

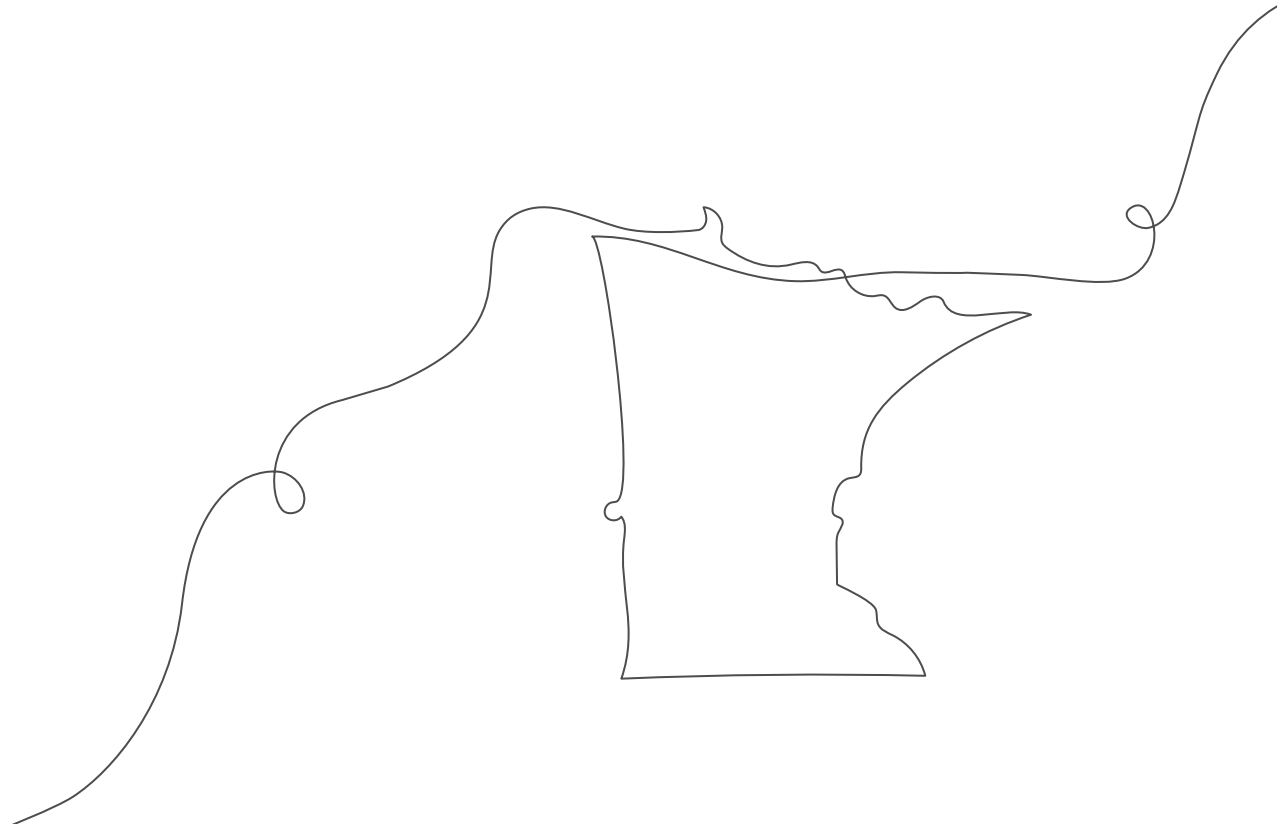
MINNESOTA STATE BENCHMARKS

Performance expectation alignment

authored by



THE LAWRENCE
HALL OF SCIENCE
UNIVERSITY OF CALIFORNIA, BERKELEY





Amplify.



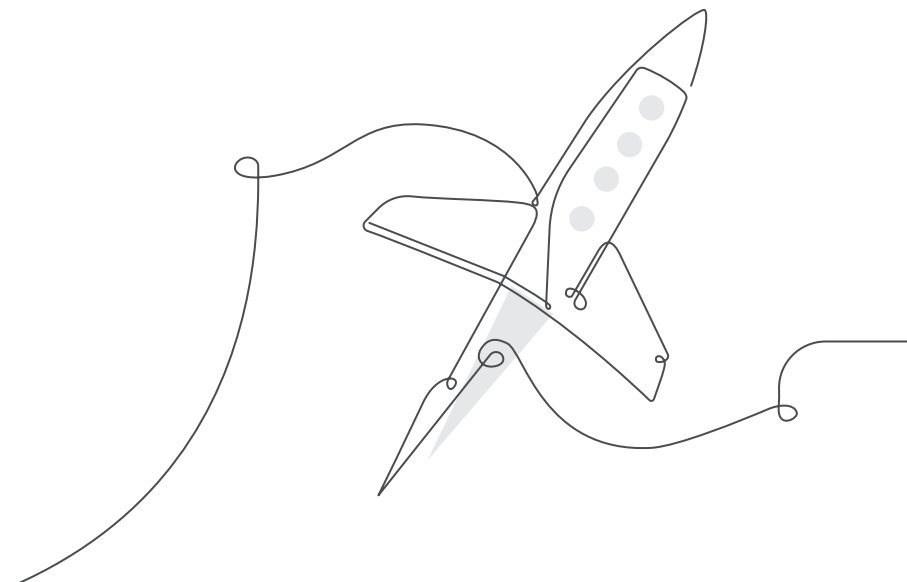
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Grades K–5 Performance expectation alignment

The Amplify Science curriculum progressively builds students' abilities through an instructional sequence that prepares them for state testing. In the program, learning is centered around anchoring phenomena designed to give students an opportunity to dive into certain core ideas while also drawing from or applying others. In organizing the Amplify Science curriculum, we carefully sequenced these ideas within each grade level to support the development of deep and coherent understanding.

The units in the course are designed and sequenced to build students' expertise with grade-level core ideas while simultaneously considering the dimensions of grade-level development, physical development, and social and emotional learning. The following pages provide a sequence of the Minnesota State Science Standards that students will encounter across the Amplify Science curriculum as they build their knowledge.



Kindergarten

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
OE.1.1.1.1	Ask questions to obtain information from weather forecasts to prepare for and respond to severe weather.* (P: 1, CC: 7, CI: ESS3, ETS2) Emphasis is on local forms of severe weather that may arise quickly and should include examples of engineered solutions to severe weather (such as clothing to wear or places to safely shelter).	Sunlight and Weather	
OE.1.1.1.2	Ask questions about how a person may reduce the amount of natural resources the individual uses.* (P: 1, CC: 2, CI: ESS3) Examples of questions may include reusing paper to reduce the number of trees cut down and recycling cans and bottles to reduce the amount of plastic, glass, or metal used.	Sunlight and Weather	Needs of Plants and Animals
OP.1.2.1.1	Collect and organize observational data to determine the effect of sunlight on Earth's surface. (P: 3, CC: 2, CI: PS3, ETS2) Examples of Earth's surface may include sand, soil, rocks, and water. Data may be organized in pictographs or bar graphs. Examples of observations may include heating, growth of plants, melting of snow, and shadows.	Sunlight and Weather	
OL.1.2.1.2	Make observations of plants and animals to compare the diversity of life in different habitats. (P: 3, CC: 1, CI: LS4) Emphasis is on the diversity of living things in a variety of different habitats and patterns across those habitats.	Needs of Plants and Animals	
OP.2.1.1.1	Sort objects in terms of natural/human-made, color, size, shape, and texture, then communicate the reasoning for the sorting system. (P: 4, CC: 2, CI: PS1) Emphasis is on using observations to describe patterns and/or relationships in the natural and designed world in order to answer scientific questions and solve problems.	Needs of Plants and Animals	
OE.2.1.1.2	Make daily and seasonal observations of local weather conditions to describe patterns over time.** (P: 4, CC: 1, CI: ESS2) Examples of qualitative observations may include descriptions of the weather (such as sunny, cloudy, rainy, and warm). Examples of quantitative observations may include numbers of sunny, windy, and rainy days in a month. Examples of patterns may include that it is usually cooler in the morning than in the afternoon and that different months have different numbers of sunny days versus cloudy days.	Sunlight and Weather	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
OL.2.1.1.3	Record and use observations to describe patterns of what plants and animals (including humans) need to survive.** (P: 4, CC: 1, CI: LS1) Examples of patterns may include that animals need to take in food, but plants do not; different animals need different kinds of food; plants require light; and that all living things need water.	Needs of Plants and Animals	
OP.2.2.1.1	Identify and describe patterns that emerge from the effects of different strengths or different directions of pushes and pulls on the motion of an object.** (P: 5, CC: 2, CI: PS2) Emphasis is on different relative strengths or different directions, but not both at the same time. Examples of pushes or pulls may include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.	Pushes and Pulls	
OL.3.1.1.1	Develop a simple model to represent the relationship between the needs of different plants and animals (including humans) and the places they live. (P: 2, CC: 4, CI: LS2) Examples of relationships may include that deer eat buds and leaves, therefore, they usually live in forested areas; and grasses need sunlight, so they often grow in meadows. Examples of models may include food chains, collages, and/or sorting activities.	Needs of Plants and Animals	
OP.3.2.2.1	Design and build a structure to reduce the warming effect of sunlight on Earth's surface.* (P: 6, CC: 2, CI: PS3, ETS1) Emphasis of the practice is on choosing appropriate materials and tools to solve a problem. Emphasis of the core idea is on understanding the heating effects of sunlight. Examples of structures may include umbrellas, canopies, and tents.	Sunlight and Weather	Pushes and Pulls
OP.4.1.1.1	Construct an argument supported by evidence for whether a design solution works as intended to change the speed or direction of an object with a push or a pull.* (P: 7, CC: 2, CI: PS2, ETS1) Examples of problems requiring a solution may include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions may include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.	Pushes and Pulls	
OP.4.2.2.1	Communicate design ideas for a structure that reduces the warming effect of sunlight on Earth's surface.* (P: 8, CC: 2, CI: PS3, ETS1) Examples of written designs include models, drawings, writing, or numbers.	Sunlight and Weather	

1st Grade

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
1L.1.1.1.1	Ask questions based on observations about the similarities and differences between young plants and animals and their parents. (P: 1, CC: 2, CI: LS3) Examples of observations may include leaves from the same kind of plant are the same shape but can differ in size; and a particular breed of dog looks like its parents but is not exactly the same.	Animal And Plant Defenses	
1P.1.2.1.1	Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. (P: 3, CC: 2, CI: PS4) Examples of vibrating materials that make sound may include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate may include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.	Light and Sound	
1P.2.1.1.1	Identify and describe patterns obtained from testing different materials and determine which materials have the properties that are best suited for producing and/or transmitting sound.* (P: 4, CC: 1, CI: PS1, ETS1) Examples of materials may be wood, paper, string, plastics, cloth, etc.	Light and Sound	
1E.2.2.1.1	Use quantitative data to identify and describe patterns in the amount of time it takes for Earth processes to occur and determine whether they occur quickly or slowly. (P: 5, CC: 7, CI: ESS1) Emphasis of the core idea is that some Earth processes happen quickly (like tornadoes and thunderstorms) and some slowly (like the erosion of soil). Examples of data may include firsthand observations data from books, videos, pictures, or historical photos.	Spinning Earth	Sunlight and Weather Changing Landforms
1L.3.1.1.1	Develop a simple model based on evidence to represent how plants or animals use their external parts to help them survive, grow, and meet their needs. (P: 2, CC: 6, CI: LS1) Examples of external parts may include acorn shells, plant roots, thorns on branches, turtle shells, animal scales, animal tails, and animal quills.	Animal And Plant Defenses	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
1P.3.2.2.1	Design and build a device that uses light or sound to solve the problem of communicating over a distance.* (P: 6, CC: 6, CI: PS4, ETS1, ETS2) Examples of devices may include paper cup and string “telephones” and a pattern of drum beats.	Light and Sound	
1L.3.2.2.2	Plan and design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* (P: 6, CC: 6, CI: LS1, ETS2) Examples of human problems that can be solved by mimicking plant or animal solutions may include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills, and detecting intruders by mimicking eyes and ears.	Animal And Plant Defenses	
1E.4.1.1.1	Construct an argument based on observational evidence for how plants and animals (including humans) can change the non-living aspects of the environment to meet their needs. (P: 7, CC: 4, CI: ESS2) Examples of plants and animals changing their environment may include a squirrel digging in the ground to hide its food and tree roots breaking concrete.	Needs of Plants and Animals	
1E.4.1.2.1	Construct an argument with evidence to evaluate multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* (P: 7, CC: 7, CI: ESS2, ETS2) Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water; and different designs for using shrubs, grass, and trees to hold back the land.	Changing Landforms	Properties of Materials
1E.4.2.1.1	Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* (P: 8, CC: 4, CI: ESS3) Examples of human actions that impact the land may include cutting trees to produce paper, using resources to produce bottles, and using water for bathing and brushing teeth. Examples of solutions may include reusing paper and recycling cans and bottles.	Needs of Plants and Animals	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
1L.4.2.1.2	Obtain information using various features of texts and other media to determine patterns in the behavior of parents and offspring that help offspring survive. (P: 8, CC: 1, CI: LS1) Examples of text features include headings, glossaries, electronic menus, pictures, illustrations, icons, etc. Examples of behavior patterns may include the signals that offspring make (such as crying, chirping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).	Animal And Plant Defenses	
1P.4.2.2.1	Communicate solutions that use materials to provide shelter, food, or warmth needs for communities including Minnesota American Indian tribes and communities. (P: 8, CC: 2, CI: PS1, ETS2) Examples of cultures may include those within the local context of the learning community and within the context of Minnesota . Examples of solutions may include past and current building practices that incorporate natural building materials and other green practices, such as sweat lodges, green roofs, moss used for insulation, or sustainable food production and tools used for ricing (harvesting and finishing).	Minnesota Companion Lesson	

2nd Grade

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
2P.1.1.1.1	Ask questions about an object’s motion based on observation that can be answered by an investigation. (P: 1, CC: 1, CI: PS2) Examples of questions may include what is causing the motion, what type of motion (circular, bouncing, etc.), and what changes are happening in the motion.	Pushes and Pulls	Balancing Forces
2P.1.2.1.1	Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based on their observable properties. (P: 3, CC: 1, CI: PS1) Examples of materials may include metals, cloth, plastics, styrofoam, wood, and glass.	Properties of Materials	
2E.2.1.1.1	Represent data to describe typical weather conditions expected during a particular season. (P: 4, CC: 1, CI: ESS2) Examples of data may include temperature, precipitation, and wind direction. Data displays can include pictographs and bar graphs.	Sunlight and Weather	Weather and Climate
2E.2.1.1.2	Analyze data from tests of objects designed to reduce the impacts of weather-related hazards and compare the strengths and weaknesses of how each performs. (P: 4, CC: 2, CI: ESS3, ETS2) Emphasis is on data from tests of student-designed objects. Examples of design solutions to weather-related hazards may include barriers to prevent flooding or snow drifting, structures for sun shading, materials for clothing, and orientation of bus shelters.	Sunlight and Weather	Weather and Climate
2P.2.2.1.1	Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion of an object.** (P: 5, CC: F412, CI: PS2) Examples may include: An unbalanced force on one side of a ball can make it start moving, and that balanced forces pushing on a box from both sides will not produce any motion at all. Data displays may include pictographs and bar graphs.	Pushes and Pulls	Balancing Forces
2P.3.1.1.1	Develop a simple diagram or physical model to illustrate how some changes caused by heating or cooling can be reversed and some cannot.** (P: 2, CC: 2, CI: PS1) Examples of reversible changes may include materials such as water and butter at different temperatures. Examples of irreversible changes may include cooking an egg, freezing a plant leaf, and heating paper. Examples of diagrams may include a flow chart.	Properties of Materials	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
2L.3.2.2.1	Engineer a device that mimics the structures and functions of plants or animals in seed dispersal.* (P: 6, CC: 6, CI: LS2, ETS1) Emphasis is on how specific structures have particular functions. Examples of seed dispersal by animals may include feeding and subsequent elimination of seeds, or seed dispersal by plants may include various wind-catching designs (as in dandelions or maple trees) or colors and smells that attract pollinators.	Plant and Animal Relationships	Environments and Survival
2L.4.1.1.1	Construct an argument with evidence that evaluates how, in a particular habitat, some organisms can survive well, some survive less well, and some cannot survive at all. (P: 7, CC: 2, CI: LS4, ETS2) Emphasis is on the interdependence of parts of a system (organisms and their habitat). Example of habitats should include those found in Minnesota, such as a wetland, prairie, or garden. Examples of evidence may include needs and characteristics of the organisms and habitats involved.	Needs of Plants and Animals	
2E.4.2.1.1	Obtain and use information from multiple sources to identify where water is found on Earth. (P: 8, CC: 1, CI: ESS2) Emphasis of the practice is on learning how to use texts and maps to integrate and evaluate content. Examples may include liquid water in oceans, lakes, rivers, and ponds; and solid water in glaciers and polar ice caps.	Changing Landforms	
2E.4.2.1.2	Obtain and use information from multiple sources, including electronic sources, to describe climates in different regions of the world.** (P: 8, CC: 1, CI: ESS2) Emphasis of the practice is on learning how to use electronic sources to integrate and evaluate content. Examples of information may include data on an area's typical weather conditions and how these patterns are considered climate.	MN Companion Lesson	Weather and Climate
2P.4.2.2.1	Obtain information and communicate how Minnesota American Indian Tribes and communities and other cultures apply knowledge of the natural world in determining which materials have the properties that are best suited for an intended purpose. (P: 8, CC: 2, CI: PS1) Examples of cultures may include those within the local context of the learning community and within the context of Minnesota . Emphasis of the practice is on obtaining, interpreting, and communicating information related to how various cultures have built materials suited for intended purposes according to their properties. Examples of materials may include instruments (cedar for knockers and black spruce for poles) for ricing, birch bark for baskets or other containers for carrying water, and sinew for connecting parts of tools.	Properties of Materials	

3rd Grade

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
3P.1.1.1.1	Ask questions based on observations about why objects in darkness can be seen only when illuminated. (P: 1, CC: 2, CI: PS4) Emphasis should be on addressing the misconception that people can see in the dark if they wait long enough and on the way eyes receive light. Examples of observations may include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight.	Light and Sound	Vision and Light
3P.1.2.1.1	Plan and conduct a controlled investigation to determine the effect of placing objects made with different materials in the path of a beam of light. (P: 3, CC: 2, CI: PS4) Emphasis is on conducting fair tests by controlling variables. Examples of materials may include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).	Light and Sound	
3L.1.2.1.2	Plan and conduct an investigation to determine how amounts of sunlight and water impact the growth of a plant. (P: 3, CC:2, CI: LS2) Emphasis of the practice is on conducting fair tests and using data to support explanations. Examples of investigations may include simple experiments with fast-growing plants.	Plant and Animal Relationships	Needs of Plants and Animals
3E.2.1.1.1	Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted.** (P: 4, CC: 1, CI: ESS1) Examples of patterns may include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.	Spinning Earth	Patterns of Earth and Sky
3E.2.2.1.1	Organize and electronically present collected data to identify and describe patterns in the amount of daylight in the different times of the year.** (P: 5, CC: 1, CI: ESS1) Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.	Spinning Earth	Patterns of Earth and Sky

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
3P.3.1.1.1	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (P: 2, CC: 2, CI: PS4) Examples of models may include diagrams, drawings, physical models, or computer programs.	MN Companion Lesson	Light and Sound Vision and Light
3L.3.1.1.2	Develop multiple models to describe how organisms have unique and diverse life cycles but all have birth, growth, reproduction, and death in common. (P: 2, CC: 4, CI: LS1) Emphasis is on the pattern of changes organisms go through during their life. Examples of models may include diagrams, drawings, physical models, or computer programs.	Inheritance and Traits	Animal and Plant Defenses
3L.3.2.1.1	Construct an explanation using evidence from various sources for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. (P: 6, CC: 2, CI: LS4) Examples of cause and effect relationships may include how individual plants of the same species with thorns of different lengths may be more or less likely to be eaten by predators; or animals that have better camouflage coloration than others of their species may be more likely to survive and therefore more likely to leave offspring.	Environments and Survival	Inheritance and Traits
3L.4.1.1.1	Construct an argument about strategies animals use to survive. (P: 7, CC: 2, CI: LS2) Emphasis is on group behavior and how being part of a group helps animals obtain food, defend themselves, and cope with changes. Examples of animals should include wolves or other animals that live in Minnesota.	Inheritance and Traits	
3L.4.2.1.1	Obtain information from various types of media to support an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** (P: 8, CC: 4, CI: LS1) Examples of structures may include thorns, stems, roots, colored petals, heart, stomach, lungs, brain, and skin. Examples of media may include electronic sources.	Environments and Survival	Vision and Light
3E.4.2.2.1	Gather information and communicate how Minnesota American Indian Tribes and communities and other cultures use patterns in stars to make predictions and plans. (P 8, CC: 1, CI: ESS1) Examples of cultures may include those within the local context of the learning community and within the context of Minnesota . Examples may include using star maps to predict seasons, star patterns to inform navigation, and star stories to identify numeric patterns that guide behavior.	MN Companion Lesson	Patterns of Earth and Sky

4th Grade

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
4P.1.1.1.1	Ask questions to determine cause and effect relationships of electric and magnetic interactions between two objects not in contact with each other. (P: 1, CC: 2, CI: PS2) Examples of an electric force may include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force may include the force between two permanent magnets, the force between an electromagnet and steel paper clips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships may include how the distance between objects affects the strength of the force and how the orientation of magnets affects the direction of the magnetic force.	Balancing Forces	
4E.1.1.1.2	Ask questions about how water moves through the Earth system and identify the type of question. (P: 1, CC: 5, CI: ESS2) Emphasis is on the processes of evaporation, condensation, and precipitation. Examples of types of questions may include those that can be tested by an experiment, and questions that may be answered with a text.	MN Companion Lesson	Inheritance and Traits The Earth System
4P.1.1.2.1	Define a simple design problem that can be solved by applying scientific ideas about magnets.* (P: 1, CC: 2, CI: PS2, ETS2) Examples of problems may include constructing a latch to keep the door shut and creating a device to keep two moving objects from touching each other.	Balancing Forces	
4E.1.2.1.1	Make observations and measurements to provide evidence of the effects of weathering or the rate of erosion by the forces of water, ice, wind, or vegetation.* (P: 3, CC: 2, CI: ESS2) Emphasis is on predicting the rate of change when variables are changed. Examples of variables to test may include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.	Earth's Features	
4E.1.2.1.2	Plan and carry out fair tests in which variables are controlled and failure points are considered to improve a model or prototype to prevent erosion.* (P: 3, CC: -, CI: ESS2, ETS1; ETS2) Examples of prototypes to prevent erosion include retaining walls, wind breaks, use of shrubs or other vegetation, and drainage systems.	Earth's Features	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
4E.2.2.1.1	Interpret charts, maps and/or graphs of the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.** (P: 5, CC: 4, CI: ESS2) Emphasis is on oceans, lakes, rivers, glaciers, ground water, and polar ice caps.	MN Companion Lesson	The Earth System Ecosystem Restoration
4E.3.1.1.1	Develop a model based in part on student observations or data to describe ways the geosphere, biosphere, hydrosphere, and atmosphere interact. (P: 2, CC: 4, CI: ESS2) Emphasis is on how rock, living things, water, and/or air are individual systems that make up the larger Earth system and interact with each other.	Earth's Features	The Earth System
4E.3.2.1.1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation of changes in a landscape over time.** (P: 6, CC: 1, CI: ESS1) Examples of evidence from patterns may include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.	Earth's Features	
4E.3.2.2.1	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* (P: 6, CC: 2, CI: ESS3, ETS2) Emphasis is on cause and effect relationships to explain change. Examples of solutions may include designing an earthquake-resistant building and improving monitoring of volcanic activity.	Waves, Energy, and Information	Energy Conversions Earth's Features The Earth System
4L.4.1.1.1	Construct or support an argument that traits can be influenced by different environments. (P: 7, CC: 2, CI: LS3) Emphasis of the practice is on using evidence, data, and/or a model to support an argument. Examples of the environment affecting a trait may include the stunted growth of a typically tall plant grown with insufficient water or an animal's weight being influenced by the availability of food.	Inheritance and Traits	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
4E.4.2.1.1	Read and comprehend grade-appropriate complex texts and/or other reliable media to describe that energy and fuels are derived from natural resources and their uses affect the environment. (P: 8, CC: 2, CI: ESS3, ETS2) Examples of information about natural resources should include details about those found in Minnesota. Examples of renewable energy resources may include wind, water behind dams, and sunlight; non-renewable energy resources include fossil fuels and fissile materials. Examples of environmental effects may include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution and global warming from burning fossil fuels.	Energy Conversions	
4L.4.2.1.2	Obtain information from various media sources to determine that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.** (P: 8, CC: 1, CI: LS3) Emphasis of the practice is to compare and/or combine information across texts and other reliable media. Emphasis is on organisms other than humans and the patterns in traits between offspring and their parents or among siblings.	Inheritance and Traits	
4E.4.2.2.1	Obtain and combine multiple sources of information about ways individual communities, including Minnesota American Indian Tribes and communities and other cultures, use evidence and scientific principles to make decisions about the uses of Earth's resources. (P: 8, CC: 4, CI: ESS3) Examples of cultures may include those within the local context of the learning community and within the context of Minnesota . Examples may include balancing the water, soil, wildlife, plant, and human needs to support sustainable use of resources.	Needs of Plants and Animals	Energy Conversions Ecosystem Restoration

5th Grade

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
5P.1.1.1.1	Ask investigatable questions and predict reasonable outcomes about the changes in energy, related to speed, that occur when objects interact. (P: 1, CC: 5, CI: PS3) Emphasis is on the change in energy due to a change in speed, not on the forces, as objects interact. Example of a question: Where and how do marbles move after a collision?	Waves, Energy and Information	
5P.1.2.1.2	Conduct an investigation to determine whether the mixing of two or more substances results in new substances. (P: 3, CC: 2, CI: PS1) Emphasis is on conducting fair tests by controlling variables.	Modeling Matter	The Earth System
5P.1.2.1.3	Evaluate appropriate methods and tools to identify materials based on their properties prior to investigation. (P: 3, CC: 3, CI: PS1) Examples of materials to be identified may include baking soda and other powders, metals, minerals, and liquids. Examples of properties may include color, hardness, reflectivity, electrical conductivity, ability to conduct heat, response to magnetic forces, and solubility; density is not intended as an identifiable property.	Modeling Matter	The Earth System
5L.1.2.1.4	Plan and conduct an investigation to obtain evidence that plants get the materials they need for growth chiefly from air and water. (P: 3, CC: 5, CI: LS1) Examples of plants may include aquatic plants that grow without soil. Examples of observational evidence may include growth patterns for plants grown in different environments.	Ecosystem Restoration	
5P.2.1.1.1	Analyze and interpret data to show that energy can be transferred from place to place by sound, light, heat, and electric currents. (P: 4, CC: 5, CI: PS3) Emphasis of the practice is on analyzing student observations and data to serve as evidence to support a claim.	Energy Conversions	Waves, Energy, and Information
5P.2.2.1.1	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (P: 5, CC: 3, CI: PS1) Examples of reactions or changes may include phase changes, dissolving, and mixing to form new substances. Mass and weight are not distinguished.	The Earth System	Modeling Matter

5TH GRADE

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
5E.2.2.1.2	Use data to describe patterns in the daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.** (P: 5, CC: 1, CI: ESS1) Examples of patterns may include the number of daylight hours over the course of a year, selected stars that are visible only in particular months, and the length and direction of shadows over a year.	Patterns of Earth and Sky	
5P.3.1.1.1	Develop and refine a model to describe that matter is made of particles too small to be seen. (P: 2, CC: 3, CI: PS1) Examples of evidence supporting a model may include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.	Modeling Matter	Ecosystem Restoration
5P.3.1.1.2	Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun. (P: 2, CC: 5, CI: PS3) Examples of models may include diagrams and flow charts.	Ecosystem Restoration	
5L.3.1.1.3	Create an electronic visualization of the movement of matter among plants, animals, decomposers, and the environment.** (P: 2, CC: 4, CI: LS2) Emphasis is on the idea that matter that is not food is changed by plants into matter that is food. Examples of systems through which matter cycles may include organisms, ecosystems, and the Earth. Examples of an electronic visualization may include a computer program, simulation, or animation.	Ecosystem Restoration	Modeling Matter
5P.3.2.1.1	Construct an explanation based on evidence relating the speed of an object to the energy of that object. (P: 6, CC: 5, CI: PS3). The emphasis of the practice is on students identifying the evidence that supports particular points in the explanation. Examples of evidence may include the damage and the height attained when going up a ramp.	Energy Conversions	Waves, Energy, and Information
5P.3.2.2.1	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* (P: 6, CC: 5, CI: PS3, ETS1, ETS2) Examples of devices may include electric circuits that convert electrical energy into motion, light, or sound; and a passive solar heater that converts light into heat. Examples of constraints may include the materials, cost, or time to design the device.	Energy Conversions	

Minnesota state benchmark	Summary	Primary Amplify unit	Supporting Amplify unit(s)
5E.4.1.1.1	Use evidence to support an argument that the apparent brightness of the sun and stars is due to their relative distances from Earth. (P: 7, CC: 3, CI: ESS1) Evidence may include analogies of light bulbs and distances.	Patterns of Earth and Sky	
5L.4.1.2.1	Evaluate the merit of a solution to a problem caused by changes in plant and animal populations as a result of environmental changes.* (P: 7, CC: 4, CI: LS2, ETS1) Emphasis is on evaluating solutions (based on evidence and design criteria and constraints), not developing new solutions. Examples of environmental changes may include land characteristics, water distribution, temperature, food availability, or the presence of other organisms.	Ecosystem Restoration	

Elementary curriculum course structure

Kindergarten

- Needs of Plants and Animals
- Pushes and Pulls
- Sunlight and Weather

Grade 3

- Balancing Forces
- Inheritance and Traits
- Environments and Survival
- Weather and Climate

Grade 1

- Animal and Plant Defenses
- Light and Sound
- Spinning Earth

Grade 4

- Energy Conversions
- Vision and Light
- Earth's Features
- Waves, Energy, and Information

Grade 2

- Plant and Animal Relationships
- Properties of Materials
- Changing Landforms

Grade 5

- Patterns of Earth and Sky
- Modeling Matter
- The Earth System
- Ecosystem Restoration

For more information on Amplify Science,
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Amplify.



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