Museum of Science

TRAVELING PROGRAMS FOR SCHOOLS

SEPTEMBER 2018 – JUNE 2019

NEW THIS YEAR

NO TRAVEL FEES!

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RESERVATIONS

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PROGRAMS AT A GLANCE

PROGRAM TITLES (LOWER ELEMENTARY / UPPER ELEMENTARY / MIDDLE SCHOOL)	SESSIONS PER DAY	SESSION CAPACITY	SESSION LENGTH	PRICE	
				ONE SESSION	ADDITIONAL SAME-DAY SESSION
Dig into Dinosaurs INT	1 – 4	1 Class	50 min.	$450	$100
Engineering: Bridges Workshop INT	1 – 4	1 Class	50 min.	$450	$100
Animal Habitats PRES	1 – 3	2 Classes	50 min.	$450	$100
Life Cycles PRES	1 – 3	2 Classes	50 min.	$450	$100
Magnets, Forces, and Fields PRES	1 – 3	4 Classes	45 min.	$475	$275
Starlab: Lower Elementary IMM	1 – 8	1 Class	50 min.	$450	$75
States of Matter PRES	1 – 2	8 Classes	60 min.	$575	$375
Animal Adaptations PRES	1 – 3	2 Classes	50 min.	$450	$100
Electromagnetism PRES	1 – 2	8 Classes	60 min.	$575	$375
Geology: Rock Detectives INT	1 – 4	1 Class	60 min.	$450	$100
Motion, Forces, and Energy: Upper Elementary PRES	1 – 2	8 Classes	60 min.	$575	$375
Now Hear This: The Sound of Science PRES	1 – 2	8 Classes	60 min.	$575	$375
Starlab: Upper Elementary IMM	1 – 8	1 Class	50 min.	$450	$75
Weather: Wind, Water, and Temperature PRES	1 – 2	8 Classes	60 min.	$575	$375
Engineering: Wind Energy Workshop INT	1 – 8	1 Class	60 min.	$450	$100
Dynamic Earth: Heat Flow PRES	1 – 2	8 Classes	60 min.	$575	$375
Motion, Forces, and Energy: Middle School PRES	1 – 2	8 Classes	60 min.	$575	$375
Starlab: Middle School IMM	1 – 8	1 Class	50 min.	$450	$75

TYPE OF PROGRAM:

IMM Immersive Program
Transforms the immediate environment using large-scale materials and models.

INT Interactive Program
A workshop involving hands-on activities.

PRES Presentation
Includes demonstrations of unique devices or live animals. Ideally suited to large groups (50+ participants).

AVAILABLE PROGRAMS

Dig into Dinosaurs

Optimal for grades Pre-K, K, and 1

This workshop gives students a chance to think like paleontologists and explore the world of dinosaurs hands-on. Students investigate real fossils, practice moving like a dinosaur over model tracks, and excavate a replica field site.

Length: 50 minutes. **Capacity:** 1 class (maximum of 24 students) per session; 1 to 4 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 12.

Engineering: Bridges Workshop

Optimal for grades Pre-K, K, 1, and 2

In this workshop, a read-aloud storybook guides the way as children discover the engineering skills it takes to build a bridge. Through hands-on activities, they develop their own bridge models and analyze the strengths and weaknesses of different testable designs. As the program progresses, children work independently, in small groups, and then as a whole group to build a full-size bridge in the room.

Length: 50 minutes. **Capacity:** 1 class (maximum of 24 students) per session; 1 to 4 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 12.

Animal Habitats

Optimal for grades Pre-K , K, and 2 | ***40-minute introductory version available for multi-grade groups (Pre-K – 2)***

In this presentation, students use inference to determine the ideal place for an animal to live. We bring up to three live animals for students to observe, and students look for clues that determine their ideal shelter and food. Based on the information collected, students are challenged to pick a suitable habitat for each animal. Students also have the opportunity to touch assorted skins, bones, and feathers so they can feel some of the characteristics that help these animals survive.

Length: 50 minutes. **Capacity:** 2 classes (maximum of 50 students) per session; 1 to 3 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session. **Booking restrictions apply:** See page 20.

To see how this program is aligned with Next Generation Science Standards, see page 12.

> "Students absolutely loved having animals come visit the school. They were engaged with observing and discussing the characteristics of the animals and the habitats in which they live!"
>
> *—Kelsey Bower, Grade 1 Teacher, Willett Elementary School*

Life Cycles

Optimal for grades K and 1

In this presentation, students learn how living things grow, change, and reproduce. We bring three different living things that showcase a variety of life cycles found in the living world. Through the use of observations and media resources, students compare life cycles involving egg development, live birth, metamorphosis, and plant development in different species. Students demonstrate the process of metamorphosis using a transforming costume and have the opportunity to explore life cycles further by engaging with touchable materials and activities at exploration tables.

Length: 50 minutes. **Capacity:** 2 classes (maximum of 50 students) per session; 1 to 3 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session. **Booking restrictions apply:** See page 20.

To see how this program is aligned with Next Generation Science Standards, see page 13.

Magnets, Forces, and Fields

Optimal for grades K, 1, and 2

This presentation uses exciting demonstrations to help younger students explore the properties of electricity and magnetism and learn how the two are related fields of invisible force. Volunteers hold magnets so powerful that their like poles cannot be pushed together and they test a variety of metals for magnetism, resulting in some unexpected surprises!

Length: 45 minutes. **Capacity:** 4 classes (maximum of 100 students) per session; 1 to 3 sessions per day.
Fees: $475 for 1 session; $275 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 14.

AVAILABLE
PROGRAMS

Starlab: Lower Elementary

Optimal for grade 1 | ***40-minute introductory version available for multi-grade groups (K – 2)***

In this immersive program, students are challenged to make observations and think like scientists both inside and outside our portable planetarium. They explore how stars are different from one another and learn to recognize star patterns in the sky from cultures around the world. In an immersive activity, students use binoculars to better understand how we learn about the cosmos.

Length: 50 minutes. **Capacity:** 1 class (maximum of 25 students) per session; 1 to 8 sessions per day.
Fees: $450 for 1 session; $75 per additional same-day session. **Space restrictions apply:** See page 21.

To see how this program is aligned with Next Generation Science Standards, see page 14.

States of Matter

Optimal for grades 2 and 5

Observe how solids, liquids, and gases change phases and properties when subjected to changes in energy, and learn what defines the states of matter. Our demonstrations involve extremely cold liquid nitrogen. Students will see balloons shrink, metal melt before their eyes, and a piece of paper set on fire using only water!

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 14.

Animal Adaptations

Optimal for grades 3 and 4

What are adaptations, and where do they come from? Students learn about natural selection and observe the adaptations of three live animals, as well as discuss the driving environmental forces behind those traits. After observing the live animals, students participate in a hands-on activity: they will use models to investigate the structures of animal skulls and draw conclusions about how the animals may have lived.

Length: 50 minutes. **Capacity:** 2 classes (maximum of 50 students) per session; 1 to 3 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session. **Booking restrictions apply:** See page 20.

To see how this program is aligned with Next Generation Science Standards, see page 14.

> "The students were engaged the entire time. There was a lot of great activities that kept the students on their toes and wanting to learn the science behind it."
>
> *—Amanda Belair, Grade 5 Teacher, Drewicz Elementary School*

Electromagnetism

Optimal for grade 4 | ***45-minute introductory version available for multi-grade groups (3 – 5)***

During this presentation featuring high-tech Museum equipment, students learn about forces, energy transfer, and electric and magnetic fields. See students' hair stand on end; see examples of electrical energy changing into light, heat, and sound; and transfer enough kinetic energy to a ring to launch it across the room!

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 15.

Geology: Rock Detectives

Optimal for grades 4 and 5

In this hands-on workshop, students explore different types of rocks and how they form over geologic time. Working as a team, they identify various rocks and minerals through observations and experiments. For a finale, they figure out how a particular rock formation has changed over millions of years.

Length: 60 minutes. **Capacity:** 1 class (maximum of 24 students) per session; 1 to 4 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 15.

Motion, Forces, and Energy: Upper Elementary

Optimal for grades 3 and 4

This presentation includes demonstrations and experiments to explore how motion is a form of energy and how we can use forces to change an object's motion. We'll use the energy stored in a bungee cord to launch a student-ridden cart across the room, and use student energy and force to lift a teacher using a giant lever.

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 15.

AVAILABLE **PROGRAMS**

Now Hear This: The Sound of Science

Optimal for grades 4 and 6

In this presentation, students learn about vibrations and how changes in their frequency and amplitude result in different kinds of sound. They'll hear a sonic boom (location dependent), test whether sound can travel through a vacuum, and see a wine glass shatter solely due to sound.

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 16.

Starlab: Upper Elementary

Optimal for grade 5 | ***40-minute introductory version available for multi-grade groups (3 – 5)***

In this immersive program, students explore the model sky and search for constellations and planets visible on a given night. They also observe the Moon in its current phase and discuss why we see the phases of the Moon over the course of a month. They later watch how the sky changes due to the effects of Earth's rotation and orbit.

Length: 50 minutes. **Capacity:** 1 class (maximum of 24 students) per session; 1 to 8 sessions per day.
Fees: $450 for 1 session; $75 per additional same-day session. **Space restrictions apply:** See page 21.

To see how this program is aligned with Next Generation Science Standards, see page 16.

Weather: Wind, Water, and Temperature

Optimal for grades 3, 4, and 5

This presentation demonstrates how atmospheric phenomena interact with each other to create the weather we experience every day. Students watch a hot air balloon launch toward the ceiling, pressurize a tank to create enough wind to power a cannon, and see a cloud form before their eyes.

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 17.

Engineering: Wind Energy Workshop

Optimal for grades 3, 4, 5, and 6

In this workshop, students follow the engineering design process as they test how changing the characteristics of a wind turbine's blade affects its efficiency. After exploring which variables have the greatest impact on energy production, the students design, build, and test their own blades with an emphasis on improving their turbine. The program also incorporates science process skills and math framework connections, such as graphing and reporting results.

Length: 60 minutes. **Capacity:** 1 class (maximum of 24 students) per session; 1 to 8 sessions per day.
Fees: $450 for 1 session; $100 per additional same-day session. **Space restrictions apply:** See page 21.

To see how this program is aligned with Next Generation Science Standards, see page 17.

Dynamic Earth: Heat Flow

Optimal for grades 7 and 8

This program illustrates core ideas about heat energy. Through live demonstrations, students learn the differences between the three main mechanisms of heat transfer: conduction, convection, and radiation. Students explore the definitions of heat and temperature, melt a penny, find out that light can incinerate a piece of paper, and make a component of rocket fuel.

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 18.

> "The Wind Energy Workshop **was very well planned and organized.** The program was very engaging to the students and meaningful."
>
> *—Alesia Salinas, Grade 3 Teacher, A.C. Whelan Elementary School*

Motion, Forces, and Energy: Middle School

Optimal for grade 7

This program explores the role of forces and energy and how they affect the motion of everything around us. Students watch a pencil accelerate to almost 200 mph in a fraction of a second, hear the effects of gravity with the help of crashing metal plates, and become a medieval engineer as they suggest ways to improve the design of our medieval catapult.

Length: 60 minutes. **Capacity:** 8 classes (maximum of 200 students) per session; 1 to 2 sessions per day.
Fees: $575 for 1 session; $375 per additional same-day session.

To see how this program is aligned with Next Generation Science Standards, see page 18.

Starlab: Middle School

Optimal for grade 6 | ***40-minute introductory version available for multi-grade groups (6 – 8)***

In this presentation, discover how the relationships between the Earth, Moon, and Sun cause the phases of the Moon as well as solar and lunar eclipses. Observe our nighttime sky to find constellations and planets visible on a given night. Learn where to look for the Milky Way in the model sky, find out why it looks the way it does, and explore other galaxies outside our own.

Length: 50 minutes. **Capacity:** 1 class (maximum of 24 students) per session; 1 to 8 sessions per day.
Fees: $450 for 1 session; $75 per additional same-day session. **Space restrictions apply:** See page 21.

To see how this program is aligned with Next Generation Science Standards, see page 19.

Dig into Dinosaurs

- PreK-LS1-1. Compare, using descriptions and drawings, the external body parts of animals (including humans) and plants and explain functions of some of the observable body parts.
- PreK-LS1-3. Use their five senses in their exploration and play to gather information.
- PreK-PS1-2. Investigate natural and human-made objects to describe, compare, sort, and classify objects based on observable physical characteristics, uses, and whether something is manufactured or occurs in nature.
- K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants or other animals. Plants make their own food and need light to live and grow.
- Scientific Practices: A, B, D, F, G, H (see page 19 for more information)

Engineering: Bridges Workshop

- PreK-PS1-2. Investigate natural and human-made objects to describe, compare, sort, and classify objects based on observable physical characteristics, uses, and whether something is manufactured or occurs in nature.
- PreK-PS2-2. Through experience, develop awareness of factors that influence whether things stand or fall.
- 1.K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change that can be solved by developing or improving an object or tool.
- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- 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.
- Scientific Practices: A, B, D, F, G, H (see page 19 for more information)

Animal Habitats

- PreK-ESS2-1: Raise questions and engage in discussions about how different types of local environments (including water) provide homes for different kinds of living things.
- PreK-LS1-1: Compare, using descriptions and drawings, the external body parts of animals (including humans) and plants and explain functions of some of the observable body parts.
- PreK-LS1-2: Explain that most animals have five senses they use to gather information about the world around them.
- PreK-LS1-3: Use their five senses in their exploration and play to gather information.
- PreK-LS2-2. Using evidence from the local environment, explain how familiar plants and animals meet their needs where they live.

- PreK-LS2-3. Give examples from the local environment of how animals and plants are dependent on one another to meet their basic needs.
- K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.
- K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
- K-ESS3-3. Communicate solutions to reduce the amount of natural resources an individual uses.
- K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants or other animals. Plants make their own food and need light to live and grow.
- 2-LS2-3. 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-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.
- Scientific Practices: A, D, E, F, G (see page 19 for more information)

Life Cycles

- K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants or other animals. Plants make their own food and need light to live and grow.
- K-LS1-2. Recognize that all plants and animals grow and change over time.
- 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-LS1-2. Obtain information to compare ways in which the behavior of different animal parents and their offspring help the offspring to survive.
- 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.
- Scientific Practices: A, D, F, G, H (see page 19 for more information)

NEXT GENERATION SCIENCE STANDARDS

Magnets, Forces, and Fields

- K-PS2-1. Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- 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.
- Scientific Practices: A, B, D, E, F (see page 19 for more information)

Starlab: Lower Elementary

- 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.
- Scientific Practices: A, B, D, F (see page 19 for more information)

States of Matter

- 2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- 2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
- 5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.
- 5-PS1-3. Make observations and measurements to identify materials based on their properties.
- Scientific Practices: A, B, D, F (see page 19 for more information)

Animal Adaptations

- 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-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.
- 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.
- 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. Provide evidence to support a claim that the survival of a population is dependent upon reproduction.
- 4-LS1-1. Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.
- Scientific Practices: A, D, E, F, G, H (see page 19 for more information)

Electromagnetism

- 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.
- Scientific Practices: A, B, D, E, F, G (see page 19 for more information)

Geology: Rock Detectives

- 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.
- 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.
- Scientific Practices: A, B, D, E, F, G, H (see page 19 for more information)

Motion, Forces, and Energy: Upper Elementary

- 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-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- 3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.
- 3.3-5-ETS1-2. Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.
- 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.
- 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.
- Scientific Practices: A, B, C, D, E, F (see page 19 for more information)

Now Hear This: The Sound of Science

- 4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- 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.
- 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-PS4-3. Develop and compare multiple ways to transfer information through encoding, sending, receiving, and decoding a pattern.
- 6.MS-PS4-1. Use diagrams of a simple wave to explain that (a) a wave has a repeating pattern with a specific amplitude, frequency, and wavelength, and (b) the amplitude of a wave is related to the energy of the wave.
- 6.MS-PS4-2. Use diagrams and other models to show that both light rays and mechanical waves are reflected, absorbed, or transmitted through various materials.
- Scientific Practices: A, B, C, D, E, F (see page 19 for more information)

Starlab: Upper Elementary

- 5-ESS1-1. Use observations, first-hand and from various media, to argue that the Sun is a star that appears larger and brighter than other stars because it is closer to Earth.
- 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.
- Scientific Practices: A, B, D, F (see page 19 for more information)

NEXT GENERATION SCIENCE STANDARDS

Weather: Wind, Water, and Temperature

- 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.
- 4-PS3-2. Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.
- 5-ESS2-1. Use a model to describe the cycling of water through a watershed through evaporation, precipitation, absorption, surface runoff, and condensation.
- Scientific Practices: A, B, C, D, E, F (see page 19 for more information)

Engineering: Wind Energy Workshop

- 3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.
- 3.3-5-ETS1-2. Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.
- 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.
- 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. 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.
- 4.3-5-ETS1-5. Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem.
- 6.MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Include potential impacts on people and the natural environment that may limit possible solutions.
- Scientific Practices: A, B, C, D, E, F, G, H (see page 19 for more information)

Dynamic Earth: Heat Flow

- 7.MS-PS3-5. Present evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
- 7.MS-PS3-6. Use a model to explain how thermal energy is transferred out of hotter regions or objects and into colder ones by convection, conduction, and radiation.
- 8.MS-ESS2-1. Use a model to illustrate that energy from Earth's interior drives convection that cycles Earth's crust, leading to melting, crystallization, weathering, and deformation of large rock formations, including generation of ocean sea floor at ridges, submergence of ocean sea floor at trenches, mountain building, and active volcanic chains.
- 8.MS-PS1-4. Develop a model that describes and predicts changes in particle motion, relative spatial arrangement, temperature, and state of a pure substance when thermal energy is added or removed.
- Scientific Practices: A, B, D, F (see page 19 for more information)

Motion, Forces, and Energy: Middle School

- 7.MS-PS2-5. Use scientific evidence to argue that fields exist between objects with mass, between magnetic objects, and between electrically charged objects that exert force on each other even though the objects are not in contact.
- 7.MS-PS3-1. Construct and interpret data and graphs to describe the relationships among kinetic energy, mass, and speed of an object.
- 7.MS-PS3-2. Develop a model to describe the relationship between the relative positions of objects interacting at a distance and their relative potential energy in the system.
- 7.MS-PS3-5. Present evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
- 7.MS-PS3-7. Use informational text to describe the relationship between kinetic and potential energy and illustrate conversions from one form to another.
- 7.MS-ETS1-4. Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.
- Scientific Practices: A, B, C, D, E, F (see page 19 for more information)

NEXT GENERATION SCIENCE STANDARDS

Starlab: Middle School

- 6.MS-ESS1-1a. Develop and use a model of the Earth-Sun-Moon system to explain the causes of lunar phases and eclipses of the Sun and Moon.
- MS-ESS1-2. Explain the role of gravity in ocean tides, the orbital motions of planets, their moons, and asteroids in the solar system.
- MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.
- 6-MS-ESS1-5. Use graphical displays to illustrate that Earth and its solar system are one of many in the Milky Way galaxy, which is one of billions of galaxies in the universe.
- Scientific Practices: A, B, C, D, E, F (see below for more information)

NGSS Scientific and Engineering Practices

A. Asking questions and defining problems.
B. Planning and carrying out investigations.
C. Using mathematics and computational thinking.
D. Developing and using models.
E. Analyzing and interpreting data.
F. Constructing explanations and designing solutions.
G. Engaging in argument from evidence.
H. Obtaining, evaluating, and communicating information.

■ ***How far in advance should I book my program?***

We always sell out and encourage schools to book as early as possible. We begin taking school year reservations the preceding April and continue through the summer. The pace of reservations dramatically increases after Labor Day; last year, 80% of our school program slots were filled by the end of November.

■ ***Do you give discounts for schools with financial need?***

No, but thanks to generous support of our funders, we have a scholarship program where eligible schools can apply for full or partial coverage of our fees. Visit mos.org/traveling-programs/scholarships for more information.

■ ***Is it possible to have a presentation for our whole school?***

As part of our mission to prioritize quality curriculum enrichment, we do not currently offer "all-school" programming. A school could potentially serve a grade range of PreK – 8 with a combination of three to four of our programs. For example, a school might book *Engineering: Bridges Workshop* for grades PreK – 2; the introductory version of *Electromagnetism* for grades 3 – 5; and the introductory version of *Starlab* for grades 6 – 8. However, this would require at least three or four days of programming, depending on the size of the school. For schools seeking a one-hour presentation that can accommodate their entire PreK – 8 population, we are not able to meet your needs at this time.

■ ***Do any programs have distance restrictions?***

Live animals cannot travel during January and February or be away from the Museum for more than six hours. Schools wishing to book *Animal Adaptations*, *Animal Habitats*, or *Life Cycles* can book up to three consecutive sessions if they are up to 50 miles from the Museum; two consecutive sessions if they are up to 75 miles from the Museum; and one session if they are up to 100 miles from the Museum.

FREQUENTLY
ASKED QUESTIONS

■ ***Do any programs have space restrictions?***

All school programs are indoors-only. All have differing space needs based on their category and capacities. Please check the program preview for the space needs of a specific program, as well as a picture of the typical setups. None of our school programs can move from room to room.

Starlab portable planetarium programs can only be presented in accessible rooms (the equipment is too heavy to carry up or down stairs). The room must have at least 24 by 24 square feet of open area with 11 feet of clearance to the lowest ceiling fixtures. Typically, this limits the room options to gyms, and our visit will preclude any other regular activities. For reservations of five to eight sessions, we bring two such planetariums that will require two small rooms of this size, or a gym at least 80 feet long (plus the same width/height dimensions).

Similarly, booking five to eight sessions of *Engineering: Wind Energy Workshop* also requires enough space for two setups of equipment to operate simultaneously: either two small rooms or one large one. High ceilings aren't essential for this program.

■ ***I have a different kind of group, and the curriculum-based programs in this brochure are not a good fit. Do you have any other options?***

We have a separate catalog of programs that are shorter and much more generalized in content. These cannot be booked by schools, and in fact are only available from late June through August, but are ideal for library patrons, camp groups, youth groups, and summer preschool groups. Unfortunately we cannot take reservations for birthday parties. Please see our web page at mos.org/travelingprograms for a PDF of our library/camp flyer.

■ ***How early can you start?***

The earliest educators can reasonably depart the Museum is 7:00 a.m. for most programs and 7:15 a.m. for live animal programs. The earliest we can start teaching depends on how long it takes to drive, load in, and set up—factors that vary by program and location.

■ ***Why do you charge travel fees?***

Actually, we don't! We are testing a pilot program this year, thanks to the generosity of the Boston Athletic Association, where all travel fees for Traveling Programs held in New England are fully subsidized during the 2018-19 school year. The only travel-related cost sites are still responsible for are lodgings during overnight trips.

■ ***Will my site require an overnight visit?***

Any site located more than 150 miles from the Museum will require an overnight stay to make scheduling practical. Sites located 110 – 150 miles from the Museum may choose an overnight because of specific scheduling needs. On all overnight trips, the site is responsible for lodging fees, but not meals.

■ ***I just booked a program. Who can answer my questions?***

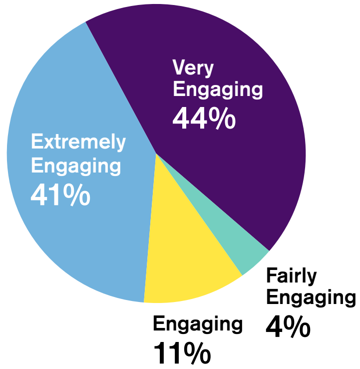
You will receive a confirmation packet via email that will answer many of your program-specific questions. You can also contact the registrar with any questions: 617-589-0354, **travelingprograms@mos.org**. Email is the most efficient way to communicate with us given how frequently we are in the field.

EVALUATION **RESULTS**

How engaging was the program?

96% of teachers surveyed said that the program was **engaging, very engaging,** or **extremely engaging.**

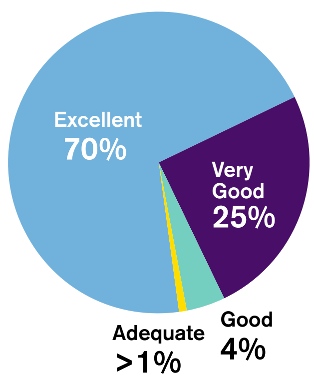
Teachers were given a choice of Not Engaging, Fairly Engaging, Engaging, Very Engaging, and Extremely Engaging.



How would you rate the educator?

95% of the teachers surveyed rated the educator's skills, knowledge, and level of professionalism highly favorably. They rated the educator's skills as **very good** or **excellent**.

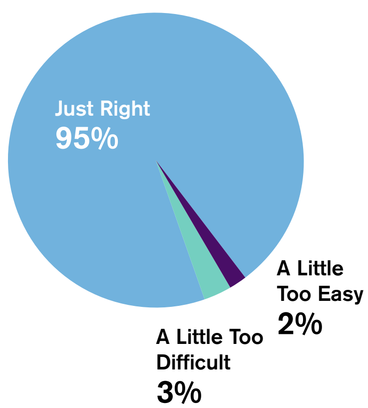
Choices given were Poor, Adequate, Good, Very Good, and Excellent.



How age-appropriate was the program?

95% of teachers surveyed said that the program was **age-appropriate** or **just right.**

Choices given were Much Too Easy, A Little Too Easy, Just Right, A Little Too Difficult, and Much Too Difficult.



Information above taken from 494 teacher evaluations received by Traveling Programs from September 1, 2017 – June 30, 2018

ONE REMARKABLE **DISCOVERY** AFTER ANOTHER

The Museum of Science is the place to encounter the fresh and unfamiliar, to ask questions, exchange views, and actively address the provocative issues raised by innovations in science and technology. Here, you become the scientist—testing theories, gathering data, and finding answers for yourself—all while making memories that will last a lifetime.

THIS YEAR THE **MILES ARE ON US!**

Travel Fees in 2018 – 2019 for New England schools are subsidized thanks to the Boston Athletic Association and the 2018 Museum of Science Boston Marathon® Team! See Page 21 for details.

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