Mystery Science Alignment with Massachusetts Science Standards

Mystery Science is a hands-on curriculum that aligns with the Massachusetts Science Standards.

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

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Massachusetts Standards Alignment

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Animal Needs (Animal Secrets)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**K-LS1-1** Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants and other animals. Plants make their food and need light to live and grow.
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.	**K-ESS2-2** Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.
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.	**K-LS1-1** Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants and other animals. Plants make their food and need light to live and grow.
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.	**K-ESS2-2** Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.

Plant Needs (Plant Secrets)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
Lesson 1 	**Living & Nonliving** Are plants alive?	Students make observations of plants in order to identify their needs and that they are, in fact, living things.	**K-LS1-1** Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants and other animals. Plants make their food and need light to live and grow.
Lesson 2 	**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.	**K-LS1-1** Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants and other animals. Plants make their food and need light to live and grow. **K-LS1-2(MA)** Recognize that all plants and animals grow and change over time.
Lesson 3 	**Animal Needs & Changing 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.	**K-ESS2-2** Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.

Severe Weather (Wild Weather)

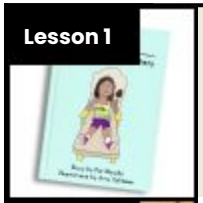
	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
Lesson 1 	**Severe Weather & Preparation Read-Along** How can you get ready for a big storm?	Students obtain information of different types of severe weather to observe and describe how the weather changes during these events and what students can do to prepare and stay safe.	**K-ESS3-2** Obtain and use information about weather forecasting to prepare for, and respond to, different types of local 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.	**K-ESS3-2** Obtain and use information about weather forecasting to prepare for, and respond to, different types of local 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.	**K-ESS2-1** Use and share quantitative observations of local weather conditions to describe patterns over time.

Weather Patterns (Circle of Seasons)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
Lesson 1 	**Local Weather & Daily 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.	**K-ESS2-1** Use and share quantitative observations of local weather conditions to describe patterns over time.
Lesson 2 	*Although this appears next on our site, we **recommend teaching this in 1st grade** if following MA Standards.* ***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.*	***1-ESS1-2** Analyze provided data to identify relationships among seasonal patterns of change, including relative sunrise and sunset time changes, seasonal temperature, and rainfall or snowfall patterns, and seasonal changes to the environment.*
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.	**K-ESS2-1** Use and share quantitative observations of local weather conditions to describe patterns over time. **K-ESS2-2** Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.

Massachusetts Specific Standard: **K-ESS3-3** Communicate solutions to reduce the amount of natural resources an individual uses.

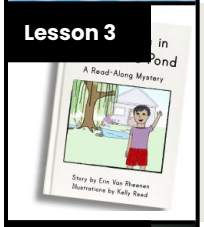
Sunlight & Warmth (Sunny Skies)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**K-PS3-1** Make observations to determine that sunlight warms materials on Earth's surface. **K-PS3-2** Use tools and materials to design and build a model of a structure that will reduce the warming effect of sunlight on an area.
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.)	**K-PS3-1** Make observations to determine that sunlight warms materials on Earth's surface. **K-PS3-2** Use tools and materials to design and build a model of a structure that will reduce the warming effect of sunlight on an area.
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.	**K-PS3-1** Make observations to determine that sunlight warms materials on Earth's surface. **K-PS1-1(MA)** Investigate and communicate the idea that different kinds of materials can be solid or liquid depending on temperature.

Pushes & Pulls (Force Olympics)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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 K-PS2-1** Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
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 K-PS2-1** Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
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.	**K-PS2-1** Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
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.	**K-PS2-1** Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
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.	**K-PS2-1** Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
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.	**K-PS2-1** Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

✔ Animal Traits & Survival (Animal Superpowers)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**1-LS3-1** Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind.
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.	**1-LS3-1** Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind.
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.	**1-LS1-2** Obtain information to compare ways in which the behavior of different animal parents and their offspring help the offspring to 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.	**1-LS1-1** Use evidence to explain that (a) different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air, and (b) plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant.
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.	**1-LS1-1** Use evidence to explain that (a) different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air, and (b) plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant.

Plant Traits & Survival (Plant Superpowers)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**1-LS3-1** Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind.
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.	**1-LS1-1** Use evidence to explain that (a) different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air, and (b) plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant. **1.K-2-ETS1-1 & 1.K-2.ETS1-2**
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.	**1-LS1-1** Use evidence to explain that (a) different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air, and (b) plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant.

Massachusetts Standards Alignment

1st Grade - Earth & Space Science

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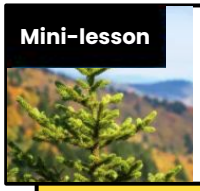
***This unit is found under Kindergarten on our site**, but we recommend teaching lessons in 1st grade if you are following MA Standards.*

Weather Patterns (Circle of Seasons)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
Lesson 1 	*Although this appears here on our site, we **recommend teaching this in Kindergarten** if following MA Standards.*		
	Local Weather & Daily Patterns Read-Along *How do you know what to wear for the weather?*	*and sharing their observations to observe patterns of weather changing throughout the day and from day-to-day.*	***K-ESS2-1** Use and share quantitative 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.	**1-ESS1-2** Analyze provided data to identify relationships among seasonal patterns of change, including relative sunrise and sunset time changes, seasonal temperature, and rainfall or snowfall patterns, and seasonal changes to the environment.
Lesson 3 	*Although this appears next on our site, we **recommend teaching this in Kindergarten** if following MA Standards.*		
	Animals Changing Their Environment *Why do birds lay eggs in the spring?*	*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.*	***K-ESS2-2** Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.*

The following mini-lessons can be used to support Massachusetts Science Standards.

Mini-lesson 

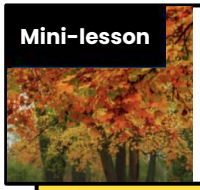
1-ESS1-2

Why don't all trees lose their leaves in the fall?

Mini-lesson 

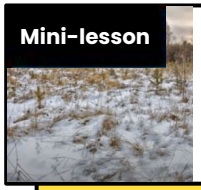
1-ESS1-2

Why do animals come back after going to warm places in the winter?

Mini-lesson 

1-ESS1-2

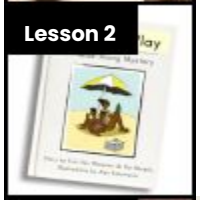
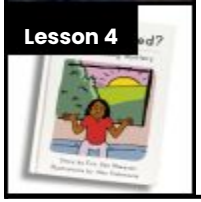
Why do leaves change color in the fall?

Mini-lesson 

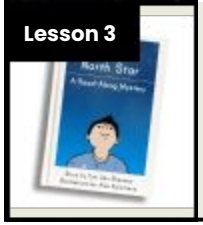
1-ESS1-2

Where do bugs go in winter?

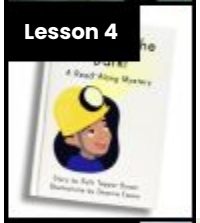
Day Patterns (Sun & Shadows)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**1-ESS1-1** Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.
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.	**1-ESS1-1** Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.
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.	**1-ESS1-1** Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.
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.	**1-ESS1-2** Analyze provided data to identify relationships among seasonal patterns of change, including relative sunrise and sunset time changes, seasonal temperature, and rainfall or snowfall patterns, and seasonal changes to the environment.

Night Patterns (Moon & Stars)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
	**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.	**1-ESS1-1** Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.
	**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.	**1-ESS1-1** Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.
	**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.	**1-ESS1-1** Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.

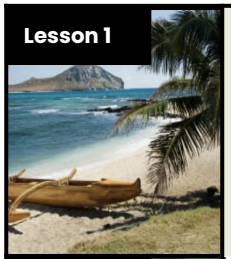
Light, Sound, & Communication (Lights & Sounds)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**1-PS4-1** Demonstrate that vibrating materials that make sound and that sound can make materials vibrate.
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.	**1-PS4-1** Demonstrate that vibrating materials that make sound and that sound 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.	**1-PS4-3** Conduct an investigation to determine the effect of placing materials that allow light to pass through them, allow only some light through them, block all the light, or redirect light when put 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.	**1-PS4-3** Conduct an investigation to determine the effect of placing materials that allow light to pass through them, allow only some light through them, block all the light, or redirect light when put in the path of a beam of light.
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.	**1-PS4-4** Use tools and materials to design and build a device that uses light or sound to send a signal over a distance. **1.K-2-ETS1-1** **1.K-2-ETS1-2**
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.	**1-PS4-4** Use tools and materials to design and build a device that uses light or sound to send a signal over a distance.

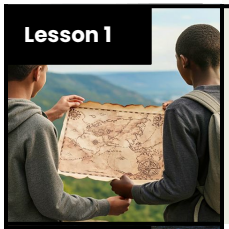
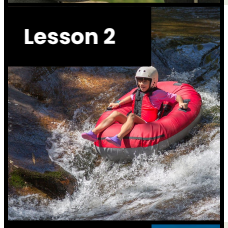
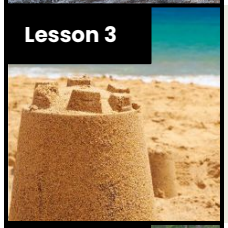
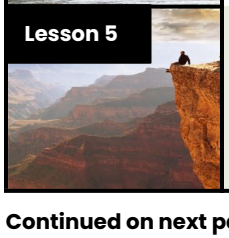
Animal Biodiversity & Habitats (Animal Adventures)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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 2-LS4-1** Use texts, media, or local environments to observe and compare (a) different kinds of living things in an area, and (b) differences in the kinds of living things living in different types of areas.
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.	**2-LS4-1** Use texts, media, or local environments to observe and compare (a) different kinds of living things in an area, and (b) differences in the kinds of living things living in different types of areas. **2-LS2-3(MA)** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.
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.	**2-LS4-1** Use texts, media, or local environments to observe and compare (a) different kinds of living things in an area, and (b) differences in the kinds of living things living in different types of areas.
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.	**2-LS2-3(MA)** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live. **2.K-2.ETS1-3** Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.

Plant Growth & Interactions (Plant Adventures)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**2-LS2-3(MA)** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.
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.	**2-LS2-3(MA)** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.
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.	**2-LS2-3(MA)** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.
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.	**2-LS2-3(MA)** Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

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

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 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.	**2-ESS2-2** Map the shapes and types of landforms and bodies of water in an area.
 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.	**2-ESS2-2** Map the shapes and types of landforms and bodies of water in an area. **2-ESS2-3** Use examples obtained from informational sources to explain that water is found in the ocean, rivers and streams, lakes and ponds, and may be solid or liquid.
 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.	**2-ESS2-2** Map the shapes and types of landforms and bodies of water in an area. **2-ESS2-4(MA)** Observe how blowing and flowing water can move Earth materials from one place to another and change the shape of a landform.
 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.	**2-ESS2-2** Map the shapes and types of landforms and bodies of water in an area.
 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.	**2-ESS2-4(MA)** Observe how blowing and flowing water can move Earth materials from one place to another and change the shape of a landform.

Continued on next page

✨ New Lesson

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

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
Lesson 6 	**Erosion & Engineering** How can you stop a landslide?	Students compare multiple solutions for preventing erosion.	**2-ESS2-1** Investigate and compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land. **2.K-2.ETS1-3** Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.

✔ **Material Properties** (Material Magic)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**2-PS1-1** Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency.
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.	**2-PS1-2** Test different materials and analyze the data obtained to determine which materials have the properties that are best suited for an intended purpose.
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.	**2-PS1-3** Analyze a variety of evidence to conclude that when a chunk of material is cut or broken into pieces, each piece is still the same material and, however small each piece is, has weight. Show that the material properties of a small set of pieces do not change when the pieces are used to build larger objects.
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.	**2-PS1-1** Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency. **2-PS1-2** Test different materials and analyze the data obtained to determine 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	Massachusetts Science Standards
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.	**2-ESS2-3** Use examples obtained from informational sources to explain that water is found in the ocean, rivers and streams, lakes and ponds, and may be solid or liquid.
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.	**2-PS1-4** Construct an argument with evidence that some changes to materials caused by heating or cooling can be reversed and some cannot.
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.	**2-PS1-4** Construct an argument with evidence that some changes to materials caused by heating or cooling can be reversed and some cannot. **2-PS1-2** Test different materials and analyze the data obtained to determine which materials have the properties that are best suited for an intended purpose.

✨ New Unit or Lesson

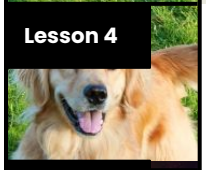
Fossils & Changing Environments (Animals Through Time)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
	**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.	**3-LS4-1** Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.
	**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.	**3-LS4-1** Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.
	**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.	**3-LS4-1** Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.

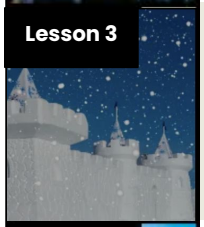
Life Cycles (Circle of Life)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 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.	**3-LS1-1** Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen.
 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.	**3-LS4-4** Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce. **3-LS4-5(MA)** Provide evidence to support a claim that the survival of a population is dependent upon reproduction. **3.3-5-ETS1-1 & 3.3-5-ETS1-4(MA)**
 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.	**3-LS1-1** Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen.
 Lesson 4	**Fruit, Seeds, & Plant Reproduction** Why do plants give us fruit?	Students explore the function of fruits in plants and practice classification.	**3-LS1-1** Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen.
 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.	**3-LS1-1** Use simple graphical representations to show that different types of organisms have unique and diverse life cycles. Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen. **3-LS4-5(MA)** Provide evidence to support a claim that the survival of a population is dependent upon reproduction.

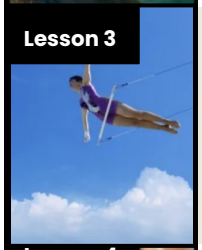
Heredity, Survival, & Selection (Fates of Traits)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**3-LS3-1** Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist 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.	**3-LS4-2** Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.
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.	**3-LS3-1** Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms. **3-LS4-2** Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction. **3-LS4-3** Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.
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.	**3-LS4-2** Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.
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.	**3-LS3-2** Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.

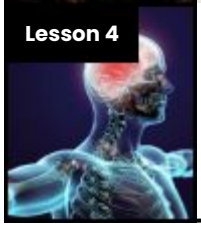
Weather & Climate (Stormy Skies)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 Lesson 1	**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.	**Foundational for 3-ESS2-1** Use graphs and tables of local weather data to describe and predict typical weather during a particular season in an area.
 Lesson 2	**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.	**3-ESS2-1** Use graphs and tables of local weather data to describe and predict typical weather during a particular season in an area.
 Lesson 3	**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.	**3-ESS2-1** Use graphs and tables of local weather data to describe and predict typical weather during a particular season in an area.
 Lesson 4	**Climate & Global Weather Patterns** Why are some places always hot?	Students obtain and combine information to describe the different climate regions of the world.	**3-ESS2-2** Obtain and summarize information about the climate of different regions of the world to illustrate that typical weather conditions over a year vary by region.
 Lesson 5	**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.	**3-ESS3-1** Evaluate the merit of design solutions that reduces the damage caused by weather. **3.3-5-ETS1-2** **3.3-5-ETS1-4(MA)**

Forces, Motion, & Magnets (Invisible Forces)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 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.	**3-PS2-1** Provide evidence to explain the effect of multiple forces, including friction, on an object. Include balanced forces that do not change the motion of the object and unbalanced forces that do change the motion of the 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.	**3-PS2-1** Provide evidence to explain the effect of multiple forces, including friction, on an object. Include balanced forces that do not change the motion of the object and unbalanced forces that do change the motion of the object. **3.3-5-ETS1-1** **3.3-5-ETS1-2**
 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.	**3-PS2-1** Provide evidence to explain the effect of multiple forces, including friction, on an object. Include balanced forces that do not change the motion of the object and unbalanced forces that do change the motion of the object.
 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.	**3-PS2-3** Conduct an investigation to determine the nature of the forces between two magnets based on their orientations and distance relative to 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.	**3-PS2-4** Define a simple design problem that can be solved by using interactions between magnets. **3.3-5-ETS1-2** **3.3-5-ETS1-4(MA)**

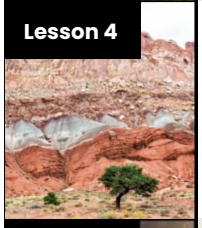
Human Body, Vision, & The Brain (Human Machine)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**4-LS1-1** Construct an argument that animals and plants have internal and external structures that support their 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.	**4-PS4-2.** Develop a model to describe that light must reflect off an object and enter the eye for the object 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.	**4-PS4-2.** Develop a model to describe that light must reflect off an object and enter the eye for the object 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.	**4-LS1-1** Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.

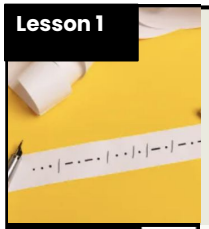
Animal & Plant Adaptations (Animal & Plant Adaptations)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**4-LS1-1** Construct an argument that animals and plants have internal and external structures that support their 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.	**4-LS1-1** Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.
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.	**4-LS1-1** Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.

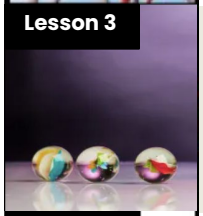
Earth's Features & Processes (The Birth of Rocks)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 **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."	**4-ESS2-2** Analyze and interpret maps of Earth's mountain ranges, deep ocean trenches, volcanoes, and earthquake epicenters to describe patterns of these features and their locations relative to boundaries between continents and oceans.
 **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.	**4-ESS1-1** Use evidence from a given landscape that includes simple landforms and rock layers to support a claim about the role of erosion or deposition in the formation of the landscape over long periods of 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.	**4-ESS2-1** Make observations and collect data to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and moved around through erosion.
 **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.	**4-ESS1-1** Use evidence from a given landscape that includes simple landforms and rock layers to support a claim about the role of erosion or deposition in the formation of the landscape over long periods of 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.	**4-ESS2-1** Make observations and collect data to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and moved around through erosion. **4-ESS3-2.** Evaluate different solutions to reduce the impacts of a natural event such as an earthquake, blizzard, or flood on humans.

Sound, Waves, & Communication (Waves of Sound)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**4-PS4-3** Develop and compare multiple ways to transfer information through encoding, sending, receiving, and decoding a pattern.
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.	**4-PS4-1** Develop a model of a simple mechanical wave (including sound) to communicate that waves (a) are regular patterns of motion along which energy travels and (b) can cause objects to move. **4.3-5-ETS1-3.** Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype.
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.	**4-PS4-1** Develop a model of a simple mechanical wave (including sound) to communicate that waves (a) are regular patterns of motion along which energy travels and (b) can cause objects to move.
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.	**4-PS4-1** Develop a model of a simple mechanical wave (including sound) to communicate that waves (a) are regular patterns of motion along which energy travels and (b) can cause objects to move.

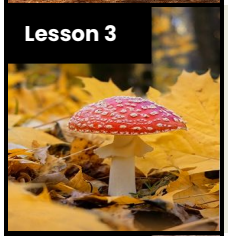
Energy & Energy Transfer (Energizing Everything)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**4-PS3-1** Use evidence to construct an explanation 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.	**4-PS3-1** Use evidence to construct an explanation relating the speed of an object to the energy of that object. **4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
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.	**4-PS3-3** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
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.	**4-PS3-4** Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound. **4.3-5-ETS1-3.** **4.3-5-ETS1-5(MA)**
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.	**4-PS3-4** Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound. **4.3-5-ETS1-3.** **4.3-5-ETS1-5(MA)**

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

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**4-ESS3-1** Obtain information to describe that energy and fuels humans use are derived from natural resources and that some energy and fuel sources are renewable and some are not.
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.	**4-PS3-2** Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents. **4.3-5-ETS1-5(MA)** Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem.
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.	**4-PS3-2** Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents. **4-PS3-4** Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound.

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

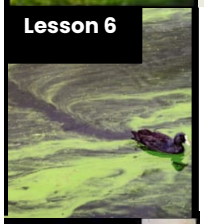
	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
Lesson 1 	✨New!✨ **Food Chains & Matter Flow** What if all the ants disappeared?	Students construct models of food chains by linking cards discovering that different interrelationships exist between organisms.	**5-LS2-1** Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria break down dead organisms and recycle some materials back to the air and soil.
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.	**5-LS1-1** Ask testable questions about the process by which plants use air, water, and energy from sunlight to produce sugars and plant materials needed for growth and reproduction.
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.	**5-LS2-1** Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria break down dead organisms and recycle some materials back to the air and soil.
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.	**5-LS2-1** Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria break down dead organisms and recycle some materials back to the air and soil.

Continued on next page

✨ New Lesson

Massachusetts Specific Standard: **5-LS2-2(MA).** Compare at least two designs for a composter to determine which is most likely to encourage decomposition of materials..

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

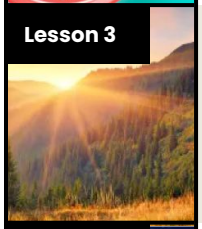
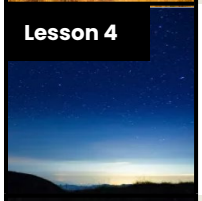
	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 **Lesson 5**	**Ecosystems & Matter Cycle** Why do you have to clean a fish tank but not a pond?	Students develop a model of a pond ecosystem and realize that interrelationships exist between decomposers, plants, and animals. Students discover that each organism must be in balance for the pond ecosystem to function.	**5-LS2-1** Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria break down dead organisms and recycle some materials back to the air and soil.
 **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.	**5-ESS3-1** Obtain and combine information about ways communities reduce human impact on the Earth's resources and environment by changing the agricultural, industrial, or community practice or process.
 **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.	**5-PS3-1** Use a model to describe that the food animals digest (a) contains energy that was once energy from the Sun, and (b) provides energy and nutrients for life processes, including body repair, growth, motion, body warmth, and reproduction.

Water Cycle & Earth's Systems (Watery Planet)

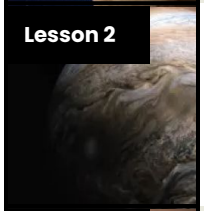
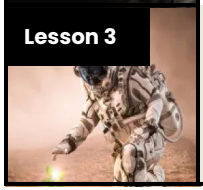
	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 Lesson 1	**Hydrosphere & Water Distribution** How much water is in the world?	Students analyze and interpret data from world maps to determine the relative amounts of fresh, salt, and frozen water. Students figure out that while the Earth has a lot of water, most of Earth's water is not fresh or accessible.	**5-ESS2-2** Describe and graph the relative amounts of salt water in the ocean; fresh water in lakes, rivers, and groundwater; and fresh water frozen in glaciers and polar ice caps to provide evidence about the availability of fresh water in Earth's biosphere.
 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.	**5-PS1-2** Measure and graph the weights (masses) of substances before and after a reaction or phase change to provide evidence that regardless of the type of change that occurs when heating, cooling, or combining substances, the total weight (mass) 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.	**5-ESS2-1** Use a model to describe the cycling of water through a watershed through evaporation, precipitation, absorption, surface runoff, and condensation.
 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.	**5-ESS2-1** Use a model to describe the cycling of water through a watershed through evaporation, precipitation, absorption, surface runoff, and condensation.
 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.	**5-ESS3-1** Obtain and combine information about ways communities reduce human impact on the Earth's resources and environment by changing the agricultural, industrial, or community practice or process. **5.3-5-ETS3-1(MA)**

Massachusetts Specific Standard: **5-ESS3-2(MA).** Test a simple system designed to filter particulates out of water and propose one change to the design to improve it.

Earth & Space Patterns (Spaceship Earth)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
 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.	**5-ESS1-2** Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.
 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.	**5-ESS1-2** Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.
 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.	**5-ESS1-2** Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.
 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.	**5-ESS1-2** Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.
 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.	**5-ESS1-2** Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.

Stars & Planets (Stars & Planets)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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.	**5-ESS1-1** Use observations, first-hand and from various media, to argue that the Sun is a star that appears brighter than other stars because it is closer to 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.	**5-PS2-1** Support an argument with evidence that the gravitational force exerted by Earth on objects is directed toward Earth's center.
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.	**5-ESS1-1** Use observations, first-hand and from various media, to argue that the Sun is a star that appears brighter than other stars because it is closer to Earth.

Massachusetts Specific Standard: **5.3-5-ETS3-2(MA).** Use sketches or drawings to show how each part of a product or device relates to other parts in the product or device.

Chemical Reactions & Properties of Matter (Chemical Magic)

	Topic & Guiding Question	Student Objectives	Massachusetts Science Standards
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 5-PS1-2** Measure and graph the weights (masses) of substances before and after a reaction or phase change to provide evidence that regardless of the type of change that occurs when heating, cooling, or combining substances, the total weight (mass) 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.	**Foundational for 5-PS1-2** Measure and graph the weights (masses) of substances before and after a reaction or phase change to provide evidence that regardless of the type of change that occurs when heating, cooling, or combining substances, the total weight (mass) 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.	**5-PS1-3** Make observations and measurements of substances to describe characteristic properties of each, including color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility.
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.	**5-PS1-4** Conduct an experiment to determine whether the mixing of two or more substances results in new substances with new properties (a chemical reaction) or not (a mixture).
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.	**5-PS1-1** Use a particle model of matter to explain common phenomena involving gases, and phase changes between gas and liquid and between liquid and solid.