



## Traveling Science Workshops

Highly skilled, dynamic educators inspire students with fun, hands-on STEM workshops delivered in the classroom. Workshops are convenient, affordable, and support the new Massachusetts Science and Technology/Engineering standards for preK-8. Students observe, raise questions, investigate, problem-solve, give evidence, and discuss their findings throughout these highly engrossing experiences. Teachers receive FREE follow-up topic guides with ideas for furthering exploration.

If you have questions or would like help selecting the best programs to support specific grade level standards, call Jill Foster, our Director of School Programs, at 978-264-4200 ext. 18, or email her at [jfoster@discoverymuseums.org](mailto:jfoster@discoverymuseums.org).

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### **NEW Workshops for 2016-2017**

*We are pleased to offer four new topics:*

**Sound for Preschool** (Grades PreK) – **NEW!**  
Sound, can you hear it? Is it loud? Is it soft? What makes sound? Preschool students will delight in exploring the world of sound as they make sound toys and learn how to control pitch and volume.  
*MA STE Standards: PreK-PS2-1(MA), PreK-PS4-1(MA)*

**Force and Motion** (Grades PreK-3) – **NEW!**  
What makes an object move? Can we control the movement? Does the strength of a push or pull have an effect? How about the direction of the push or pull? What

happens when objects move past each other or collide? Students explore concepts of force and motion while interacting with a variety of toys, rolling balls, and vehicles.  
*MA STE Standards: PreK-PS2-1(MA), K-PS2-1, 1.K-2-ETS1-2, 2-PS3-1(MA), 3-PS2-1, 3.3-5-ETS1-1, 3.3-5-ETS1-2*

**Weather and Climate** (Grade 3) – **NEW!**  
Using weather maps and historical data, groups of meteorologists work together to describe and predict typical weather for a given region at a particular time of the year. Sharing their findings, each group builds and appreciation for how weather conditions vary by region. Student teams

then apply their new knowledge as they engineer structures to withstand typical weather for a given region. *MA STE Standards: 3-ESS2-1, 3-ESS2-2, 3-ESS3-1, 3.3-5-ETS1-1, 3.3-5-ETS1-2, 3.3-5-ETS1-4(MA)*

**Force and Magnetism** (Grade 3) – **NEW!**  
Students review the basics of force and motion and explore ideas of balanced and unbalanced forces while working with and learning about magnetic force. Applying what they learn, students construct an original moving toy of their own design that uses the force of magnetism to operate. *MA STE Standards: 3-PS2-3, 3-PS2-4, 3.3-5-ETS1-1, 3.3-5-ETS1-2*



## **Workshops Available To Pilot, 2016-2017**

*The following workshops are in development and available for a select group of schools to pilot. Please contact Jill Foster at 978-264-4200 ext. 18 or [jfoster@discoverymuseums.org](mailto:jfoster@discoverymuseums.org) for more information.*

**Liquids and Solids** (Grades PreK-K)  
Students engage in a fun chilly exploration, make observations and ask questions as they investigate the role temperature plays in causing materials to change from solid to liquid or liquid to solid.

*MA STE Standards: PreK-PS1-1(MA), K-PS1-1 (MA), K-PS3-1, K-PS3-2*

**Light Waves** (Grades 1-4)  
Teams of students work together to design a solution to a light challenge that uses everyday materials. Properties of how light travels, reflects, is absorbed, can be redirected, and helps us to see objects are explored.

*MA STE Standards: 1-PS4-3, 1-PS4-4, 1.K-2-ETS1-1, 1.K-2-ETS1-2, 2.K-2-ETS1-3, 4-PS4-2, 4.3-5-ETS1-3, 4.3-5-ETS1-5(MA)*

**Shaping and Mapping the Land** (Grade 2)  
Students learn to map hills, valleys, and river banks, while creating topographical maps. Using a model, they experience firsthand the effects of wind on shaping the land and explore solutions to slow erosion.  
*MA STE Standards: 2-ESS2-1, 2-ESS2-2, 2-ESS2-3, 2-ESS2-4(MA), 2.K-2-ETS1-3*

**Sound Waves** (Grade 4)  
Students explore simple wave models while delving into the science of sound and how it travels. This is an adaptation of our original Sound workshop that specifically supports the new Grade 4 STE standards for Waves and their Applications in Technologies for Information Transfer.  
*MA STE Standards: 4-PS4-1, 4-PS4-3*

## **ALL 2016-2017 Workshops**

*In alphabetical order; does not include pilots*

### **Bubbles** (Grades PreK-2)

How long does a bubble really last? What color is a bubble? Can you predict when a bubble will pop? Students challenge what they think they know about bubbles as they make new observations, pose questions, investigate, and discuss their findings.

*Workshop length: 45 minutes*

*MA STE Standards: PreK-PS1-3(MA)*

### **Chemistry Lab** (Grades 3-6)

*(formerly Kitchen Chemistry)*

Colorful chemical reactions spark creative scientific exploration, building understanding as students explore safely with familiar, everyday chemicals. Students discover the difference between a physical and chemical reaction while they change and monitor the pH of various household liquids.

*Workshop length: 45 minutes*

*MA STE Standards: 5-PS1-3, 5-PS1-4*

### **Dinosaurs** (Grades PreK-2)

Acting as paleontologists, students practice simple tool identification and usage as they excavate from a mock dig site, unearthing fossils and sharing their finds. Comparing the bodies of different dinosaurs and between parent and offspring builds an

understanding of differences and similarities, heredity and variation. *Multiple sessions must be held in one room.*

*Workshop length: 45 minutes*

*MA STE Standards: PreK-LS1-1(MA), PreK-LS1-2 (MA), PreK-LS1-3(MA), PreK-LS3-1(MA), 1-LS1-1, 1-LS1-2, 1-LS3-1*

### **Earth Science** (Grades 3-6)

*(formerly Rocks and Minerals)*

Students learn how rock formation and erosion are involved in creating new landforms. By handling and comparing specimens, constructing special sedimentation chambers, and making crystal cards, students build evidence for how these systems work. *Requires direct access to running water.*

*Workshop length: 45 minutes*

*MA STE Standards: 4-ESS1-1, 4-ESS2-1, 5-PS1-3*

### **Electromagnetism** (Grades 3-6)

Students practice science and apply math skills as they discover the connection between magnetic and electrical energy. Students review basic magnetism and work in teams to build a simple electromagnet, test its strength, and graph the results.

*Workshop length: 45 minutes*

*MA STE Standards: 3-PS2-3*

### **Flight** (Grades 3-8)

What makes a flying object fly? Student engineers develop an understanding of the properties of flight and the multiple forces at play as they fold, blow, and throw flying contraptions of their own design.

*Workshop length: 45 minutes*

*MA STE Standards: 3-PS2-1, 3.3-5-ETS1-1, 3.3-5-ETS1-2*

### **Force and Magnetism** (Grade 3) – **NEW!**

Students review the basics of force and motion and explore ideas of balanced and unbalanced forces while working with and learning about magnetic force. Applying what they learn, students construct an original moving toy of their own design that uses the force of magnetism to operate.

*Workshop length: 60 minutes*

*MA STE Standards: 3-PS2-3, 3-PS2-4, 3.3-5-ETS1-1, 3.3-5-ETS1-2*

**Force and Motion** (Grades PreK-3) – **NEW!**

What makes an object move? Can we control the movement? Does the strength of a push or pull have an effect? How about the direction of the push or pull? What happens when objects move past each other or collide? Students explore concepts of force and motion while interacting with a variety of toys, balls, and vehicles.

*Multiple sessions must be held in one room.*

*Workshop length: 60 minutes*

*MA STE Standards: PreK-PS2-1(MA), K-PS2-1, 1.K-2-ETS1-2, 2-PS3-1(MA), 3-PS2-1, 3.3-5-ETS1-1, 3.3-5-ETS1-2*

**Keeping Cool: Green Engineering**

(Grades 3-8)

Teams of student scientists and engineers work together on a hands-on, group challenge in this fantastical adventure. They must think creatively to develop and test possible solutions to an insulation design problem, discovering how design and engineering choices relate to energy conservation. *Multiple sessions must be held in one room.*

*Workshop length: 60 minutes*

*MA STE Standards: 2-PS1-2, 3-ESS3-1, 3.3-5-ETS1-1, 3.3-5-ETS1-4(MA), 4-ESS3-1, 4.3-5-ETS1-3, 4.3-5-ETS1-5(MA), 5-ESS3-1*

**Light and Color** (Grades K-3)

Students discover properties of light and color using flashlights, prisms, and colored acetates. Spinning tops mix color before their eyes and conducting chromatography experiments with coffee filters and pens lets them observe the separation of color in ink. *Workshop length: 45 minutes*

*MA STE Standards: General Science and Engineering Practices supported*

**Light and Lasers** (Grades 1-8)

As students compare white light and laser light they identify key properties including how light must be reflected in order to be seen. Students work with flashlights, prisms, lenses, and a variety of materials that block, reflect, or allow light to pass through.

*Workshop length: 45 minutes*

*MA STE Standards: 1-PS4-3,4-PS3-2, 4-PS4-2*

**Magnets** (Grades K-3)

Students explore how distance, orientation, size and strength impact the behavior of magnets. They make and take home a magnetic field viewing chamber to visualize the force around a magnet, and receive special magnets to continue their exploration at home.

*Workshop length: 45 minutes*

*MA STE Standards: 3-PS2-3*

**Microscopes and Magnification**

(Grades 3-6)

Students learn about the history and technology behind the microscope as they create and use a simple water lens. The properties of light and optics are further revealed as lenses are doubled and tripled. Hand-held microscopes set the room abuzz as every child examines the surfaces of their classroom and shares in the discovery of a microscopic universe never before seen!

*Workshop length: 45 minutes*

*MA STE Standards: General Science and Engineering Practices supported*

**Physical Changes of Matter I** (Grades 2-5)

Investigating the physical properties of solids, liquids and gasses has never been so much fun! In this most popular workshop, dry ice and liquid nitrogen make learning the phase changes very dramatic as together we change liquid water to gas, shatter flowers and rubber bands, use a banana as a hammer, and even shrink solid metal in just a few seconds.

*Workshop length: 45 minutes*

*MA STE Standards: 2-PS1-4, 5-PS1-1*

**Physical Changes of Matter II** (Grades 5-8)

PCM II adds student exploration stations to the general introductory workshop, PCM I. Students will do several hands-on dry ice investigations. *Multiple workshops must be held in the same room with warm running water accessible. We also require the full participation of the classroom teacher and at least two parent or school volunteers during each workshop.*

*Workshop length: 60 minutes*

*MA STE Standards: 5-PS1-1*

**Simple Machines Technology** (Grades 3-6)

Teams of students work together on challenges that show how simple machines technology, specifically the lever, benefits humans. Children delight in helping one child lift the teacher without straining a muscle. Engineering their own team levers, they see and feel how a lever helps accomplish work using mechanical advantage. *Multiple workshops must be held in one room.*

*Workshop length: 60 minutes*

*MA STE Standards: General Science and Engineering Practices supported*

**Sound** (Grades K-5)

Plunging a vibrating tuning fork into a bowl of water creates quite a spray as students learn that sound is vibration. Students actively engage in exploring sound, creating unique sound makers with household materials.

*Workshop length: 45 minutes*

*MA STE Standards: 1-PS4-1, 1-PS4-4, 1.K-2-ETS1-1, 4-PS4-1*

**Sound for Preschool** (Grade PreK) – **NEW!**

Sound, can you hear it? Is it loud? Is it soft? What makes sound? Preschool students will delight in exploring the world of sound as they make sound toys and learn how to control pitch and volume.

*Workshop length: 45 minutes*

*MA STE Standards: PreK-PS2-1(MA), PreK-PS4-1(MA)*

**Static Electricity** (Grades 1-4)

Snap, crackle, pop are just a few of the sounds created in this hair-raising electrical experience. Students discover what a plastic slide, wool sweater, and clothes dryer have to do with static electricity while experimenting with a variety of household materials. They are introduced to one extraordinary static generating machine and safely feel the effects of moving electrons!

*Workshop length: 45 minutes*

*MA STE Standards: General Science and Engineering Practices supported*

**Weather** (Grades PreK-3)

Young meteorologists understand the important role weather plays in daily life as they engage in the practice of science and engineering by developing tools for forecasting and observing day-to-day changes and seasonal patterns over time.

*Multiple sessions must be held in one room.*

*Workshop length: 45 minutes PreK, 60 minutes K-3*

*MA STE Standards: PreK-ESS2-3 (MA), PreK-ESS2-4(MA), PreK-ESS2-5 (MA), PreK-ESS2-6 (MA), K-ESS2-1, K-ESS3-2, K-PS3-1, 1-ESS1-2*

**Weather and Climate** (Grade 3) – **NEW!**

Using weather maps and historical data, groups of meteorologists work together to describe and predict typical weather for a given region at a particular time of the year. Sharing their findings, each group builds an appreciation for how weather conditions vary by region. Student teams then apply their new knowledge as they engineer structures to withstand typical weather for a given region.

*Workshop length: 60 minutes*

*MA STE Standards: 3-ESS2-1, 3-ESS2-2, 3-ESS3-1, 3.3-5-ETS1-1, 3.3-5-ETS1-2, 3.3-5-ETS1-4(MA)*

### **Scheduling Requirements**

Workshops are 45 to 60 minutes long depending on the topic.

Up to five 45-minute workshops or four 60-minute workshops (or a combination) may be presented at one school in a single day.

Each workshop is for 25 or fewer students.

### **2016-2017 Pricing**

\$355 for one 45-minute workshop, \$90 for each additional workshop held on the same day (maximum of 5 workshops per day).

\$415 for one 60-minute workshop, \$100 for each additional workshop held on the same day (maximum of 4 workshops per day).

### **Fees**

All workshops include an extra fee for materials; most are \$30/workshop. The exceptions are as follows:

\$40/workshop – Earth Science

\$50/workshop – Magnets, Weather, Electromagnetism, Force and Magnetism

\$215/day of workshops – Physical Changes of Matter I & II

Mileage fees may also apply.

## **Interested in saving money? Check out our 2016-2017 Package Deals:**

**Package One:** Schedule two or more grades' Traveling Science Workshops to take place before December 31 and automatically save 20%!

**Package Two:** Schedule a Traveling Science Workshop and a pre- or post- Field Trip to the museums for the same grade, and receive a 20% discount on both the workshop program fees *and* the Field Trip admission.

**Package Three:** Schedule a Traveling Science Workshop for one grade at your school and a Field Trip to the museums for another grade from the same school, and both grades will receive a 20% discount on fees.

Please contact our Scheduling Manager, Kathie Watt, at 978-264-4200 ext. 22, or [kwatt@discoverymuseums.org](mailto:kwatt@discoverymuseums.org) with any questions or to schedule this year's school programs.



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