Mystery Science Alignment with Minnesota Science Standards

Mystery Science is a hands-on curriculum that aligns with the Minnesota Academic Standards in Science (2019).

Mystery Science's units of study contain:

- Hands-on, easy-prep activities with EVERY lesson
- Engaging, real-world investigative phenomena
- Thoughtful discussions to build background knowledge
- Lesson & unit assessments to evaluate comprehension
- Curated, cross-curricular extensions

Mystery Science also offers the Anchor Layer, which enriches the unit with an anchor phenomenon, incorporates anchor connections after each lesson, & concludes the unit with a performance task.

mystery science

Updated 06/14/2025

Minnesota Standards Alignment

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Animal Needs (Animal Secrets)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Animal Needs: Food** Why do woodpeckers peck wood?	Students obtain information through virtual observations of different animal behaviors. They use this evidence to explain that one of the basic needs of animals is food.	**0L.2.1.1.3** Record and use observations to describe patterns of what plants and animals (including humans) need to survive.
Lesson 2 	**Animal Needs: Shelter Read-Along** Where do animals live?	Students obtain information through media about how different animal homes are built. They use this evidence to explain that animals need shelter.	**0L.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.
Lesson 3 	**Animal Needs: Safety** How can you find animals in the woods?	Students obtain information through virtual observations of different animal behaviors. They use this evidence to explain that one of the basic needs of animals is shelter.	**0L.2.1.1.3** Record and use observations to describe patterns of what plants and animals (including humans) need to survive.
Lesson 4 	**Animals & Changing the Environment Read-Along** How do animals make their homes in the forest?	Students take a nature walk to look for evidence of animal homes.	**0L.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.

Plant Needs (Plant Secrets)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
	**Living & Nonliving** Are plants alive?	Students make observations of plants in order to identify their needs and that they are, in fact, living things.	**0L.2.1.1.3** Record and use observations to describe patterns of what plants and animals (including humans) need to survive.
	**Plant Needs: Water & Light** How do plants and trees grow?	Students investigate to determine the basic needs of plants. They observe to identify ways young plants resemble the parent plant and how the plant changes as it proceeds through its life cycle.	**0L.2.1.1.3** Record and use observations to describe patterns of what plants and animals (including humans) need to survive.
	**Human Impacts on the Environment Read-Along** Why would you want an old log in your backyard?	Students obtain evidence of living organisms by virtually keeping watch of a log and the living things that visit it.	**0L.1.2.1.2** Make observations of plants and animals to compare the diversity of life in different habitats.

Severe Weather (Wild Weather)

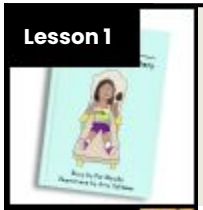
	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Severe Weather & Preparation Read-Along** How can you get ready for a big storm?	Students obtain information of different types of severe weather to observe and describe how the weather changes during these events and what students can do to prepare and stay safe.	**0E.1.1.1.1** Ask questions to obtain information from weather forecasts to prepare for and respond to severe weather.
Lesson 2 	**Wind & Storms** Have you ever watched a storm?	Students create a simple tool that allows them to observe how hard the wind is blowing. They use this tool to observe weather changes and describe the pattern of faster wind speeds right before a storm.	**0E.1.1.1.1** Ask questions to obtain information from weather forecasts to prepare for and respond to severe weather.
Lesson 3 	**Weather Conditions** How many different kinds of weather are there?	Students obtain information through observations of the weather. They communicate the information by acting as weather watchers and creating drawings of the weather conditions.	**0E.2.1.1.2** Make daily and seasonal observations of local weather conditions to describe patterns over time.

Minnesota Specific Standard: **0E.1.1.1.2** Ask questions about how a person may reduce the amount of natural resources the individual uses.

Weather Patterns (Circle of Seasons)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Daily Weather Patterns Read-Along** How do you know what to wear for the weather?	Students track the weather daily and analyze the data by collecting, recording, and sharing their observations to observe patterns of weather changing throughout the day and from day-to-day.	**0E.2.1.1.2** Make daily and seasonal observations of local weather conditions to describe patterns over time.
Lesson 2 	**Seasonal Weather Patterns** What will the weather be like on your birthday?	Students evaluate information in a series of unnamed drawings of each season. They use these clues to identify characteristics of each season and describe the yearly cyclical pattern.	**0E.2.1.1.2** Make daily and seasonal observations of local weather conditions to describe patterns over time.
Lesson 3 	**Animals Changing Their Environment** Why do birds lay eggs in the spring?	Students identify the reasons why birds lay eggs in the spring. Then, they develop a bird nest model and use this model as evidence for how animals can change the environment to meet their needs.	**0E.2.1.1.2** Make daily and seasonal observations of local weather conditions to describe patterns over time.

Sunlight & Warmth (Sunny Skies)

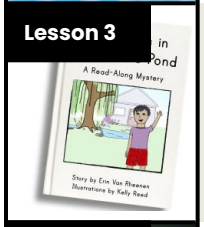
	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Sunlight, Heat, & Earth's Surface Read-Along** How could you walk barefoot across hot pavement without burning your feet?	Students make observations of the pavement heating up after being warmed by the Sun. Then, they design a solution to build a shade structure that can reduce the warming effect of sunlight.	**0P.3.2.2.1** Design and build a structure to reduce the warming effect of sunlight on Earth's surface. **0P.4.2.2.1** Communicate design ideas for a structure that reduces the warming effect of sunlight on Earth's surface.
Lesson 2 	**Sunlight, Warming, & Engineering** How could you warm up a frozen playground?	Students carry out an investigation to test which materials can redirect the light and heat of sunlight. (*This lesson has students increase the warming effect of sunlight on an area.)	**0P.3.2.2.1** Design and build a structure to reduce the warming effect of sunlight on Earth's surface.
Lesson 3 	**Sunlight & Warmth** Why does it get cold in winter?	Students construct an explanation for why marshmallows melt in one car and not in another car. Then, they conduct a virtual investigation to determine that the warmth of the Sun is the cause of the melted marshmallows.	**0P.1.2.1.1** Collect and organize observational data to determine the effect of sunlight on Earth's surface.

Pushes & Pulls (Force Olympics)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Pushes & Pulls** What's the biggest excavator?	Students observe different machines and use those observations as evidence for why machines make work easier.	**Foundational for 0P.2.2.1.1** Identify and describe patterns that emerge from the effects of different strengths or different directions of pushes.
Lesson 2 	**Pushes, Pulls, & "Work Words" Read-Along** Why do builders need so many big machines?	Students observe construction equipment being used in different ways to move objects.	**Foundational for 0P.2.2.1.1** Identify and describe patterns that emerge from the effects of different strengths or different directions of pushes.
Lesson 3 	**Motion, Speed, & Strength** How can you knock down a wall made of concrete?	Students carry out an investigation to determine how far back they should pull a model wrecking ball to knock down a wall, but not the houses behind it.	**0P.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.
Lesson 4 	**Speed & Direction of Force Read-Along** How can you knock down the most bowling pins?	Students play a game of bumper bowling to observe the way that objects can move in straight lines, zigzags, and back and forth.	**0P.2.2.1.1** Identify and describe patterns that emerge from the effects of different strengths or different directions of pushes.
Lesson 5 	**Direction of Motion & Engineering** How can we protect a mountain town from falling rocks?	Students conduct an investigation of how to protect a town from a falling boulder. They design a solution to safely guide the direction of the boulder away from the town.	**0P.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.
Lesson 6 	**Forces & Engineering Read-Along** How could you invent a trap?	Students define a problem they would like to solve and then design a solution using what they know about the locations of objects and how they can move.	**0P.2.2.1.1** Identify and describe patterns that emerge from the effects of different strengths or different directions of pushes.

Minnesota Specific Standard: **0P.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.

✔ Animal Traits & Survival (Animal Superpowers)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Parent & Offspring Traits** How can you help a lost baby animal find its parents?	Students observe the traits of adult and baby animals in order to construct an explanation that most young animals are like, but not exactly like, their parents.	**1L.1.1.1.1** Ask questions based on observations about the similarities and differences between young plants and animals and their parents.
Lesson 2 	✨New!✨ **Offspring Trait Variation** Can you predict what an animal's babies will look like?	Students observe the traits of parent and baby animals to construct an explanation that offspring look similar to their parents, but can also vary in many ways. They predict what a puppy might look like based on the traits of the parent dogs.	**1L.1.1.1.1** Ask questions based on observations about the similarities and differences between young plants and animals and their parents.
Lesson 3 	**Animal Behavior & Offspring Survival Read-Along** Why do baby ducks follow their mother?	Students obtain information about the behaviors of animal parents that help their offspring survive.	**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.
Lesson 4 	**Animal Structures & Survival** Why do birds have beaks?	Students investigate how different bird beaks are well suited for eating different kinds of food. They explain which beak would help a particular bird survive in a particular environment.	**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.
Lesson 5 	**Camouflage & Animal Survival** Why are polar bears white?	Students use observations of animal parents and their offspring to construct an explanation about young plants and animals being similar, but not identical, to their parents.	**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.

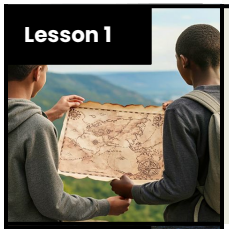
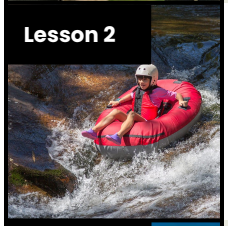
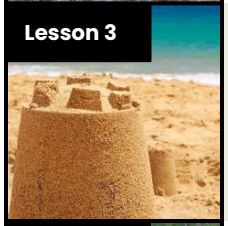
✨ New Lesson
✔ Unit Restructured for the 2025-2026 School Year

Plant Traits & Survival (Plant Superpowers)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Plant Traits & Offspring** What will a baby plant look like when it grows up?	Students observe seedlings and adult plants and use their observations to identify the pattern that young plants are similar to their parent plants.	**1L.1.1.1.1** Ask questions based on observations about the similarities and differences between young plants and animals and their parents.
Lesson 2 	**Plant Survival & Engineering** Why don't trees blow down in the wind?	Students learn how plants respond to light. They conduct an investigation to compare how the parts of a plant respond to light.	**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.
Lesson 3 	**Plant Movement & Survival Read-Along** What do sunflowers do when you're not looking?	Students learn how plants respond to light. They conduct an investigation to compare how the parts of a plant respond to light.	**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.

Minnesota Specific Standard: **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.

Erosion & Earth's Surface (Work of Water) • Page 1 of 2

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	✨New!✨ **Mapping Landforms & Bodies of Water** Where's the best place to hide a treasure?	Students develop a model (a map) of different landforms and bodies of water in a given location based on the shape of each feature.	**Foundational for 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.
Lesson 2 	**Mapping: Mountains & Rivers** If you floated down a river, where would you end up?	Students develop a model of the Earth's surface and use it to discover an important principle about how rivers work: rivers flow downhill, from high places to low places.	**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.
Lesson 3 	**Rocks, Sand, & Erosion** Why is there sand at the beach?	Students investigate the effects of rocks tumbling in a river. Based on their observations, they construct an explanation for why rocks on the top of mountains are much bigger than the sand at the beach.	**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.
Lesson 4 	**Mapping & Severe Weather** Where do flash floods happen?	Students use a model (i.e. a map) to examine the different factors, including the shapes and kinds of land, that contribute to flash floods. They use this to predict where flash floods are most likely to happen.	**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.
Lesson 5 	**Erosion, Earth's Surface, & Landforms** What's strong enough to make a canyon?	Students create a model landform and investigate how some Earth events can occur quickly, while others occur slowly.	**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.

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✨ New Lesson

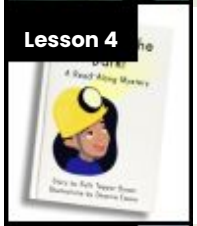
Erosion & Earth's Surface (Work of Water) • Page 2 of 2

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 6 	**Erosion & Engineering** How can you stop a landslide?	Students compare multiple solutions for preventing erosion.	**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.

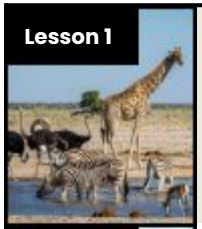
Minnesota Specific Standard: **1E.4.1.1.1** Construct an argument based on observational evidence for how plants and animals (including humans) can change the non-living aspects of the environment to meet their needs.

Minnesota Specific Standard: **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.

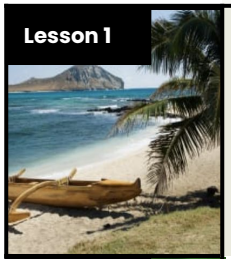
Light, Sound, & Communication (Lights & Sounds)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Sounds & Vibrations** How do they make silly sounds in cartoons?	Students explore how to make different sounds with everyday objects. They construct an explanation that objects vibrate when they make a sound, and if the vibration stops, the sound stops.	**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.
Lesson 2 	**Sounds & Vibrations Read-Along** Where do sounds come from?	Students create three different sound makers and construct an explanation about where the vibrations are happening in each sound experiment.	**1P.1.2.1.1** Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sounds can make materials vibrate.
Lesson 3 	*Although this appears next on our site, we **recommend teaching this in 3rd grade** if following MN Standards.*		
	Light, Materials, Transparent & Opaque *What if there were no windows?*	*Students investigate the properties of different materials that they can and cannot see through. Then they create a stained glass window using tissue paper to explore how materials interact with 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.*
Lesson 4 	*Although this appears next on our site, we **recommend teaching this in 3rd grade** if following MN Standards.*		
	Light & Illumination Read-Along *Can you see in the dark?*	*Students look inside a completely dark box to determine if they can see the shape of the object inside. They allow more light into the box to illuminate the object and allow them to see it. Students use their observations explain that objects need light to be seen.*	***3P.1.1.1.1** Ask questions based on observations about why objects in darkness can be seen only when illuminated.*
Lesson 5 	**Light, Communication, & Engineering** How could you send a secret message to someone far away?	Students are presented with the problem that they need to send a message at night, without using noise. They design a solution to create a color-coded message system and communicate with light signals.	**1P.3.2.2.1** Design and build a device that uses light or sound to solve the problem of communicating over a distance.
Lesson 6 	**Lights, Sounds, & Communication Read-Along** How do boats find their way in the fog?	Students obtain information about light and sound signals. They analyze different sounds with eyes closed to determine which type of sound they hear.	**1P.3.2.2.1** Design and build a device that uses light or sound to solve the problem of communicating over a distance.

Animal Biodiversity & Habitats (Animal Adventures)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Biodiversity & Classification** How many different kinds of animals are there?	Students observe the traits of different animals and use that information to organize them into groups based on their characteristics.	**Foundational for 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.
Lesson 2 	**Habitat Diversity** Why would a wild animal visit a playground?	Students observe animals, plants, and the physical characteristics of two different habitats. They collect and analyze data to compare the biodiversity between the two habitats.	**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.
Lesson 3 	**Biodiversity, Habitats, & Species** Why do frogs say “ribbit”?	Students identify frogs based on their unique calls and use that information to determine the level of frog species diversity within multiple habitats.	**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.
Lesson 4 	**Biodiversity & Engineering** How could you get more birds to visit a bird feeder?	Students investigate which kinds of birds are likely to visit a bird feeder based on what they eat and design and build a prototype bird feeder that attracts a specific type of bird.	**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.

Plant Growth & Interactions (Plant Adventures)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Seed Dispersal** How did a tree travel halfway around the world?	Students develop physical models of seed structures. They observe how structure affects the seed's function in dispersing away from the tree.	**2L.3.2.2.1** Engineer a device the mimics the structures and functions of plants or animals in seed dispersal.
Lesson 2 	**Animal Seed Dispersal** Why do seeds have so many different shapes?	Students develop a model of a furry animal and then use it to test how far seed models with different structures can travel.	**2L.3.2.2.1** Engineer a device the mimics the structures and functions of plants or animals in seed dispersal.
Lesson 3 	*Although the following lessons appear on our site, we **recommend teaching these in 3rd grade** if following MN Standards.* ***Water, Sunlight, & Plant Growth*** *Could a plant survive without light?*	*Students conduct an investigation to determine that plants need water and light to grow.*	***3L.1.2.1.2** Plan and conduct an investigation to determine how amounts of sunlight and water impact the growth of a plant.*
Lesson 4 	*Although the following lessons appear on our site, we **recommend teaching these in 3rd grade** if following MN Standards.* ***Plant Needs & Habitats*** *How much water should you give a plant?*	*Students plan and conduct a series of virtual experiments in order to determine how much water and sunlight a set of mystery plants need in order to stay healthy and survive.*	***3L.1.2.1.2** Plan and conduct an investigation to determine how amounts of sunlight and water impact the growth of a plant.*

Minnesota Standards Alignment

2nd Grade - Earth & Space Science

***This unit is found under 3rd Grade on our site**, but we recommend teaching lessons in 2nd grade if you are following Minnesota Standards.*

Weather & Climate (Stormy Skies)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
	**Water Cycle & States of Matter** Where do clouds come from?	Students obtain and combine information that water can change from liquid to gas, but that it is always made of tiny drops. Clouds are made of water that has evaporated.	**2E.4.2.1.1** Obtain and use information from multiple sources to identify where water is found on Earth.
	**Local Weather Patterns & Weather Prediction** How can we predict when it's going to storm?	Students make observations of clouds and develop a tool to make predictions about what kind of weather might happen next.	**2E.2.1.1.1** Represent data to describe typical weather conditions expected during a particular season.
	**Seasonal Weather Patterns** Where's the best place to build a snow fort?	Students gather winter temperature data from three different towns. They represent the data in a table to compare the weather and decide which town is the best candidate to host a snow fort festival in future years.	**2E.2.1.1.1** Represent data to describe typical weather conditions expected during a particular season.
	**Climate & Global Weather Patterns** Why are some places always hot?	Students obtain and combine information to describe the different climate regions of the world.	**2E.4.2.1.2** Obtain and use information from multiple sources, including electronic sources, to describe climates in different regions of the world.
	**Natural Hazards & Engineering** How can you keep a house from blowing away in a windstorm?	Students design and build solutions that reduce the hazards associated with strong winds that could damage buildings.	**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.

✔ **Material Properties** (Material Magic)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Material Properties & Engineering** Why do we wear clothes?	Students investigate different material properties, such as flexibility and absorbency, and use those properties to design and build a hat that protects them from the sun.	**2P.1.2.1.1** Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based upon their observable properties.
Lesson 2 	**Classify Materials: Insulators & Conductors** Can you really fry an egg on a hot sidewalk?	Students conduct an investigation of conductors and insulators in order to determine which are best suited for allowing people to handle hot items.	**2P.1.2.1.1** Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based upon their observable properties.
Lesson 3 	**Material Building Blocks & Engineering** Could you build a house out of paper?	Students construct an evidence-based account of how a structure built of paper can be disassembled and rebuilt in new ways.	**2P.1.2.1.1** Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based upon their observable properties.
Lesson 4 	**Soil Properties** How do you build a city out of mud?	Students conduct an investigation where they examine three different soil models. They use this information to determine which type of soil has the properties that will result in the best mud that can be used to build a house.	**2P.1.2.1.1** Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based upon their observable properties. **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.

✔ Unit Restructured for the 2025-2026 School Year

⭐ **States of Matter** (States of Matter)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	✨New!✨ **Liquid Water & Solid Ice** Where do animals find the water they need?	Students obtain information about the liquid water and solid ice that different animals utilize for their survival in the Arctic.	**2E.4.2.1.1** Obtain and use information from multiple sources to identify where water is found on Earth.
Lesson 2 	✨New!✨ **Reversible & Irreversible Changes** How is an ice cube like a crayon?	Students observe the properties of different materials after being heated up and then cooled down. They use these observations to support the explanation that some changes are reversible and others are not.	**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. **2P.1.2.1.1** Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based upon their observable properties.
Lesson 3 	**Heating, Cooling, & States of Matter** Why are so many toys made out of plastic?	Student conduct an investigation of different materials in order to determine which are most and least easily melted.	**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. **2P.1.2.1.1** Plan and conduct an investigation to describe how heating and cooling affects different kinds of materials based upon their observable properties.

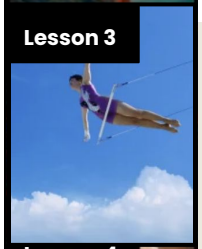
✨ New Unit or Lesson

Minnesota Standards Alignment
2nd Grade - Physical Science

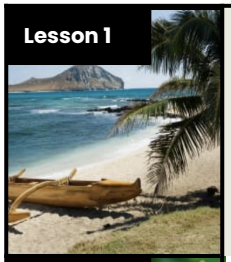
mystery science

***This unit is found under 3rd Grade on our site**, but we recommend teaching lessons in 2nd grade if you are following Minnesota Standards.*

Forces, Motion, & Magnets (Invisible Forces)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Balanced & Unbalanced Forces** How could you win a tug-of-war against a bunch of adults?	Students develop a mental model of the nature of forces and motion and use that model to explain the behavior of an elastic jumper.	**2P.2.2.1.1** Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion or an object.
Lesson 2 	**Balanced Forces & Engineering** What makes bridges so strong?	Students develop and design a bridge to be as strong as possible while working with limited materials.	**Foundational for 2P.2.2.1.1** Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion or an object.
Lesson 3 	**Pattern of Motion, Gravity, & Friction** How high can you swing on a flying trapeze?	Students make observations and measurements of a trapeze model. Then, using that information they predict the motion of a real trapeze.	**2P.1.1.1.1** Ask questions about an object's motion based on observation, that can be answered by an investigation.
Lesson 4 	*Although this appears next on our site, we **recommend teaching this in 4th grade** if following MN Standards.* **Magnets & Forces** What can magnets do?	*Students investigate the properties of magnets and the fact that they exert forces that act at a distance.*	***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.*
Lesson 5 	*Although this appears next on our site, we **recommend teaching this in 4th grade** if following MN Standards.* **Magnets & Engineering** How can you unlock a door using a magnet?	*Students investigate magnetic attraction and repulsion, and design a magnetic lock in the hands-on activity.*	***4P.1.1.2.1** Define a simple design problem that can be solved by applying scientific ideas about magnets.*

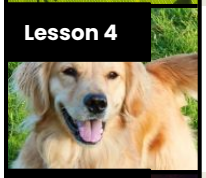
Plant Growth & Interactions (Plant Adventures)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	*Although this appears on our site, we **recommend teaching this in 2nd grade** if following MN Standards.*		
	Seed Dispersal *How did a tree travel halfway around the world?*	*Students develop physical models of seed structures. They observe how structure affects the seed's function in dispersing away from the tree.*	***2L.3.2.2.1** Engineer a device the mimics the structures and functions of plants or animals in seed dispersal.*
Lesson 2 	*Although this appears on our site, we **recommend teaching this in 2nd grade** if following MN Standards.*		
	Animal Seed Dispersal *Why do seeds have so many different shapes?*	*Students develop a model of a furry animal and then use it to test how far seed models with different structures can travel.*	***2L.3.2.2.1** Engineer a device the mimics the structures and functions of plants or animals in seed dispersal.*
Lesson 3 	**Water, Sunlight, & Plant Growth** Could a plant survive without light?	Students conduct an investigation to determine that plants need water and light to grow.	**3L.1.2.1.2** Plan and conduct an investigation to determine how amounts of sunlight and water impact the growth of a plant.
Lesson 4 	**Plant Needs & Habitats** How much water should you give a plant?	Students plan and conduct a series of virtual experiments in order to determine how much water and sunlight a set of mystery plants need in order to stay healthy and survive.	**3L.1.2.1.2** Plan and conduct an investigation to determine how amounts of sunlight and water impact the growth of a plant.

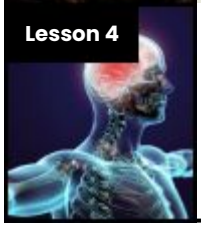
Life Cycles (Circle of Life)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Animal Life Cycles** How is your life like an alligator's life?	Students create models of several different animal life cycles and compare them to one another. They use these models to discover the pattern that all animals are born, grow, can have babies, and eventually die.	**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.
Lesson 2 	**Environmental Change & Engineering** What's the best way to get rid of mosquitoes?	Students obtain and evaluate information about mosquitoes from different sources. They analyze and interpret information about the mosquito life cycle to reduce the number of mosquitoes that live in a certain area.	**3L.4.1.1.1** Construct an argument about strategies animals use to survive.
Lesson 3 	**Pollination & Plant Reproduction** Why do plants grow flowers?	Students model the structure and function of flower parts that are responsible for creating seeds.	**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.
Lesson 4 	**Fruit, Seeds, & Plant Reproduction** Why do plants give us fruit?	Students explore the function of fruits in plants and practice classification.	**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.
Lesson 5 	**Plant Life Cycles** Why are there so many different kinds of flowers?	Students play a game that models the stages of the plant life cycle. After playing the game students use the model to show how changes to one part of the life cycle affect all other stages.	**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.

Heredity, Survival, & Selection (Fates of Traits)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	*Although this appears on our site, we **recommend teaching this in 4th grade** if following MN Standards.* ***Traits & Inheritance*** *How do you identify a mysterious fruit?*	*unknown fruit. They look for similarities and differences in the leaves, flowers, and fruits of plants to sort them into groups and identify patterns of inheritance.*	***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.*
Lesson 2 	*Although this appears on our site, we **recommend teaching this in 4th grade** if following MN Standards.* ***Trait Variation, Inheritance, & Artificial Selection*** *What do dogs and pigeons have in common?*	*They interpret this data to discover that the variation and inheritance of traits creates a pattern that explains why we see such extreme traits in artificially selected animal breeds.*	***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.*
Lesson 3 	**Trait Variation, Survival, & Natural Selection** How could a lizard's toes help it survive?	Students compare the structures of lizards that live on an island. They simulate multiple generations of these lizards, and analyze and interpret the data to understand how these structures aid in their survival.	**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.
Lesson 4 	**Animal Groups & Survival** Why do dogs wag their tails?	Students observe animals that live in groups in order to obtain, evaluate, and communicate information about animal social behavior. Students use evidence to show how animals form groups to help them survive.	**3L.4.1.1.1** Construct an argument about strategies animals use to survive.
Lesson 5 	*Although this appears on our site, we **recommend teaching this in 4th grade** if following MN Standards.* *How long can people (and animals) survive in outer space?*	*physical traits (arm strength, balance, and height) and analyze the information to construct an explanation for how the environment can influence traits.*	***4L.4.1.1.1** Construct or support an argument that traits can be influenced by different environments.*

Human Body, Vision, & The Brain (Human Machine)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Muscles & Skeleton** Why do your biceps bulge?	Students construct a model of the human hand to explain how muscles pull on bones to create movement.	**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.
Lesson 2 	**Light, Eyes, & Vision** What do people who are blind see?	Students develop a working model of an eye. They use the model to reason about how light reflects off an object and into the eye, helping an organism process information from the environment.	**3P.3.1.1.1** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Lesson 3 	**Structure & Function of Eyes** How can some animals see in the dark?	Students use their eye model to discover that the pupil controls the amount of light let into the eye. In the dark, pupils get larger to let in more light.	**3P.3.1.1.1** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Lesson 4 	**Brain, Nerves, & Information Processing** How does your brain control your body?	Students investigate how their own brain works by testing their reflexes. They discover that the brain receives information from the senses, processes the information, and sends signals to the muscles to enable movement.	**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.

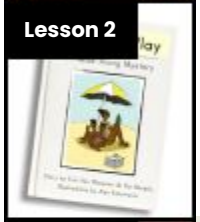
***This unit is found under 4th Grade on our site**, but we recommend teaching lessons in 3rd grade if you are following Minnesota Standards.*

Animal & Plant Adaptations (Animal & Plant Adaptations)

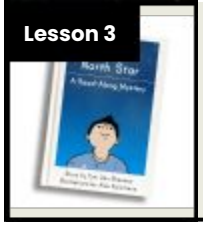
	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Animal Adaptations** Why do some sea creatures look so strange?	Students make observations of underwater animals in order to collect evidence that external structures serve specific functions. They use their observations to construct an argument that an animal's structures work together as part of a system to support their growth and survival.	**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.
Lesson 2 	**Learned Behavior & Instinct** Why would a sea turtle eat a plastic bag?	Students use models to understand how an animal's senses, brain, and memories all work together as a system to influence their behavior and support their survival.	**3L.4.1.1.1** Construct an argument about strategies animals use to survive.
Lesson 3 	**Plant Adaptations** Why don't the same trees grow everywhere?	Students use models of roots and branches to explore their functions and then construct an argument about how these structures must work together in order to support the survival of trees in the unique environment of the frozen taiga.	**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.

***This unit is found under 1st Grade on our site**, but we recommend teaching lessons in 3rd grade if you are following Minnesota Standards.*

Day Patterns (Sun & Shadows)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Sun, Shadows, & Daily Patterns** Could a statue's shadow move?	Students observe how shadows change as time passes, or as the Sun moves across the sky. They analyze how to move a light source to change the shape and direction of shadows, constructing an explanation of what causes a shadow to move.	**3E.2.1.1.1** Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted.
Lesson 2 	**Sun, Shadows, & Daily Patterns Read-Along** What does your shadow do when you're not looking?	Students conduct an investigation to gather information about how their shadow changes throughout the day.	**3E.2.1.1.1** Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted.
Lesson 3 	**Sun & Daily Patterns** How can the Sun help you if you're lost?	Students develop a Sun Finder, a model of the Sun's movement across the sky. They use this model to reason about how the Sun can help guide them during the day.	**3E.2.1.1.1** Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted.
Lesson 4 	**Daylight & Seasonal Patterns Read-Along** Why do you have to go to bed early in the summer?	Students obtain information about the seasonal patterns of sunrise and sunset.	**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.

Night Patterns (Moon & Stars)

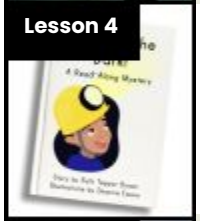
	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Moon Phases & Patterns** When can you see the full moon?	Students record observations of the Moon's shape using a series of photos collected over the course of four weeks. Using this information, students discover that the Moon follows a cyclical pattern, which they can use to predict when a full moon will appear.	**3E.2.1.1.1** Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted.
Lesson 2 	**Stars & Daily Patterns** Why do stars come out at night?	Students develop and use a model of the Big Dipper in the night sky. After conducting a simple investigation, students construct an explanation for why stars are only visible in the night sky.	**3E.2.1.1.1** Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted.
Lesson 3 	**Stars & Seasonal Patterns Read-Along** How can stars help you if you get lost?	Students observe that groups of stars in the sky form a pattern: constellations. Even though the Big Dipper changes its spot in the sky in different seasons, it always points to the North Star.	**3E.2.1.1.1** Record observations of the sun, moon, and stars and use them to describe patterns that can be predicted. **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.

Minnesota Standards Alignment

3rd Grade - Physical Science

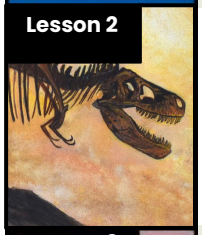
***This unit is found under 1st Grade on our site**, but we recommend teaching lessons in 3rd grade if you are following Minnesota Standards.*

Light, Sound, & Communication (Lights & Sounds)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	*Although this appears on our site, we **recommend teaching this in 1st grade** if following MN Standards.* *How do they make silly sounds in cartoons?*	*Students explore how to make different sounds with everyday objects. They construct an explanation that objects vibrate when they make a sound, and if the vibration stops, the sound stops.*	*testing different materials and determine which materials have the properties that are best suited for producing and/or transmitting sound.*
Lesson 2 	*Although this appears next on our site, we **recommend teaching this in 1st grade** if following MN Standards.* ***Read-Along*** *Where do sounds come from?*	*Students create three different sound makers and construct an explanation about where the vibrations are happening in each sound experiment.*	*evidence that vibrating materials can make sound and that sounds can make materials vibrate.*
Lesson 3 	**Light, Materials, Transparent & Opaque** What if there were no windows?	Students investigate the properties of different materials that they can and cannot see through. Then they create a stained glass window using tissue paper to explore how materials interact with 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.
Lesson 4 	**Light & Illumination Read-Along** Can you see in the dark?	Students look inside a completely dark box to determine if they can see the shape of the object inside. They allow more light into the box to illuminate the object and allow them to see it. Students use their observations explain that objects need light to be seen.	**3P.1.1.1.1** Ask questions based on observations about why objects in darkness can be seen only when illuminated.
Lesson 5 	*Although this appears next on our site, we **recommend teaching this in 1st grade** if following MN Standards.* ***Engineering*** *How could you send a secret message to someone far away?*	*Students are presented with the problem that they need to send a message at night, without using noise. They design a solution to create a color-coded message system and communicate with light signals.*	***1P.3.2.2.1** Design and build a device that uses light or sound to solve the problem of communicating over a distance.*
Lesson 6 	*Although this appears next on our site, we **recommend teaching this in 1st grade** if following MN Standards.* ***Communication, Read-Along*** *How do boats find their way in the fog?*	*Students obtain information about light and sound signals. They analyze different sounds with eyes closed to determine which type of sound they hear.*	***1P.3.2.2.1** Design and build a device that uses light or sound to solve the problem of communicating over a distance.*

***This unit is found under 3rd Grade on our site**, but we recommend teaching lessons in 4th grade if you are following Minnesota Standards.*

Fossils & Changing Environments (Animals Through Time)

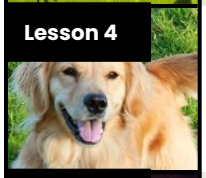
	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Habitats, Fossils, & Environments Over Time** Where can you find whales in a desert?	Students explore the idea that the rock under our feet sometimes contains fossils, and investigate how these fossils reveal changes in habitats through time.	**4E.3.2.1.1** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.
Lesson 2 	**Fossil Evidence & Dinosaurs** How do we know what dinosaurs looked like?	Students learn how we can infer what the outside of an animal looked like by using clues about their skeleton.	**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.
Lesson 3 	**Trace Fossil Evidence & Animal Movement** Can you outrun a dinosaur?	Students learn how fossilized animal tracks can tell us a great deal about the animals that left them.	**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.

Minnesota Standards Alignment

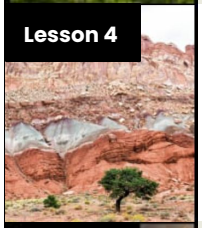
4th Grade - Life Science

***This unit is found under 3rd Grade on our site**, but we recommend teaching lessons in 4th grade if you are following Minnesota Standards.*

Heredity, Survival, & Selection (Fates of Traits)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Traits & Inheritance** How do you identify a mysterious fruit?	Students examine plant traits and use that information as evidence to help them identify an unknown fruit. They look for similarities and differences in the leaves, flowers, and fruits of plants to sort them into groups and identify patterns of inheritance.	**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.
Lesson 2 	**Trait Variation, Inheritance, & Artificial Selection** What do dogs and pigeons have in common?	Students analyze trait similarities and differences among parent, offspring, and sibling pigeons. They interpret this data to discover that the variation and inheritance of traits creates a pattern that explains why we see such extreme traits in artificially selected animal breeds.	**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.
Lesson 3 	*Although this appears next on our site, we **recommend teaching this in 3rd grade** if following MN Standards.* ***Trait Variation, Survival, & Natural Selection*** *How could a lizard's toes help it survive?*	*Students compare the structures of lizards that live on an island. They simulate multiple generations of these lizards, and analyze and interpret the data to understand how these structures aid in their survival.*	***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.*
Lesson 4 	*Although this appears next on our site, we **recommend teaching this in 3rd grade** if following MN Standards.* *Why do dogs wag their tails?*	*information about animal social behavior. Students use evidence to show how animals form groups to help them survive.*	*to survive.*
Lesson 5 	**Traits & Environmental Variation** How long can people (and animals) survive in outer space?	Students measure and compare their own physical traits (arm strength, balance, and height) and analyze the information to construct an explanation for how the environment can influence traits.	**4L.4.1.1.1** Construct or support an argument that traits can be influenced by different environments.

Earth's Features & Processes (The Birth of Rocks)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
 **Lesson 1**	**Volcanoes & Patterns of Earth's Features** Could a volcano pop up where you live?	Students use coordinates to develop a map of volcanoes to discover a pattern of where volcanoes exist on Earth. Students identify the pattern of volcanoes in the "Ring of Fire."	**4E.3.2.1.1** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.
 **Lesson 2**	**Volcanoes & Rock Cycle** Why do some volcanoes explode?	Students investigate the properties of thin and thick lava by attempting to create air bubbles. Students realize that thick lava will cause a volcano to explode, while thin lava will not.	**4E.3.2.1.1** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.
 **Lesson 3**	**Weathering & Erosion** Will a mountain last forever?	Students make observations of the effects of weathering to discover that rocks will become rounded and break into small pieces when they tumble down a mountain.	**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.
 **Lesson 4**	**Sedimentary Rock & Fossils** What did your town look like 100 million years ago?	Students create a model canyon and use the pattern of fossils found in each rock layer to support the explanation that the landscape has changed many times over millions of years.	**4E.3.2.1.1** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landscape over time.
 **Lesson 5**	**Erosion, Natural Hazards, & Engineering** How could you survive a landslide?	Students generate multiple possible solutions to protect homes from a landslide. Students realize that there are many causes for the erosion that causes rocks to fall in landslides.	**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. **4E.3.2.2.1** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

***This unit is found under 5th Grade on our site**, but we recommend teaching lessons in 4th grade if you are following Minnesota Standards.*

Water Cycle & Earth's Systems (Watery Planet)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Hydrosphere & Water Distribution** How much water is in the world?	Students analyze and interpret data from world maps to determine the relative amounts of fresh, salt, and frozen water. Students figure out that while the Earth has a lot of water, most of Earth's water is not fresh or accessible.	**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.
Lesson 2 	*Although this appears next on our site, we **recommend teaching this in 5th grade** if following MN Standards.* ***Mixtures & Solutions*** *How much salt is in the ocean?*	*dissolved in water. Students measure and graph quantities to provide evidence that the salt is still in the solution, even though we can't see it.*	***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.*
Lesson 3 	**Groundwater as a Natural Resource** When you turn on the faucet, where does the water come from?	Students learn most people get fresh water from underground sources. Students determine the best place to settle a town by considering features of the landscape & the characteristics of the plants that thrive there.	**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.
Lesson 4 	**Water Cycle** Can we make it rain?	Students create a model of the ocean and sky to investigate how temperature influences evaporation and condensation. Students figure out that higher ocean temperatures lead to more evaporation, thus leading to more rain.	**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. **4E.1.1.1.2** Ask questions about how water moves through the Earth system and identify the type of question.
Lesson 5 	**Natural Disasters & Engineering** How can you save a town from a hurricane?	Students define the problem that a town needs protection from flooding. They design solutions using different types of flood protection. They realize flooding is caused by severe rainfall generated by hurricanes. Hurricanes are created where ocean temperatures are warm.	**4E.3.2.2.1** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Electricity, Light, & Heat (Electricity, Light & Heat)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Renewable Energy & Natural Resources** What's the best way to light up a city?	Students evaluate the advantages and disadvantages of wind, water, and solar energy to power a town. Students obtain and evaluate information about the needs of each source of energy and analyze and interpret data about the town's resources.	**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. **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.
Lesson 2 	***We recommend teaching this in 5th grade*** *if following MN Standards.* ***Electrical Energy*** *What if there were no electricity?*	*using batteries, flights, and tin foil. Students figure out that electricity can be transformed to other forms of energy, such as movement, light, and heat.*	***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.*
Lesson 3 	***We recommend teaching this in 5th grade*** *if following MN Standards.* ***Heat Energy & Energy Transfer*** *How long did it take to travel across the country before cars and planes?*	*students build a paper spinner and conduct an investigation to explain how heat makes things move. Students realize that heat energy can be transformed into motion energy using a turbine.*	*electric currents.* ***5P.3.2.2.1*** *Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*

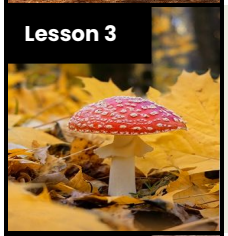
Minnesota Standards Alignment
4th Grade - Physical Science

***This unit is found under 3rd Grade on our site**, but we recommend teaching lessons in 4th grade if you are following Minnesota Standards.*

Forces, Motion, & Magnets (Invisible Forces)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	*Although this appears on our site, we **recommend teaching this in 2nd grade** if following MN Standards.*		
	Balanced & Unbalanced Forces *How could you win a tug-of-war against a bunch of adults?*	*Students develop a mental model of the nature of forces and motion and use that model to explain the behavior of an elastic jumper.*	***2P.2.2.1.1** Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion or an object.*
Lesson 2 	*Although this appears next on our site, we **recommend teaching this in 2nd grade** if following MN Standards.*		
	Balanced Forces & Engineering *What makes bridges so strong?*	*Students develop and design a bridge to be as strong as possible while working with limited materials.*	***Foundational for 2P.2.2.1.1** Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion or an object.*
Lesson 3 	*Although this appears next on our site, we **recommend teaching this in 2nd grade** if following MN Standards.*		
	Friction & Pattern of Motion *How can you go faster down a slide?*	*Students plan and carry out investigations of the behaviors of different materials as they slide past one another.*	***2P.1.1.1.1** Ask questions about an object's motion based on observation, that can be answered by an investigation.*
Lesson 4 	**Magnets & Forces** What can magnets do?	Students investigate the properties of magnets and the fact that they exert forces that act at a distance.	**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.
Lesson 5 	**Magnets & Engineering** How can you unlock a door using a magnet?	Students investigate magnetic attraction and repulsion, and design a magnetic lock in the hands-on activity.	**4P.1.1.2.1** Define a simple design problem that can be solved by applying scientific ideas about magnets.

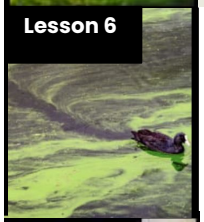
Ecosystems & The Food Web (Web of Life)• Page 1 of 2

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	✨New!✨ **Food Chains & Matter Flow** What if all the ants disappeared?	Students construct models of food chains by linking cards discovering that different interrelationships exist between organisms.	**5L.3.1.1.3** Create an electronic visualization of the movement of matter among plants, animals, decomposers, and the environment.* *Visualization is paper-based
Lesson 2 	✨New!✨ **Plant Growth & Matter** How does a tiny seed become one of the heaviest trees on Earth?	Students gather evidence through a series of virtual experiments to construct an argument that plants use mostly air and water as the materials for their growth.	**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.
Lesson 3 	✨New!✨ **Decomposers & Matter Flow** Where do fallen leaves go?	Students conduct an investigation to gain an understanding of the important role that decomposers play in recycling matter from dead leaves back into the environment.	**5L.3.1.1.3** Create an electronic visualization of the movement of matter among plants, animals, decomposers, and the environment.* *Visualization is paper-based
Lesson 4 	**Decomposers & Soil Nutrients** Do worms really eat dirt?	Students make observations of worms to realize that worms act as decomposers to eat dead matter in an ecosystem and cycle nutrients into the soil.	**5L.3.1.1.3** Create an electronic visualization of the movement of matter among plants, animals, decomposers, and the environment.* *Visualization is paper-based

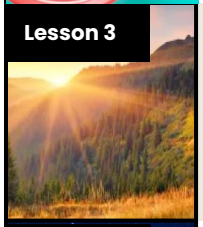
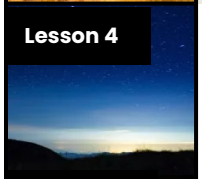
Continued on next page

✨ New Lesson

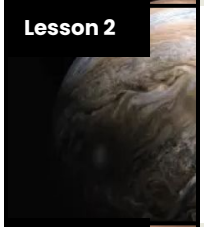
Ecosystems & The Food Web (Web of Life)• Page 2 of 2

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 5 	**Ecosystems & Matter Cycle** Why do you have to clean a fish tank but not a pond?	Students develop a model of a pond ecosystem and realize that interrelationships exist between decomposers, plants, and animals. Students discover that each organism must be in balance for the pond ecosystem to function.	**5L.3.1.1.3** Create an electronic visualization of the movement of matter among plants, animals, decomposers, and the environment.* *Visualization is paper-based
Lesson 6 	**Protecting Environments** How can we protect Earth's environments?	In this lesson, students learn about what happens in unbalanced ecosystems and how that can lead to an overabundance of algae and harmful algal blooms. In the activity, Bloom Busters, students play a game in which they obtain and combine science ideas in order to help a community respond to and prevent harmful algal blooms.	**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.
Lesson 7 	**Food Webs & Flow of Energy** Why did the dinosaurs go extinct?	Students develop a model of a dinosaur food web. Students realize that blocking the sun's energy would have disastrous effects on the organisms that rely on this energy in the food web and cause the extinction of some entire species.	**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.

Earth & Space Patterns (Spaceship Earth)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Day, Night, & Earth's Rotation** How fast does the Earth spin?	Students model the rotation of the Earth and investigate why the Sun looks like it's moving across the sky. Using evidence they gathered in the investigation, students build a model that explains how the Earth's rotation around its own axis causes the Sun to appear to rise and set.	**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.
Lesson 2 	**Earth's Rotation & Daily Shadow Patterns** Who set the first clock?	Students make a shadow clock (sundial) and investigate how the direction and length of shadows change with the position of the light shining on the sundial. Students realize that the Sun's position in the sky can be used to tell the time of day.	**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.
Lesson 3 	**Seasonal Changes & Shadow Length** How can the Sun tell you the season?	Students examine photos taken at different times of year and figure out the time of year that each photo was taken. Students discover that the Sun's path changes with the seasons, as does the time of sunrise and sunset. The Sun is always highest in the sky at noon, but that height changes with the season.	**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.
Lesson 4 	**Seasonal Patterns & Earth's Orbit** Why do the stars change with the seasons?	Students build a model of the universe and use it to explain why different stars are visible at different times of year. Using evidence from this model, students make an argument that supports the claim that the Earth orbits the Sun.	**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.
Lesson 5 	**Moon Phases, Lunar Cycle** Why does the Moon change shape?	Students use a physical model of the Sun and Moon to investigate how the Moon's phase relates to its position relative to the Sun. Students notice that the Moon's phases repeat in a predictable pattern.	**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.

Stars & Planets (Stars & Planets)

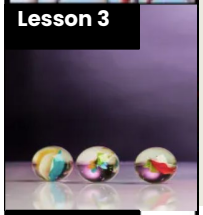
	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Solar System & Sun Brightness** How can the Sun help us explore other planets?	Students gather evidence to support an argument that the apparent brightness of the Sun is dependent upon an observer's distance from the Sun. They construct a model of the solar system and gather observations of the Sun's apparent brightness from each planet within their model.	**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.
Lesson 2 	**Gravity** Why is gravity different on other planets?	Using mathematics and computational thinking, students calculate how high they could jump on planets and moons that have stronger or weaker gravity than Earth. Students analyze and interpret this data to construct an explanation for why the amount of gravity is different on other planets.	**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.
Lesson 3 	**Star Brightness & Habitable Planets** Could there be life on other planets?	Sun with the right amount of light and heat for life to exist. Students evaluate other solar systems, comparing their stars to our Sun. Based on their analysis, students plan a space mission to a planet with conditions similar to those on Earth.	**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.

Minnesota Standards Alignment

5th Grade - Physical Science

***This unit is found under 4th Grade on our site**, but we recommend teaching lessons in 5th grade if you are following Minnesota Standards.*

Energy & Energy Transfer (Energizing Everything)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Speed & Energy** How is your body similar to a car?	Students learn about stored energy and about the relationship between motion and energy. Students build models of an amusement park ride and discover how energy can be stored in materials. Stored energy can be converted to speed.	**5P.3.2.1.1** Construct an explanation based on evidence relating the speed of an object to the energy of that object.
Lesson 2 	**Gravitational Energy, Speed, & Collisions** What makes roller coasters go so fast?	Students build a model of a roller coaster and carry out an investigation using marbles. Students learn that lifting an object up stores energy in the object. When the object falls, that stored energy is released. They realize that energy is transferred when objects collide.	**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.
Lesson 3 	**Collisions & Energy Transfer** How can marbles save the world?	Students investigate how energy transfers when objects collide. In the activity, Bumper Jumper, students ask questions and make predictions about how far a marble will launch over a jump after colliding with other objects.	**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.
Lesson 4 	**Energy Transfer & Engineering** Could you knock down a building using only dominoes?	Students experiment with ways to store and release energy, creating the beginning of a chain reaction machine with a lever and a ramp. Students figure out that a domino standing on end is storing energy, only requiring a small amount of energy (a tiny push) to release the stored energy.	**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.
Lesson 5 	**Energy Transfer & Engineering** Can you build a chain reaction machine?	Students continue to build a chain reaction machine — identifying a goal, brainstorming and testing multiple ideas, and determining an optimal solution. The chain reaction machine uses multiple components to transfer energy from one part to the next.	**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.

***This unit is found under 4th Grade on our site**, but we recommend teaching lessons in 5th grade if you are following Minnesota Standards.*

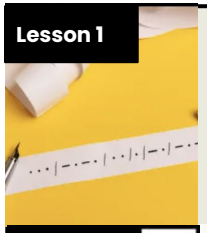
Electricity, Light, & Heat (Electricity, Light & Heat)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	***We recommend teaching this in 4th grade** if following MN Standards.* ***Renewable Energy & Natural Resources*** *What's the best way to light up a city?*	*disadvantages of wind, water, and solar energy to power a town. Students obtain and evaluate information about the needs of each source of energy and analyze and interpret data about the town's resources.*	***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.*
Lesson 2 	**Electrical Energy** What if there were no electricity?	Students design a flashlight with an on/off switch, using batteries, flights, and tin foil. Students figure out that electricity can be transformed to other forms of energy, such as movement, light, and heat.	**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.
Lesson 3 	**Heat Energy & Energy Transfer** How long did it take to travel across the country before cars and planes?	Students build a paper spinner and conduct an investigation to explain how heat makes things move. Students realize that heat energy can be transformed into motion energy using a turbine.	**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. **5P.3.2.2.1** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

Minnesota Standards Alignment
5th Grade - Physical Science

***This unit is found under 4th Grade on our site**, but we recommend teaching lessons in 5th grade if you are following Minnesota Standards.*

Sound, Waves, & Communication (Waves of Sound)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	**Pattern Transfer & Technology** How do you send a secret code?	Students explore how digital devices encode complex information. Students generate their own codes in order to transfer information across the classroom. Then, they compare their codes and evaluate which worked best given the criteria and constraints.	**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.
Lesson 2 	**Sound, Vibration, & Engineering** How far can a whisper travel?	Students investigate sound energy using paper cup telephones. Students figure out that sound is a vibration that can travel through a medium.	**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.
Lesson 3 	**Sound & Vibrations** What would happen if you screamed in outer space?	Students construct a model of sound vibrations to explain how air is a medium that sound vibrations travel through.	**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.
Lesson 4 	**Sound Waves & Wavelength** Why are some sounds high and some sounds low?	Students make observations of vibrations and sound waves to discover that high pitch sounds vibrate faster and have short wavelengths and low pitch sounds vibrate slower and have long wavelengths.	**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.

Water Cycle & Earth's Systems (Watery Planet)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
Lesson 1 	*Although this appears on our site, we **recommend teaching this in 4th grade** if following MN Standards.*		
	Hydrosphere & Water Distribution *How much water is in the world?*	*Students analyze and interpret data from world maps to determine the relative amounts of fresh, salt, and frozen water. Students figure out that while the Earth has a lot of water, most of Earth's water is not fresh or accessible.*	***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.*
Lesson 2 			
	Mixtures & Solutions How much salt is in the ocean?	Students create a model ocean to observe how salt seems to completely vanish when dissolved in water. Students measure and graph quantities to provide evidence that the salt is still in the solution, even though we can't see it.	**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.
Lesson 3 	*Although this appears next on our site, we **recommend teaching this in 4th grade** if following MN Standards.*		
	Groundwater as a Natural Resource *When you turn on the faucet, where does the water come from?*	*Students learn most people get fresh water from underground sources. Students determine the best place to settle a town by considering features of the landscape & the characteristics of the plants that thrive there.*	***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.*
Lesson 4 	*Although this appears next on our site, we **recommend teaching this in 4th grade** if following MN Standards.*		
	Water Cycle *Can we make it rain?*	*Students create a model of the ocean and sky to investigate how temperature influences evaporation and condensation. Students figure out that higher ocean temperatures lead to more evaporation, thus leading to more rain.*	*observations or data to describe ways the geosphere, biosphere, hydrosphere, and atmosphere interact.* ***4E.1.1.1.2** Ask questions about how water moves through the Earth system and identify the type of question.*
Lesson 5 	*Although this appears next on our site, we **recommend teaching this in 4th grade** if following MN Standards.*		
	Natural Disasters & Engineering *How can you save a town from a hurricane?*	*protection from flooding. They design solutions using different types of flood protection. They realize flooding is caused by severe rainfall generated by hurricanes. Hurricanes are created where ocean temperatures are warm.*	***4E.3.2.2.1** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*

Chemical Reactions & Properties of Matter (Chemical Magic)

	Topic & Guiding Question	Student Objectives	Minnesota Academic Standards in Science (2019)
 Lesson 1	**Conservation of Matter** Are magic potions real?	Students observe that a salt and vinegar solution will turn a dull penny shiny again indicating that substances can change other substances.	**Foundational for 5P.3.1.1.1** Develop and refine a model to describe the matter is made of particles too small to be seen. **Foundational for 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.
 Lesson 2	**Dissolving & Particulate Nature of Matter** Could you transform something worthless into gold?	Students coat a steel nail in copper by placing it into the solution that dissolved bits of the penny. Students realize that substances can change to become particles too small to be seen, but they still exist.	**5P.3.1.1.1** Develop and refine a model to describe the matter is made of particles too small to be seen. **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.
 Lesson 3	**Properties of Matter: Acids** What would happen if you drank a glass of acid?	Students figure out that acids are very reactive substances. Students investigate reactions between different substances to determine how known acids react with other materials.	**5P.1.2.1.3** Evaluate appropriate methods and tools to identify materials based on their properties prior to investigation.
 Lesson 4	**Chemical Reactions** What do fireworks, rubber, and Silly Putty have in common?	Students combine different substances together to discover that chemical reactions can create new substances.	**5P.1.2.1.2** Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
 Lesson 5	**Gases & Particle Models** Why do some things explode?	Students investigate and model the reaction between baking soda and vinegar. They figure out that gases are made of particles too small to be seen.	**5P.3.1.1.1** Develop and refine a model to describe the matter is made of particles too small to be seen.