. 					

UNIT 6: ECOSYSTEMS

Timing: Semester 1, Quarter 2

Teaching Time Required: 28 days

Textbook: *iScience Life Science, Ch. 20*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Resource Availability Affects Organisms	5	–Interpret data to predict the effects of resource availability on the growth of organisms and populations in an ecosystem.	–Ecosystem –Biomes –Biotic Factor –Abiotic Factor –Species –Population –Community	–BrainPop –Moby Max –Textbook reading, questions	–Nome area ecosystems (tundra)	
Interactions in Ecosystems	5	–Analyze patterns of interaction between organisms.	–Predator –Prey –Herbivore –Symbiosis –Competition	–BrainPop –Moby Max –Textbook reading, questions		
Matter & Energy in Ecosystems	5	–Develop a model to explain how matter and energy flow through ecosystems.	–Producer –Consumer –Decomposer –Food Web –Energy Pyramid	–BrainPop –Moby Max –Textbook reading, questions	–Nome area food webs	
Changes in Ecosystems	5	–Use evidence to support an explanation of how changes in ecosystems cause changes in populations.	–Disturbance –Succession –Gradual Change –Interconnected –Pioneer Species –Recovery	–BrainPop –Moby Max –Textbook reading, questions		
Unit Test	3			Western Alaska Food Web Poster		
Standards:		<ul style="list-style-type: none"> • MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. • MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. • MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. • MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. 				

SCIENTIFIC PROCESS SKILLS

Timing: All year

Teaching Time Required: Varies

Textbook: Embedded throughout

Objectives

- Ask questions, predict, observe, describe, measure, classify, make generalizations, infer, and communicate.
- Plan and carry out scientific investigations of various types (such as systematic observations or experiments), identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- Select appropriate tools for collecting qualitative and quantitative data and record measurements (volume, mass, distance) in metric units.
- Develop a model describing phenomenon.
- Conduct research to learn how the local environment is used by a variety of competing interests (e.g. competition for habitat/resources, tourism, oil, mining companies, and hunting groups).
- Use standard safety practices for all classroom laboratory and field investigations.

Grade 8 Science

Grade(s): 8 Length: two semesters	Course Overview: <i>Science 8</i> is designed to expand student investigation of physics and chemistry. Aspects of physics are studied through laboratory investigations including sound, light, electricity, mechanics, motion, and energy. Aspects of chemistry are studied based on the Periodic Table of the Elements and through basic chemical laboratory investigations. Laboratory work, laboratory reporting, and engineering design will be included and is an integral part of the learning process. Adopted Textbook: <i>iScience Physical Science</i> . McGraw Hill, 2017 Next Generation Science Standards (NGSS): https://www.nextgenscience.org/
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Units (Recommended Order)	
Semester 1	Semester 2
<ul style="list-style-type: none">• Introduction to NBMHS, Nature of Science• Structure of Matter• Atomic Theory• Forces and Motion	<ul style="list-style-type: none">• Energy Transfer and Transformation• Electric and Magnetic Forces• Waves and Information Transfer• Ongoing, yearlong learning objects: Scientific Process Skills and Engineering Design Concepts

Notes:

- *Science process skills are best taught in context. Therefore, the performance expectations will be incorporated into the units below. Not all of these performance expectations will be incorporated into every activity; however, the opportunities to learn these skills will be provided throughout the course

UNIT 1: STRUCTURE OF MATTER

Timing: Semester 1, Quarter 1

Teaching Time Required: 24

Textbook: *iScience* Physical Science

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Properties of Matter	5	<ul style="list-style-type: none"> –Investigate and explain that all matter is made up of atoms, and understand that substances have physical properties that are unique to each. –Compare physical and chemical properties 	<ul style="list-style-type: none"> –Matter –Mass –Volume –Density –Solid –Liquid –Gas –Physical property –Chemical property 	<ul style="list-style-type: none"> – Matter ws –Density problems ws –Physical/Chemical property ws –BrainPop –Moby Max –Textbook reading, questions 	Ice thickness, types of snow	
Changes of State	5	<ul style="list-style-type: none"> –Investigate changes that occur in physical and chemical properties of matter using a qualitative description of changes on a molecular level, including conservation of matter. 	<ul style="list-style-type: none"> –Change of State –Thermal Energy –Temperature –Pressure 	<ul style="list-style-type: none"> –States of Matter PHET Lab –BrainPop –Moby Max –Textbook reading, questions 		
Unit Test	1					
Standards:	MS-PS1-1, MS-PS1-4					

UNIT 2: ATOMIC THEORY

Timing: Semester 1, Quarter 2
Teaching Time Required: 24
Textbook: *iScience* Physical Science

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials	
Atoms and Elements	20	<ul style="list-style-type: none"> –Describe the relationship between atomic mass, atomic number, and location on the periodic table, with chemical properties of the elements. –Structure of atoms and how atoms combine into compounds. 	<ul style="list-style-type: none"> –Element –Atom –Periodic Table 	<ul style="list-style-type: none"> –Candy Periodic Table –Bohr model ws –Lewis Dot ws –BrainPop –Moby Max –Textbook reading, questions 			
Molecules and Extended Structure	5	<ul style="list-style-type: none"> –Develop and use models to demonstrate how atoms and elements form molecules and compounds. –Classify everyday materials as elements, compounds, or mixtures. 	<ul style="list-style-type: none"> –Pure Substance –Chemical Bond –Molecule –Compound 	<ul style="list-style-type: none"> –BrainPop –Moby Max –Molecule PHET Lab –Candy Compound Lab –Textbook reading, questions 			
Unit Test	1						
Standards:	MS-PS1-1, MS-PS1-4						

UNIT 3: FORCES & MOTION

Timing: Semester 1, Quarter 2, Quarter 3

Teaching Time Required: 18 days

Textbook: *iScience*

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Introduction to Forces	5	–Investigate through experimentation and “real- life” examples of the relationship among (1) force, mass, acceleration, and gravity, (2) speed, distance, time and acceleration, (3) force and friction.	–Motion –Speed –Velocity –Acceleration –Force –Gravity –Friction	–Time, Speed, Distance foldable –Time, Speed, Distance, Acceleration ws –BrainPop –Moby Max –Textbook reading, questions		
Simple Machines	7	–Compare the types of simple machines, three types of levers	–Inclined plane –Lever –Screw –Wedge –Wheel/axle –Machine –Mechanical advantage –Effort –Load	–Inclined plane lab –Lever lab –Textbook reading, questions	Using simple machines in Bush Alaska	
Newton’s Laws of Motion	5	–Explain “real-life” examples of linear and motion using Newton’s Laws of Motion.	–Inertia –Work –Power –Momentum	–Newton’s Laws ws –BrainPop –Moby Max –Magic Tablecloth lab –Catching coins lab –Textbook reading, questions		
Collisions Between Objects	5	–Conduct an investigation to provide evidence that fields exist between objects exerting forces on each other, even though the objects are not in contact.		–Gravity Phet Lab –Textbook reading, questions		
Unit Test/Project	7			–Rube Goldberg machine		
Standards:	MS-PS2-1, MS-PS2-2					

UNIT 4: ENERGY TRANSFER AND TRANSFORMATION

Timing: Semester 2, Quarter 3

Teaching Time Required: 18 days

Textbook: *iScience* Physical Science, Ch. 5

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Introduction to Energy	5	–Identify various sources and forms of energy, and classify them as potential or kinetic.	–Energy –Potential Energy –Kinetic Energy	–Eureka video BrainPop –Moby Max –Textbook reading, questions		
Changes in Energy	5	–Investigate relationships among the amount of energy transferred, the type of matter, the mass, and the change in temperature of a sample.	–Energy Transfer –System	–BrainPop –Moby Max –Textbook reading, questions		
Temperature and Heat	5	–Examine energy transfers, conservation of energy, and identify energy that is useful vs. energy that is unavailable	–Temperature –Thermal Energy –Heat	–BrainPop –Moby Max –Textbook reading, questions		
Thermal Energy Transfer in Systems	6	Differentiate between renewable and non-renewable energy resources. Investigate how energy is produced and used, including alternative energy sources in Alaska. Evaluate the impact of energy production methods on the environment.	–Renewable resource –Non-renewable resource	–Textbook reading, questions	–Energy in Alaska, alternative energy options in Western Alaska	Alaska Resource Education
Unit Test/Project	3			Design an insulator		
Standards:	MS-PS3-1: MS-PS3-2: MS-PS3-5: MS-PS3-3: MS-PS3-4:					

UNIT 5: ELECTRIC & MAGNETIC FORCES

Timing: Semester 2, Quarter 4
Teaching Time Required: 24 days
Textbook: *iScience* Physical Science

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials	
The Magnetic Force	6	Ask questions about data to determine the factors that affect the strength of magnetic forces.	–Magnet –Magnetic Force –Magnetic Domain	–Magnet lab –BrainPop –Moby Max –Textbook reading, questions			
The Electric Force	5	Ask questions about data to determine the factors that affect the strength of electric forces.	–Electric Charge –Electric Force –Voltage –Current –Resistance	–BrainPop –Moby Max –Voltage problems ws –Textbook reading, questions			
Fields	4	Conduct an investigation to provide evidence that fields exist between objects exerting forces on each other, even though the objects are not in contact.	–Field –Gravitational Field –Magnetic Field	–Textbook reading, questions			
Electromagnetism	5	Demonstrate the relationship between electricity and magnetism.	–Electric Current –Electric Field –Electromagnetism –Electromagnet –Electromagnetic Induction	–Textbook reading, questions			
Unit Test	1						
Standards:	MS-PS2-3, MS-PS2-5						

UNIT 6: WAVES & INFORMATION TRANSFER

Timing: Semester 2, Quarter 4
Teaching Time Required: 25 days
Textbook: *iScience* Physical Science

Topic	Days	Objectives	Key Vocabulary	Activity	Cultural Activities	Resources & Materials
Introduction to Waves	6	–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.	–Wave –Medium –Amplitude –Frequency –Wavelength	–BrainPop –Moby Max –Textbook reading, questions	–Ocean currents	
The Behavior of Mechanical Waves	5	–Investigate the ways that light and sound interact with matter, expanding on wavelength, color, refraction, and reflection.	–Mechanical Wave –Absorption –Transmission –Reflection –Refraction	–BrainPop –Moby Max –Textbook reading, questions		
Sound	3	–Investigate how sound travels through various media	–Decibel	–Doppler Effect lab –BrainPop –Moby Max –Textbook reading, questions		
The Behavior of Light Waves	5	–Develop and use a model to describe how waves are reflected, absorbed, or transmitted through various materials.	–Electromagnetic Waves	–BrainPop –Moby Max –Textbook reading, questions		
Unit Test	1			–Make your own instrument		
Standards List:	MS-PS4-1, MS-PS4-2, MS-PS4-3					

SCIENTIFIC PROCESS SKILLS

Timing: All year

Teaching Time Required: Varies

Textbook: Embedded throughout

Objectives

- Ask questions, predict, observe, describe, measure, classify, make generalizations, infer, and communicate.
- Plan and carry out scientific investigations of various types (such as systematic observations or experiments), identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
- Select appropriate tools for collecting qualitative and quantitative data and record measurements (volume, mass, distance) in metric units.
- Develop a model describing phenomenon.
- Conduct research to learn how the local environment is used by a variety of competing interests (e.g. competition for habitat/resources, tourism, oil, mining companies, and hunting groups).
- Use standard safety practices for all classroom laboratory and field investigations.